UCSC EXTENSION - SUMMER 2021
COURSE CATALOG

This catalog was generated on September 15, 2021 and the information contained in it is deemed accurate as of that date. We recommend referring to our website for the most up to date information.

CERTIFICATES

ACCOUNTING

Cost: $ 3,255
Required Credits: Total Required: 4 courses/16 units. End with certificate of completion review.
Duration: A full-time student can complete the certificate in 6–12 months.

Certificate Description

Note to Prospective Students

Dear Prospective Accounting Student,

We are excited that you are interested in pursuing a career in Accounting, which continues to be a critical and versatile career in today's economy. We are, however, making some changes to our curriculum. While you are invited to enroll in any open course and pick up practical skills for the field (some courses apply to the certificate in Business Administration) we are not accepting new certificate program candidates at this time. We will provide an update to the program shortly.

Questions? Please reach out to Tanya Doyle, program manager, at tdoyle@ucsc.edu.

Thank you!

— UCSC Silicon Valley Professional Education

Understand the bottom line of your organization

Help build its future. In our four-course accounting certificate program you learn to analyze transactions, prepare financials, and explore complex issues so you can collaborate with management and communicate financial needs of an organization. This is a great foundation for someone interested in pursuing a career as a Certified Public Accountant (CPA®) or Certified Management Accountant (CMA®). Start building your career network with working professionals in the area.

Accounting certificate program objectives

Analyze transactions

Prepare financial statements

Understand complex accounting issues—investments revenue recognition, leases, bonds, and pensions; and

Collaborate with management to analyze and plan organizational financial needs.

Courses

1. Required Course(s):

Intermediate Accounting I, 4.0 Units
Intermediate Accounting II, 4.0 Units
Introduction to Accounting I: Financial Accounting, 4.0 Units
Introduction to Accounting II: Managerial Accounting, 4.0 Units

2. Completion Review:

Accounting Certificate Completion Fee

Requisite Knowledge

Please review the course descriptions to ensure that you have taken necessary prerequisites or meet the requirements through job experience or previous education.

Recommend Course Sequence

Introduction to Accounting I: Financial Accounting

Introduction to Accounting II: Managerial Accounting

Intermediate Accounting I

Intermediate Accounting II

Substitutions

You may take one elective outside the certificate curriculum, if you receive prior approval from the Academic Services Department.

To receive your certificate

Upon completion of the course sequence you may request your Accounting Certificate Completion Review.

BIOINFORMATICS

Cost: $6,000
Required Credits: Total Required: 6–7 courses (18 units). Take 4 required courses (12 units) and 2–3 elective courses (6 units). End with certificate of completion review.
Duration: A full-time student can complete the certificate in 12 months.

Certificate Description

Build your computational and scientific foundation

Big data is everywhere and its presence across multiple industries will continue to stimulate job growth in pharma, biotech, and software industries. This certificate program is designed in consultation with industry leaders to meet the need for biologists and computer scientists to analyze and interpret today's deluge of biological information. Tailor your studies to your particular needs and interests while learning the tools and methods of bioinformatics. Life scientists delve into data tech and computer scientists gain a background in molecular biology.

Bioinformatics certificate program objectives

Use public domain bioinformatics tools, including Genbank and the Protein Data Bank (PDB).

Employ statistical design of experiment (SDOE) to analyze experimental data and factors affecting outputs.

Distinguish key molecular biology techniques—gene cloning, manipulation and sequencing; PCR; RNA interference; and gene expression analysis.

Complete a computational biology project using Java.

Recognize sequence analysis techniques such as Hidden Markov Models and RNA analysis.

Query and read DNA sequences from Fasta files.

A recent week-long webinar series

Accompanying lecture slides

Designed to give you a sense of what it takes to begin a bioinformatics career, you will hear from Silicon Valley bioinformaticians about the different tools and technologies used to make meaning from the vast trove of amassed health data. This specialized data serves as the foundation for cures and vaccines being discovered each day. The demand is enormous for trained professionals in the bioinformatics field. Help save lives!

Courses

1. Required Courses(s): Four Total & Equal to 12 Units

Bioinformatics Tools, Databases and Methods, 3.0 Units
Experimental Methods in Molecular Biology, 3.0 Units
Next-Gen Sequence Analysis Tools - A Hands-On Approach, 3.0 Units
Python for Data Analysis, 3.0 Units

2. Electives: Total of Six Units

Data Analysis, Introduction, 3.0 Units
Gene Expression and Pathways, 2.0 Units
Genomics and Next Generation DNA Sequencing: Methods and Applications, 3.0 Units
Principles of Drug Discovery and Development, 4.0 Units
Relational Database Design and SQL Programming, 3.0 Units
Statistical Analysis and Modeling for Bioinformatics and Biomedical Applications, 3.0 Units
Statistics, 5.0 Units

3. Completion Review:

Bioinformatics Certificate Completion Fee

Requisite Knowledge

Please review the course descriptions to ensure that you have taken necessary prerequisites or meet the requirements through job experience or previous education. Molecular biology knowledge Familiarity with the principles of modern molecular biology is required to begin the Bioinformatics certificate. You can satisfy this requirement with an introductory course in molecular biology (taken within the last five years) or by demonstrating equivalent work experience. Statistics knowledge To take Statistical Analysis and Modeling for Bioinformatics and Biomedical Applications, you need an understanding of both probability and statistics. You can satisfy this requirement with an introductory course in statistics or by demonstrating equivalent work experience. UCSC Extension offers Statistics . Programming knowledge Basic familiarity with the Python programming language is required to begin the Bioinformatics certificate. You can satisfy this requirement with an introductory course in Python (taken within the last five years) or by demonstrating equivalent work experience. UCSC Extension offers Python Programming for Beginners . Genomics and next Generation DNA sequencing knowledge Basic familiarity with genomics and next generation DNA sequencing is required for **Next-Gen Sequence Analysis Tools—a Hands-On Approach** . You can satisfy this requirement with a similar course or by demonstrating equivalent work experience. UCSC Extension offers **Genomics and Next Generation DNA Sequencing: Methods and Applications** .

Recommend Course Sequence

After completing the prerequisites, it is recommended that you start with **Next-Gen Sequence Analysis Tools—a Hands-On Approach** and **Experimental Methods in Molecular Biology .** Courses may then be taken in any sequence, unless otherwise specified in the individual course description.

Substitutions

You may take one elective outside the certificate curriculum, if you receive prior approval from the Academic Services Department.

To receive your certificate

Upon completion of the course sequence you may request your Bioinformatics Certificate Completion Review .

BIOTECHNOLOGY

Cost: $6,200
Required Credits: Total Required: 19 units. Take 3 core courses (10 units) and 9 units of electives—including at least 1 unit from each track. End with certificate of completion review.
Duration: A full-time student can complete the certificate in 9–12 months.

Certificate Description

Work on the front lines of biopharma

In the biopharmaceutical industry • In an academic environment

In this comprehensive biotechnology program, you will gain an understanding of the scientific disciplines and principles that professionals rely on for the discovery and development of new drugs. You will develop an appreciation of the latest technologies employed by the biopharmaceutical industry to bring new drugs to the market and acquire the tools you need to seek employment in the biopharmaceutical industry and in the academic research environment. Biotech professionals wanting to enhance their knowledge in specific bioscience fields will broaden their career horizons.

Biotechnology certificate program objectives

Gain an understanding of how the essential technologies of biochemistry, molecular and cell biology, and immunology (among other technologies) are used by the biopharmaceutical industry to discover and develop new drug entities.

Recognize the role that genetic mutations play in the development of human disease and the importance of understanding the pathogenesis of a disease in developing new drugs to treat disease.

Depending on a student's career interests, elective courses are offered in the biology of cancer and viral diseases (including COVID-19), stem cell biology, gene sequencing, gene therapy (including gene editing), Good Manufacturing Practices, molecular diagnostics, as well as the regulatory aspects associated with drug development (among other courses).

While much of the scientific instruction is oriented toward the biopharmaceutical industry, the technologies discussed in this program are equally applicable to research taking place in the academic environment or government and private research laboratories.

Courses

1. Prerequisite(s):

Experimental Methods in Molecular Biology, 3.0 Units

2. Required Course(s): Total of Ten Units

Biochemistry: An Introduction, 3.0 Units
Immunology, Principles, 3.0 Units
Principles of Drug Discovery and Development, 4.0 Units

3. Electives: Discovery Track 1 - Choose at Least One Class From This Track & Nine Units Total Across Both Tracks

Biology of Cancer, 2.0 Units
Cellular Biology, 3.0 Units
Gene Expression and Pathways, 2.0 Units
Gene Therapy: Hacking the Genome, 1.5 Units
Genomics and Next Generation DNA Sequencing: Methods and Applications, 3.0 Units
Human Physiology in Health and Disease, 3.0 Units
Stem Cell Biology, 1.5 Units
Viruses, Vaccines and Antiviral Therapy, 1.5 Units

4. Electives: Development Track 2 - Choose at Least One Class From This Track & Nine Units Total Across Both Tracks

Good Manufacturing Practices, 3.0 Units
Molecular Diagnostics, 1.5 Units
Regulation of Drugs & Biologics: Strategic Biopharmaceutical Product Development, 3.0 Units

5. Completion Review:

Biotechnology Certificate Completion Fee

6. Related Course(s): These courses are not part of the certificate program

Clinical Trials Essentials: An Intensive One-Week Course, 3.5 Units
Data Privacy and Security for Healthcare and Biosciences, 1.5 Units

Requisite Knowledge

Modern molecular biology Familiarity with the principles of modern molecular biology is required to begin the Biotechnology certificate. You can satisfy this requirement by completing an introductory course, such as Experimental Methods in Molecular Biology within the last five years or by demonstrating equivalent work experience. **Please review each course description** to ensure that you have taken necessary prerequisites or meet the requirements through job experience or previous education.

Recommend Course Sequence

Please follow this sequence. Begin with Principles of Drug Discovery and Development . After that, courses may be taken in any order provided the prerequisites are met. Certificate candidates also must take the other two core courses, Biochemistry: An Introduction and Immunology, Principles . Finally, students must select at least one course from each of the two elective course tracks: Discovery and Development.

Substitutions

You may take one elective outside the certificate curriculum, if you receive prior approval from the Academic Services Department.

TRANSFERRING CREDIT FROM OTHER INSTITUTIONS

You may substitute one equivalent course from another institution for a course in the certificate program with prior approval, if:

you've completed the course within the past five years at an accredited academic institution;

you received a final grade of C or better;

the content of the substituted course covers the same material as the UCSC Extension required

course; and

the course carries the equivalent credit or more.

To receive your certificate

Upon completion of the course sequence you may request your Biotechnology Certificate Completion Review .

Also of interest

Data Privacy and Security for Healthcare and Biosciences

Clinical Trials Essentials: An Intensive One-Week Course

BUSINESS ADMINISTRATION

Cost: $5,250–$6,500
Required Credits: Total Required: 7–10 courses/19 units. Take 5 required courses (13 units) and 2–5 electives (6 units). End with certificate of completion review.
Duration: A full-time student can complete the certificate in 6–12 months.

Certificate Description

Build the foundation of successful leadership

Our program builds on the huge body of science underlying the latest best practices for management. You will gain practical skills to handle the day-to-day aspects of running a business and study evidence-based methods to maximize company performance. Network with industry professionals who teach facilitation, negotiation, coaching, and how to help employees carry out a unified vision. Choose courses from four tracks:

Business Essentials

Financial Analysis/Accounting

Management Development

Marketing Business Development.

Business Administration certificate program objectives

Explain how the American legal process can impact business

Apply supply chain operation principles and techniques to cost effectively create products or services that can be competitively sold in the global marketplace

Apply marketing principles and techniques to sell innovative and competitive products or services

Employ the fundamentals of business finance to provide insights and guidance to the business in a dynamic and changing business environment

Courses

1. Required Course(s):

Business Law and Its Environment, 3.0 Units
Finance I, Fundamentals, 3.0 Units
Organizational Development and Change, 2.0 Units
Principles of Marketing, 2.0 Units
Supply Chain Operations Management, 3.0 Units

2. Electives: Business Essentials

Effective Negotiations: Principles, Strategies, and Techniques, 1.5 Units
Facilitation Skills, 2.0 Units
International Business and the Global Economy, 3.0 Units
Principles of Business Analysis, 3.0 Units
Smart Cities: Foundations, Principles and Applications, 2.0 Units

3. Electives: Financial Analysis/Accounting

Business Economics, 2.0 Units
Data Analytics for Business Management, 3.0 Units
Finance for the Business Professional, 1.0 Units
Introduction to Accounting I: Financial Accounting, 4.0 Units
Introduction to Accounting II: Managerial Accounting, 4.0 Units

4. Electives: Management Development

Advanced Management Communications, 2.0 Units
Applied Organizational Behavior and Coaching, 3.0 Units
Business Communications, 2.0 Units
Creating the Successful Team, 1.5 Units
Human Resource Management, 1.5 Units
Practical Emotional Intelligence for Agile and Project Leaders, 1.5 Units
Principle Based Leadership for Project Managers, 1.5 Units

5. Electives: Marketing Business Development

Power of Market Research, 2.0 Units
Product Marketing and Management, 2.0 Units
Strategic Marketing Operations, 2.0 Units

6. Completion Review:

Business Administration Certificate Completion Fee

Recommend Course Sequence

Flexible course sequence

Courses may be taken in any order provided the prerequisites are met.

Substitutions

You may take one elective outside the certificate curriculum, if you receive prior approval from the Academic Services Department.

Substitutions for undeclared students

If you have not yet declared your candidacy in the Business Administration certificate program, please follow the current curriculum requirements.

Substitutions for students who declared before Nov. 1, 2020

We have made some changes to the curriculum that affect students who declared their candidacy in the Business Administration certificate program between fall 2016 and Nov. 1, 2020. If you declared your candidacy during that period, please note that we're no longer offering two requisites— Microeconomics, Introduction and Management and Organization, Principles. You have new options.

For **Microeconomics, Introduction** (4 units)
Please substitute **Business Economics** (2 units). You do not need to make up the 2-unit difference for the Business Administration certificate. You do not need to make a formal request for this substitution or complete any paperwork.

For **Management and Organization, Principles** (2 units)

You can substitute **Applied Organizational Behavior and Coaching** (3 units). You do not need to make a formal request for this substitution or complete any paperwork.

If you declared candidacy for the Business Administration certificate program and completed any of these four courses prior to Nov. 1, 2020, please contact us at **extension@ucsc.edu** and we'll help you get the courses you need to complete your certificate.

To receive your certificate

Upon completion of the course sequence you may request your **Business Administration Certificate Completion Review .**

CLINICAL TRIALS DESIGN AND MANAGEMENT

Cost: $ 8,000
Required Credits: Total Required: 16 units (6–8 courses), including 11.5 core units (4 courses) and 4.5 electives (2–4 elective courses). End with certificate of completion review.
Duration: A full-time student can complete this certificate in 9–12 months.

Certificate Description

Learn the entire clinical trial process

Phase I to III clinical trials

As you study with leaders in the global biopharmaceutical and medical device industries, many of whom are discovering new treatments and health products every day, you'll gain a practical understanding of the scientific principles, current regulations, and ethical issues underlying clinical research.

You will gain an understanding of how to bring a new drug to market approval—from discovery of a potential drug molecule and evaluation in the laboratory and in clinical trials with human volunteers, to FDA oversight processes, including Good the principles of Good Clinical Practice.

The impact of drug patents on pharmaceutical pricing for new drugs

The underlying science that drives clinical trial design

Statistical considerations and the kind of information obtained from trials

FDA regulations that govern clinical trials

Bioethics related to the treatment of human subjects participating in clinical trials

Basic concepts related to drug safety

Clinical Trials Design and Management certificate learning outcomes

Demonstrate an understanding of the mechanics and key regulatory requirements of conducting a clinical trial to evaluate the safety and efficacy of an investigational drug in human volunteers.

Have an awareness and rudimentary understanding of the technologies that biopharmaceutical companies employ to discover and evaluate the pharmacological activities of potential new drug molecules.

Know the key players involved in drug discovery and development: Biopharmaceutical companies;

Contract research organizations; and

Clinical sites conducting Phase I through Phase III studies.

Understand the role of key oversight organizations U.S. Food and Drug Administration in the

context of Good Clinical Practice;

Relevant Title 21 Code of Federal Regulations; and

International Conference of Harmonization Guidelines in the conduct of clinical studies.

Assess how clinical trials are designed specific to different therapeutic areas.

Identify the role biostatistics plays in designing the clinical protocol and evaluating the resulting safety and efficacy data.

Courses

1. Required Course(s): Four Total & Equal to 11.5 Units

Clinical Statistics for Non-Statisticians, 2.0 Units
Good Clinical Practices, 3.0 Units
Principles of Drug Discovery and Development, 4.0 Units
Science of Clinical Trials Design, 2.5 Units

2. Electives: At Least 4.5 Units

Clinical Data Management, 2.0 Units
Clinical Project Management, 2.0 Units
Clinical Research: The Study Site Perspective, 1.5 Units
Data Privacy and Security for Healthcare and Biosciences, 1.5 Units
Document Preparation: Protocols, Reports, Summaries, 1.5 Units
Drug Safety and Adverse Events Reporting, 1.5 Units
Electronic Data Capture for Clinical Trials, 1.0 Units
Good Manufacturing Practices, 3.0 Units
Healthcare Equity: Improving Access, 1.5 Units
Medical Devices: Regulatory Strategies and Marketing Pathways, 1.5 Units
Medical Writing, 2.0 Units
Preparing for FDA Inspections and Conducting Sponsor Audits, 1.5 Units

3. Completion Review:

Clinical Trials Design and Management Certificate Completion Fee

4. Related Course(s): These Courses Are Not Part of The Certificate Program

Biology of Cancer, 2.0 Units
Clinical Trials Essentials: An Intensive One-Week Course, 3.5 Units
Viruses, Vaccines and Antiviral Therapy, 1.5 Units

Requisite Knowledge

Familiarity with medical terminology is required. You can satisfy this requirement by taking the Medical/Clinical Terminology , course, an equivalent course elsewhere, or relying on relevant work experience in the clinical environment. We strongly recommend that students without a medical background take Human Physiology in Health and Disease early in their studies.

Recommend Course Sequence

Please begin with **Principles of Drug Discovery and Development .** After that, courses may be taken in any order provided the prerequisites for those courses are satisfied.

Substitutions

You may take one elective outside the certificate curriculum, if you receive prior approval from the Academic Services Department.

To receive your certificate

Upon completion of the course sequence you may request your Clinical Trials Design and Management Certificate Completion Review .

COMPUTER PROGRAMMING

Cost: Up to $5,600.
Required Credits: Total Required: 5–7 courses (14 units). Take 1 required course and 1 core course (6 units) and 3–5 electives (8–8.5 units). End with certificate of completion review.
Duration: A full-time student can complete the certificate in 6–12 months.

Certificate Description

Know your code—the foundation of innovation

Understanding how to write and test code has become a foundational criteria for tech jobs across most industries. In the UCSC Silicon Valley Extension Computer Programming certificate program you learn front end and back end web development technologies, gaining a strong foundation in software development. You learn to apply coding skills across platforms—from computers and mobile devices, to web development and the cloud.

Computer Programming certificate program objectives

Demonstrate the ability to develop logically structured software solutions through the use of a high-level programming language

Design object-oriented systems

Implement optimal solutions for software systems using advanced concepts of algorithms and computer science theory

Our Computer Programming students

Entry-level programmers or people changing careers

Software developers who want to enhance their programming knowledge

Non-technical professionals who want programming training to expand their career options

Hobbyists who need to learn programming to build their own applications

Project managers who want to communicate more effectively with programmers and better manage software projects

Courses

1. Required Course(s):

Object-Oriented Analysis and Design, 3.0 Units

2. Core Course(s): (Choose 1)

C++ Programming, Comprehensive, 3.0 Units
Java Programming, Comprehensive, 3.0 Units
Python for Programmers, 3.0 Units

3. Electives: C Programming

C Programming, Advanced, 3.0 Units

C Programming for Beginners, 2.0 Units

4. Electives: C++ Programming

C++ Programming, Comprehensive, 3.0 Units
Data Structures and Algorithms Using C++, 3.0 Units

5. Electives: Java Programming

Data Structures and Algorithms Using Java, 3.0 Units
Java Programming, Comprehensive, 3.0 Units
Java Programming for Beginners, 2.0 Units
Java Threads, 3.0 Units
JUnit Test Framework, 1.5 Units

6. Electives: Scripting Languages

Data Structures and Algorithms Using Python, 3.0 Units
Python for Programmers, 3.0 Units
Python: Object-Oriented Programming, 2.0 Units
Python Programming for Beginners, 1.5 Units

7. Electives: Windows Programming

C# Programming, Comprehensive, 3.0 Units

8. Electives: Mobile Device Programming

Mobile Application Development - Android and iOS, Advanced, 3.0 Units
Mobile Application Development - Android and iOS, Introduction, 3.0 Units

9. Electives: Adv. Programming and Concepts

Computational Intelligence, Introduction, 1.5 Units
Data Engineering with Hadoop, 3.0 Units
Go Programming, Fundamentals, 3.0 Units
Introduction to Machine Learning, 3.0 Units
Mastering Data Structures and Algorithms: A Practical Approach, 3.0 Units

Completion Review:

Computer Programming Certificate Completion Fee

Requisite Knowledge

Please review the course descriptions to ensure that you have taken necessary prerequisites or meet the requirements through job experience or previous education.

Recommend Course Sequence

Get started

Courses are best taken in order of complexity—I, II, III; Beginners, Comprehensive, Advanced. Other courses may be taken in any order.

Shared credits

Some Engineering and Technology courses may be listed in more than one program. However,

only one course may be shared between two E&T certificate programs unless otherwise noted.

Substitutions

You may take one elective outside the certificate curriculum, if you receive prior approval from the Academic Services Department.

To receive your certificate

Upon completion of the course sequence you may request your Computer Programming Certificate Completion Review .

DATABASE AND DATA ANALYTICS

Cost: $5,500–$6,500
Required Credits: Complete 6 courses (16 units). Choose a track and complete 6 units of required courses and 10 units of electives. At least 3 electives must be from the selected track. End with certificate of completion review.
Duration: A full-time student can complete the certificate in 9–12 months.

Certificate Description

Learn the language of data

The industry of business intelligence and analytics has undergone major shifts in fundamental technologies. The UCSC Extension certificate program in Database and Data Analytics offers training for data scientists, analysts, administrators and managers who want to apply analytics to business decision making.

Choose between two data emphases of study

Database and Data Analytics certificate program objectives

Apply principles of data science in solving problems centered around Big Data

Obtain, manipulate, analyze, and visualize volumes of data that drive many fields, such as business and innovation, bioinformatics, weather forecasting, and healthcare

Identify and use appropriate data models in solving real-world problems

Our Database and Data Analytics students

Data analysts, data scientists, and data engineers who want to develop their Big Data and database management skills

Entry-level professionals or career changers.

Database management professionals who want Big Data or database management training

Professionals interested in managing Big Data or database management projects and need to understand how to successfully communicate Big Data or database management concepts with data specialists—analysts, scientists, or engineers.

People interested in making better data-driven decisions to grow their business and apply solutions in their personal lives.

Courses

1. Required Course(s): Track 1 - Data Science

Big Data: Overview, Tools and Use Cases, 3.0 Units
Data Analysis, Introduction, 3.0 Units

2. Electives: Track 1 - Data Science

Business Intelligence Solutions, 2.0 Units
Dashboards and Data Visualization, 3.0 Units

Data Modeling, Introduction, 2.0 Units
Deep Learning and Artificial Intelligence with TensorFlow and Keras, 3.0 Units
Introduction to Machine Learning, 3.0 Units
Predictive Analytics: Applications of Machine Learning, 3.0 Units
Python for Data Analysis, 3.0 Units
Python for Machine Learning and Artificial Intelligence, Essentials, 3.0 Units

3. Required Course(s): Track 2 - Data Engineering

Big Data: Overview, Tools and Use Cases, 3.0 Units
Relational Database Design and SQL Programming, 3.0 Units

4. Electives: Track 2 - Data Engineering

AI-Led Enterprise Transformation: Technologies and Use Cases, 0.5 Units
Apache Spark with Scala, Introduction, 3.0 Units
Data Analysis, Introduction, 3.0 Units
Data Engineering with Hadoop, 3.0 Units
MySQL and Oracle Database for Developers and Designers, 2.0 Units
NoSQL Databases, Introduction, 3.0 Units
Python for Data Analysis, 3.0 Units
The Internet of Things: Big Data Processing and Analytics, 3.0 Units

5. Completion Review:

Database and Data Analytics Certificate Completion Fee

Requisite Knowledge

Please review the course descriptions to ensure that you have taken necessary prerequisites or meet the requirements through job experience or previous education.

Recommend Course Sequence

The sequence may vary based on student background and professional interest. Choose one of the two specialized tracks—**Track 1: Data Science** or **Track 2: Data Engineering**

Substitutions

You may take one elective outside the certificate curriculum, if you receive prior approval from the Academic Services Department.

Shared credits

Some Engineering and Technology courses may be listed in more than one program. However, only one course may be shared between two E&T certificate programs unless otherwise noted.

To receive your certificate

Upon completion of the course sequence you may request your Database and Data Analytics Certificate Completion Review .

EARLY CHILDHOOD EDUCATION: ASSOCIATE TEACHER

Cost: $2,975, includes certificate fee.
Required Credits: Total Required: 5 courses (20 units)
Duration: A full-time student can complete the certificate in 6–12 months.

Certificate Description

For details, visit our ECE certificates updates page .

Teach our youngest to love learning.

Preschool teachers and child care center operators in the Early Childhood Education Associate Teacher program gain the academic preparation and field experience needed to work in preschools, day care facilities, infant and toddler centers and other programs serving young children. You will study the latest instructional techniques that promote intellectual, social, emotional, physical, and creative growth in children.

Key focus areas

Child growth and development

Strategies for effective classroom teaching

Developmentally based curriculum

Current research and trends in this field

ECE Associate Teacher Learning Outcomes

Develop daily schedules and implement age-appropriate curriculum for a center or classroom.

Identify social, intellectual, emotional, physical, and cognitive development of infants through middle childhood.

Distinguish differences in major learning theories and curriculum models relating to early childhood education center philosophies.

Communicate effectively with families, staff, and communities about physical, cognitive, social, and emotional needs of children.

Decode healthcare policies and procedures that relate to child care setting licensure.

Develop positive guidance strategies to work with diverse groups of children including those with special needs.

Courses

1. Required Course(s):

ECE 1: Development in Early Childhood, 4.0 Units
ECE 2: Introduction to Teaching Young Children, 3.0 Units
ECE 3: Curriculum Development in Early Childhood Programs, 4.0 Units

ECE 4: The Young Child in the Family and Community, 4.0 Units
ECE 8: Child Health, Safety and Nutrition, 5.0 Units

2. Completion Review:

Early Childhood Education Associate Teacher Certificate Completion Fee

3. Related Course(s): These Courses Are Not Part of The Certificate Program

Attention Deficit Hyperactivity Disorder (ADHD) in the Classroom, 3.0 Units
ECE: Brain Development in Early Childhood, 3.0 Units
ECE: Creative Arts for the Young Child (Preschool Through Grade 3), 3.0 Units
ECE: Infant/Toddler Growth and Development, 3.0 Units
ECE: Principles of Infant/Toddler Caregiving, 3.0 Units
Math Development in Young Children, 2.0 Units
Science Play: Inquiry-Based Learning Made Easy, 1.0 Units

Requisite Knowledge

There are no requirements to join the program.

Recommend Course Sequence

Flexible course sequence

Courses may be taken in any order provided the prerequisites are met.

Substitutions

You may take one elective outside the certificate curriculum, if you receive prior approval from the Academic Services Department.

To receive your certificate

Upon completion of the course sequence you may request your Early Childhood Education Associate Teacher Certificate Completion Review .

EARLY CHILDHOOD EDUCATION: SITE SUPERVISOR

Cost: $3,000
Required Credits: Total Required: 4 courses / 20 units. Take 4 required courses. End with certificate of completion review.
Duration: A full-time student can complete the certificate in 9–12 months.

Certificate Description

For details, visit our ECE certificates update page .

Head up your own ECE center

Running your own daycare center or serving as a site supervisor for our youngest learners requires the vision of an entrepreneur, the skills of a manager, and the heart of a teacher.

In the ECE Site Supervisor program, you'll learn best practices for recruiting, teacher training, and staff management while working toward your state child development site supervisor or program director permit.

You will learn to instill positive guidance and discipline into your curriculum for infants, toddlers, and young children.

The program is designed for students looking to complete requirements for the Child Development Site Supervisor Permit through the California Commission on Teacher Credentialing , and for site directors seeking professional development to renew permits for licensed facilities.

Classroom curriculum

Child growth and development

Classroom teaching strategies

Center management

Creating developmentally based curriculum

Current industry research and trends

Leadership curriculum

The curriculum delivers targeted instruction to prepare you to become a successful daycare owner and build your qualifications as a director. Gain the confidence to manage and run any daycare center.

Budget administration

Facilities management

Personnel recruitment—best practices

Supervisory skills

Early Childhood Education: Site Supervisor learning objectives

Create optimal learning environments through efficient staff interactions with children and their families

Identify the differences in major learning theories and curriculum models as it pertains to early childhood education center philosophies and use it to enhance and develop appropriate care and education at childcare centers

Apply effective communication with families, staff, and communities about the physical, cognitive, social, and emotional needs of children as a leader and director

Identify high quality settings for children using quality indicators such as the National Association for the Education of Young Children guidelines and standards and know what they are looking for as it pertains to getting childcare centers licensing, permits, and regulations for the state of California

Develop positive guidance and mentorship strategies to use when working with diverse groups of children including those with special needs

Courses

1. Required Course(s):

ECE 10: Supervision and Administration: Parents as Partners in Education, 5.0 Units
ECE 11: Supervision and Administration of Early Childhood Centers, Part A, 5.0 Units
ECE 12: Supervision and Administration of Early Childhood Centers, Part B, 5.0 Units
ECE 13: Adult Supervision and Mentoring, 5.0 Units

2. Completion Review:

Early Childhood Education: Site Supervisor Certificate Completion Fee

3. Related Course(s): These Courses Are Not Part of The Certificate Program

Attention Deficit Hyperactivity Disorder (ADHD) in the Classroom, 3.0 Units
ECE: Brain Development in Early Childhood, 3.0 Units
ECE: Creative Arts for the Young Child (Preschool Through Grade 3), 3.0 Units
ECE: Infant/Toddler Growth and Development, 3.0 Units
ECE: Principles of Infant/Toddler Caregiving, 3.0 Units
Math Development in Young Children, 2.0 Units
Science Play: Inquiry-Based Learning Made Easy, 1.0 Units

Recommend Course Sequence

Flexible course sequence

Courses may be taken in any order provided the prerequisites are met.

Substitutions

You may take one elective outside the certificate curriculum, if you receive prior approval from the Academic Services Department.

To receive your certificate

Upon completion of the course sequence you may request your Early Childhood Education Site Supervisor Certificate Completion Review .

EDUCATIONAL THERAPY

Cost: $6,300. Estimated program cost does not include additional costs for mentorship.
Required Credits: Total Required: 30 units (10–11 courses). 21 units (7) required courses, 4 units (2–3) electives, and end with the 5-unit capstone course, followed by certificate review.
Duration: A full-time student can complete the certificate in about two years.

Certificate Description

The impact of inspired learning

Learn how individualized interventions can make a tremendous impact in the classroom, in private practice, and in the home. In one of the few **Association of Educational Therapists-approved** training programs, you will learn to assess the different challenges students have so you can effectively collaborate with an educational team and understand the underlying theory and the latest research to implement practical strategies for learning.

Teachers, tutors, resource specialists, and aspiring educational therapists will learn to empower and inspire their students. Material also supports you in setting up your own clinical practice.

Educational Therapy certificate program objectives

Understand challenges faced by students with ADHD, autism, Asperger's Syndrome, nonverbal learning disorder, sensory integration disorder, fetal alcohol syndrome, oppositional defiant disorder, and other learning differences

Comprehend the theories, issues, strategies, and materials related to the assessment and instruction of students with reading difficulties

Apply strategies for helping students understand computation and problem-solving in mathematics

Develop a business plan for managing your own clinical practice

Use assessment tools and procedures frequently used in educational therapy settings

Our Educational Therapy students

General and special education teachers

Reading and math specialists

Social workers

Speech therapists

Counselors who've earned additional certifications

Parents of people who may benefit from educational therapy

School administrators

AET-approved

The UCSC Silicon Valley Professional Educational Therapy certificate program is approved by the Association of Educational Therapists. Founded in 1979, AET defines and sets standards for the professional practice of educational therapy. Educational therapists provide a broad range of

individualized educational interventions for children and adults with learning disabilities and other learning challenges. See the Professional Development section below for more information.

Courses

1. Required Course(s): Seven Total & Equal to 21 Units

Educational Assessments I, 3.0 Units
Educational Assessments II, 3.0 Units
Educational Therapy: Structured Literacy I, 3.0 Units
Educational Therapy: Structured Literacy II, 3.0 Units
Principles of Educational Therapy, 3.0 Units
Strategies for Learning Differences in Mathematics, 3.0 Units
Techniques of Educational Therapy: Affective, Cognitive and Perceptual Elements, 3.0 Units

2. Electives:

Assistive Technology for Learning Differences, 3.0 Units
Attention Deficit Hyperactivity Disorder (ADHD) in the Classroom, 3.0 Units
ECE: Brain Development in Early Childhood, 3.0 Units
Management of Clinical Practice, 3.0 Units
Neurodivergent Learners, 1.0 Units
Psychology of Human Learning, 3.0 Units
Understanding Learning Differences, 3.0 Units

3. Capstone Course:

Educational Therapy Practicum, 5.0 Units

4. Completion Review:

Educational Therapy Certificate Completion Fee

Requisite Knowledge

Please review the course descriptions to ensure that you have taken necessary prerequisites or meet the requirements through job experience or previous education. Note: We require a bachelor's degree and preferably some experience working with children to complete this certificate program. If you do not have an educational background, we strongly recommend that you enroll in the following courses. **Psychology of Human Learning Understanding Learning Differences**

Recommend Course Sequence

Flexible course sequence

Courses may be taken in any order provided the prerequisites are met and your final course is Educational Therapy Practicum .

Substitutions

You may take one elective outside the certificate curriculum, if you receive prior approval from the Academic Services Department.

To receive your certificate

Upon completion of the course sequence you may request your Educational Therapy Certificate

Completion Review.

EMBEDDED SYSTEMS

Cost: $5,700 or 5,770
Required Credits: Total Required: 5–10 courses/14 units—1 of the core courses (2–3 units) and 3–9 elective credit courses (11–12 units). End with Certificate Review.
Duration: A full-time student can complete the certificate in 9–12 months.

Certificate Description

Build your knowledge of universal connectivity

Hardware professional students in the Embedded Systems certificate program study embedded engineering principles, design tools, and practical skills, applying their growing knowledge of microprocessors, digital signal processors (DSPs), and microcontrollers in course projects.

Students also have the opportunity to focus on function-specific computer and communication systems, such as:

mobile devices,

the Internet of Things,

networking equipment,

industrial controllers, and

military electronics.

Learn to design and test hardware and software innovations of the future as you prepare for high-paying jobs in the industry.

Embedded Systems certificate program objectives

Design, debug, and synthesize digital logic for ASICs, PGAs, and IP cores

Understand the basics of embedded hardware design

Differentiate between types of jitter

Decode IO technologies, including PCI Express, Ethernet and Fibre Channel

Use analog and digital switch-mode power supplies

Courses

1. Core Course(s): (Choose One)

Embedded Firmware Essentials, 2.0 Units
Embedded Linux Design and Programming, 3.0 Units
Embedded System Hardware Architectures, Introduction, 3.0 Units
Practical Design with Xilinx FPGAs, 3.0 Units
Real-Time Embedded Systems Programming, Introduction, 3.0 Units

2. Electives: System Design

Comprehensive Signal and Power Integrity for High-Speed Digital Systems, 3.0 Units
Embedded System Hardware Architectures, Introduction, 3.0 Units
High Efficiency Switch-mode Power Supply, Design Overview, 3.0 Units
IO Concepts and Protocols: PCI Express, Ethernet, and Fibre Channel, 3.0 Units
IO Design Fundamentals, 3.0 Units
Jitter Essentials, 1.5 Units
Printed Circuit Board Design for Signal Integrity and EMC Compliance, 1.5 Units
Wireless Communications and Mobile Antenna Design, Introduction, 3.0 Units

3. Electives: FPGA Design

Digital Design with FPGA, 3.0 Units
Embedded Design with Xilinx FPGAs, 3.0 Units
FPGA Application in Autonomous Driving Systems, Introduction, 3.0 Units
Practical Design with Xilinx FPGAs, 3.0 Units

4. Electives: Embedded Linux

Embedded Linux Design and Programming, 3.0 Units
Linux Kernel and Drivers, Advanced, 3.0 Units
Linux Kernel & Drivers, 3.0 Units

5. Electives: Embedded Software

C Programming, Advanced, 3.0 Units
C Programming for Beginners, 2.0 Units
Embedded Firmware Essentials, 2.0 Units
Real-Time Embedded Systems Programming, Introduction, 3.0 Units
The Internet of Things: Big Data Processing and Analytics, 3.0 Units
The Internet of Things: Sensors, Platforms, Communications, and Applications, 3.0 Units

6. Electives: Related Electives

Digital Logic Design Using Verilog, 3.0 Units
SystemVerilog Assertions and Formal Verification, 3.0 Units

7. Completion Review:

Embedded Systems Certificate Completion Fee

Requisite Knowledge

Technical aptitude You need a degree in a technical field or equivalent knowledge acquired through training and experience in system design and development. We recommended you have experience in C programming. Please review course descriptions Make sure you have taken the necessary prerequisites or meet the requirements through job experience or previous education before registering for a course.

Recommend Course Sequence

For the certificate program, please begin with one of the five core* courses. After the core requirement is met, courses may be taken in any order provided the prerequisites are met.

These are the 4 tracks of study:

System Design

FPGA Design

Embedded Linux

Embedded Software

Substitutions

You may take one elective outside the certificate curriculum, if you receive prior approval from the Academic Services Department.

Shared credits

Some Engineering and Technology courses may be listed in more than one program. However, only one course may be shared between two E&T certificate programs unless otherwise noted.

To receive your certificate

Upon completion of the course sequence you may request your Embedded Systems Certificate Completion Review.

HUMAN RESOURCE MANAGEMENT

Cost: $7,500
Required Credits: Total Required: 11 courses/ 15–19.5 units. Take 8 required courses (13.5 units) and 3 elective credit courses (1.5–6 units). End with the certificate review.
Duration: A full-time student can complete the certificate in 6–12 months.

Certificate Description

Source, develop, and lead a diverse workforce

Impact your organization's overall success

There is no more exciting time to consider a career in human resource management or to enhance your skills in the profession than right now. In today's ultra-competitive economy, you need to know how to recruit and retain top employees, particularly those from underrepresented groups. You need to communicate powerfully, maximize the impact of total rewards programs, and understand how technology and people analytics are changing the field.

The UCSC Silicon Valley Extension provides skills to effectively source, onboard, engage, develop, and support employees in any field. Learn systems and processes that are aligned with business objectives, develop effective leaders, and create work environments that enhance productivity.

Talent Acquisition and Workforce Planning

Leadership Development

Employee Relations

HR Business Partners/Generalist

Human Resource Management certificate program objectives

Design, assess, and evaluate employee benefits programs

Recruit talent and plan a strategic workforce

Train, facilitate, and design instruction for employees

Evaluate performance management approaches and techniques

Navigate organizational development, design, and change management to assure high employee engagement and productivity

The official seal of the HR Certification Institute ® confirms that UCSC Silicon Valley Extension meets the criteria for pre-approved recertification credit(s) for any of HRCI's eight credentials, including SPHR® and PHR®.

UCSC Silicon Valley Extension is recognized by the Society for Human Resource Management (SHRM) to offer professional development credits (PDCs) for the SHRM-CP® or SHRM-SCP®.

Courses

1. Required Course(s):

Benefits Management: A Comprehensive Study of Employee Benefit Programs, 2.0 Units
Compensation Management, 2.0 Units
Effective Employee Relations, 1.5 Units
Finance for the Business Professional, 1.0 Units
Human Resource Management, 1.5 Units
Law and Human Resource Management, 2.0 Units
Managing the HR Staffing Function, 1.5 Units
Organizational Development and Change, 2.0 Units

2. Electives: Recruiting and Staffing

Effective Performance Management, 2.0 Units
Interviewing for Success: Using Structured Interviewing Techniques, 0.5 Units
Talent Acquisition 101, 1.5 Units

3. Electives: Leadership Development

Applied Organizational Behavior and Coaching, 3.0 Units
Business Communications, 2.0 Units
Facilitation Skills, 2.0 Units
Leading People Through Change, 1.0 Units
Learning Theories and Styles, 1.0 Units
People Analytics - Delivering Measurable Business Impact, 1.5 Units
Strategic DEI Initiatives for HR Professionals, 1.5 Units

4. Electives: Employee Relations

Conflict Resolution and Mediation, 3.0 Units
Cultural Proficiency, 2.0 Units
Effective Negotiations: Principles, Strategies, and Techniques, 1.5 Units
Terminating and Managing Problem Employees, 0.5 Units
Workplace Investigations, 0.5 Units

5. Electives: HR Business Partners/General

Human Resources Business Partner (HRBP) Excellence, 1.0 Units
Role of the Project Manager, 1.5 Units

6. Completion Review:

Human Resource Management Certificate Completion Fee

7. Related course(s): These courses are not part of the certificate program

Final Project: Preparing Your Job Search, 1.5 Units
Redesigning Your Career - Accelerated Weekend Career Workshop, 1.5 CEU's

Requisite Knowledge

Please review the course descriptions to ensure that you have taken necessary prerequisites or meet the requirements through job experience or previous education.

Recommend Course Sequence

Please follow this sequence

Begin with Human Resource Management . After that, courses may be taken in any order.

Substitutions

You may take one elective outside the certificate curriculum, if you receive prior approval from the Academic Services Department.

To receive your certificate

Upon completion of the course sequence you may request your Human Resource Management Certificate Completion Review .

INSTRUCTIONAL DESIGN

Cost: $5,145–$6,340, depending on choice of electives.
Required Credits: Total Required: 8–9 courses/14 units: Take 3 required courses (4 units), 4–5 elective credit courses (8–9 units), and end with capstone course (2 units) followed by certificate of completion review.
Duration: A full-time student can complete the certificate in 9–12 months.

Certificate Description

Certificate to be retired

The Instructional Design certificate will be retired March 31, 2022.

If you have already earned an ID certificate, congratulations! No action is necessary. You can find a link to your digital badge today.

Your next steps

We encourage all students who have taken courses or declared candidacy in this program to reach out to Student Services before Nov. 30, 2021 for help in adjusting your academic plan.

Deliver great learning

The rapidly changing field of instructional design needs qualified people to organize and deliver learning that effectively serves diverse learning styles and organizational goals. This certificate focuses on the principles and practices of traditional settings in K-12 classrooms, colleges, universities, and professional training settings in corporations and government.

Explore practical approaches to online learning, facilitation, the use of emerging technologies, intercultural communication, and the evaluation of curriculum and training vendors. As a student, you will develop and expand existing skills, build on natural talents and strengths, and learn from assessments to develop areas in need of special attention.

Instructional Design and Delivery certificate program objectives

Plan and implement assessment and evaluation as they play out in corporate training and university settings

Understand the principles of visual design

Develop a training program or event

Design online courses and build online communities

Manage projects and facilitate group conversations

Courses

1. Required Course(s):

Cultural Proficiency, 2.0 Units
Instructional Design and Delivery, Introduction, 1.0 Units
Learning Theories and Styles, 1.0 Units

2. Electives:

Building Online Learning Communities, 2.0 Units
Designing Online Instruction, 2.0 Units
Designing Training Programs, 2.0 Units
Facilitation Skills, 2.0 Units
Instructional Needs Assessment and Evaluation, 1.5 Units
Introduction to Online Teaching, 2.0 Units
Role of the Project Manager, 1.5 Units

3. Capstone Course:

Instructional Design and Delivery, Practicum, 2.0 Units

4. Completion Review:

Instructional Design Certificate Completion Fee

5. Related Course(s): These Courses Are Not Part of The Certificate Program

Online Learning Design for Beginners, 1.0 CEU's

Recommend Course Sequence

Flexible course sequence

Courses may be taken in any order but your final course should be Instructional Design and Delivery, Practicum .

Substitutions

You may take one elective outside the certificate curriculum, if you receive prior approval from the Academic Services Department.

To receive your certificate

Upon completion of the course sequence, please apply for your Instructional Design Certificate Completion Review .

LINUX PROGRAMMING AND ADMINISTRATION

Cost: Up to $4,200.
Required Credits: Complete 14 units (5-6 courses). In your chosen track, take 2 required courses, 1 programming course, and electives to add up to 14 units. Note: Only 1 programming course may be applied to the certificate. End with certificate of completion review.
Duration: A full-time student can complete the certificate in 9–12 months.

Certificate Description

Master Linux—the operating system of choice

Linux is the operating system of choice for servers, network infrastructure, embedded systems, and mobile devices. In our Linux Programming and Administration professional certificate program you will learn both core and advanced Linux skills needed to work at top companies in Silicon Valley.

Many of our courses are not available in traditional colleges, yet they are highly applicable in a real-world work environment. From basic installation and tools to kernel customization for advanced systems—you can tailor your Linux study path to your interests.

Choose your emphases of study

Our Linux students

Software developers wanting to enhance programming knowledge

Entry-level or career changers looking to enter the software development or support fields

IT support staff wishing to expand their knowledge of Linux

People interested in developing open source applications or advancing the Linux operating system and manage multiple VMware ESXi hosts and virtual machines using the vCenter Server

Courses

1. Required Course(s): Track 1 - Linux System Administration

Linux Shell Programming, 3.0 Units
Linux System and Network Administration, 3.0 Units

2. Core Course(s): Track 1 - Linux System Administration. Complete one programming course.

C Programming, Advanced, 3.0 Units
C++ Programming, Comprehensive, 3.0 Units
C Programming for Beginners, 2.0 Units
Go Programming, Fundamentals, 3.0 Units
Introduction to Web Programming: JavaScript and Python Django, 2.0 Units
Java Programming, Comprehensive, 3.0 Units
Java Programming for Beginners, 2.0 Units
Python for Programmers, 3.0 Units
Python: Object-Oriented Programming, 2.0 Units

3. Electives: Track 1 - Linux System Administration (5-6 units required)

Cloud Computing, Introduction, 0.5 Units
Linux, Introduction, 2.5 Units
Linux Kernel and Drivers, Advanced, 3.0 Units
Linux Kernel & Drivers, 3.0 Units
Linux System Performance in the Cloud and Data Center, 3.0 Units
Linux Systems Programming, 3.0 Units
Networking Fundamentals, 3.0 Units
Storage Technology in Data Centers, 3.0 Units
System Virtualization Fundamentals, 2.5 Units

4. Required Course(s): Track 2 - Linux System Development

Linux Shell Programming, 3.0 Units
Linux Systems Programming, 3.0 Units

5. Core Course(s): Track 2 - Linux System Development. Complete one programming course.

C Programming, Advanced, 3.0 Units
C++ Programming, Comprehensive, 3.0 Units
Java Programming, Comprehensive, 3.0 Units

6. Electives: Track 2 - Linux System Development (5 units required)

Cloud Computing, Introduction, 0.5 Units
Embedded Linux Design and Programming, 3.0 Units
Linux, Introduction, 2.5 Units
Linux Kernel and Drivers, Advanced, 3.0 Units
Linux Kernel & Drivers, 3.0 Units
Linux System and Network Administration, 3.0 Units

7. Completion Review:

Linux Programming and Administration Certificate Completion Fee

Requisite Knowledge

Please review the course descriptions to ensure that you have taken necessary prerequisites or meet the requirements through job experience or previous education.

Recommend Course Sequence

Start with Linux, Introduction

If you have limited or no UNIX or Linux experience, we strongly recommend that you begin with Linux, Introduction .

Choose your certificate program track.

Linux System Administration—Track 1

Linux System Development—Track 2

Both tracks are 14 units each.

Required Courses: 6 units (2 courses)

Programming Course: 2–3 units (1 course) You may take as many programming courses as you want, but only one counts toward your Linux certificate.

Electives: Varies. 5–6 units (2-4 courses) You must complete enough electives for a total of 14 units overall.

Substitutions

You may take one elective outside the certificate curriculum, if you receive prior approval from the Academic Services Department.

Shared credits

Some Engineering and Technology courses may be listed in more than one program. However, only one course may be shared between two E&T certificate programs unless otherwise noted.

To receive your certificate

Upon completion of the course sequence you may request your Linux Programming and Administration Certificate Completion Review .

MARKETING MANAGEMENT

Cost: $5,500
Required Credits: Total of 7 courses (15 units): Take 3 courses (7 units) of required credit, 3 courses (6 units) of elective credit, and the Capstone course (2 units). End with Certificate of Completion Review. (*See Recommended Course Sequence for 2020 update.)
Duration: A full-time student can complete the certificate in 9–12 months.

Certificate Description

Silicon Valley-style customer-driven marketing

The days of siloed sales and marketing are over. The buyer is now in control. We teach you the tools you need to succeed in sales and marketing alignment; the fusion of sales, marketing, and social selling; and programmatic marketing and sales. Learn how artificial intelligence can personalize the customer experience. We offer two tracks and a shorter specialization.

Marketing Management

Digital Marketing (includes social media courses)

Social Media Marketing Professional Specialization

Marketing Management certificate program objectives

Create integrated, multi-channel marketing campaigns

Evaluate the success of marketing campaigns based on data

Communicate brand values to diverse audiences

Leverage social media as a selling tool

Courses

1. Required Course(s):

Implementing Marketing and Sales Strategies, 2.0 Units
Integrated Marketing Communication, 3.0 Units
Principles of Marketing, 2.0 Units

2. Electives: Digital Marketing

Advanced Social Media Marketing, 2.0 Units
Application of Social Media for Business Growth, 2.0 Units
Applied Digital Media Planning and Platforms, 2.0 Units
CRM: Customer Relationship Management, 2.0 Units
Customer Acquisition Strategies, 2.0 Units
Leveraging Content and Social Analytics, 2.0 Units
Search Engine Marketing, 2.0 Units
Social Media Marketing Fundamentals, 2.0 Units
Web and Mobile Analytics, 2.0 Units

3. Electives: Marketing Management

Consumer Insights: Data Analysis and Interpretation, 2.0 Units
Positioning and Brand Management, 2.0 Units
Power of Market Research, 2.0 Units
Product Marketing and Management, 2.0 Units
Public and Analyst Relations, 2.0 Units
Strategic Marketing Operations, 2.0 Units

4. Capstone Course:

Marketing in Practice, 2.0 Units

5. Completion Review:

Marketing Management Certificate Completion Fee

Requisite Knowledge

Please review the course descriptions to ensure that you have taken necessary prerequisites or meet the requirements through job experience or previous education.

Recommend Course Sequence

Get started

Please begin with Principles of Marketing . After that, courses may be taken in any order provided the prerequisites are met.

Substitutions

You may take one elective outside the certificate curriculum, if you receive prior approval from the Academic Services Department.

To receive your certificate

Upon completion of the course sequence you may request your Marketing Management Certificate Completion Review .

*Declared candidacy prior to Dec. 19, 2020?

We made changes to the requirements for this certificate on Dec. 18, 2020. Students who declared candidacy prior to that date may choose to follow the current requirements above or the former 14-unit credit requirements that were in place when they declared, including:

3 courses (7 units) of required credit.

4–5 courses (7 units) of elective credit.

Certificate of completion review.

MEDICAL DEVICE QUALITY AND DESIGN

Cost: Track 1: $4,845 • Track 2: $5,605
Required Credits: Total Required: 14 units (6 courses). Select one track of study.
Duration: A full-time student can complete the certificate in 12 months.

Certificate Description

From tongue depressors to Fitbits

Digital health, smart wearable devices, medical device software and in-vitro diagnostics are just a few of the latest strides in the highly regulated healthcare industry.

The Medical Device Quality and Design certificate program prepares students by focusing on the latest technological and regulatory advancements in the field.

You'll study the front end of medical device design and development used to verify that design inputs meet design outputs, including:

User needs,

Risk management,

Human factors, and

Methodologies.

You will be exposed to the fundamentals and underlying concepts on how to demonstrate compliance with key regulations. (See learning outcomes below) Global harmonization quality compliance initiatives will also be addressed.

Two tracks of study

Medical Device Quality Design

Medical Device Software Quality

Based on your interests, you can choose the track that best suits your interest.

Medical Device Quality and Design learning outcomes

Interpret and develop documentation that complies with U.S. FDA quality system requirements (21 CFR 820)

European Medical Device Regulations (EU MDRS / IVDRS), ISO 13485

Risk management (ISO 14971).

Write a risk management plan and risk management report.

Apply risk management principles to develop verification and validation plans for software and manufacturing processes.

Develop a human factors usability plan.

Interpret FDA guidelines and regulations and develop quality test plans for digital health and medical device software.

Explain and apply risk management principles defined in ISO 14971 throughout the design and development lifecycle, such as product risk, software risk, and cybersecurity risk.

Courses

1. Core Course(s): Track 1 Medical Device Quality Design - 14 Units

Human Factors and Usability in Medical Device Development, 2.0 Units
Medical Device Process Validation, 2.0 Units
Quality Management Systems for Medical Devices: ISO 13485 and FDA Requirements, 2.5 Units
Regulation of in vitro Diagnostics in Europe and the US, 2.5 Units
Risk Management for Regulated Industries, 3.0 Units
Value-Added Quality Audits, 1.5 Units

2. Core Course(s): Track 2 Medical Device Software Quality - 14 Units

Design Control for Medical Devices, 2.0 Units
European Medical Device Regulation: Clinical Evaluation and Post-Market Surveillance, 3.0 Units
Mobile Health: The Evolving Industry and Regulatory Landscape, 1.0 Units
Quality Management Systems for Medical Devices: ISO 13485 and FDA Requirements, 2.5 Units
Risk Management for Regulated Industries, 3.0 Units
Validating Software for Medical Devices and Emerging Technologies, 2.0 Units

3. Completion Review:

Medical Devices Certificate Completion Fee

4. Related Course(s): These Courses Are Not Part of The Certificate Program

Clinical Trials Essentials: An Intensive One-Week Course, 3.5 Units
Post-Market Regulatory Obligations for Medical Devices, 1.5 Units

Requisite Knowledge

Please review the course descriptions to ensure that you have taken necessary prerequisites or meet the requirements through job experience or previous education. **Statistics knowledge**: You will need an understanding of statistics for this program. UCSC Extension offers Statistics .

Recommend Course Sequence

Please follow this sequence. Students new to the industry should begin with Quality Systems for Medical Devices FDA QSR and ISO 13485 (formerly Medical Device Quality Systems) followed by Regulation of Medical Devices and Diagnostics . For those with experience in this field, courses can be taken in any order provided the prerequisites are met.

Substitution

An introductory course to medical devices regulation or Medical Devices: Regulatory Strategies and Marketing Pathways taken within the last five years fulfills the requirement of Regulation of Medical Devices and Diagnostics .

You may take one elective outside the certificate curriculum, if you receive prior approval from the Academic Services Department.

PERSONAL FINANCIAL PLANNING

Cost: $6,000
Required Credits: Total Required: 8 courses (29.5 units)
Duration: A full-time student can complete the certificate in 6–12 months.

Certificate Description

The only CFP™® Board-registered program in Silicon Valley

The only CFP® Board registered program in Silicon Valley. At its core financial planning is about goal setting and practical problem solving. Financial planning helps people plan for common, real-world challenges such as how much to save for retirement, whether or not to pay off a mortgage, and how to ensure college education.

UCSC Extension financial planning students gain a strong foundation in retirement planning, tax planning, risk management, estate planning, and investments that can be applied both personally and in a professional practice. Our training fulfills the educational requirements set by the Certified Financial Planning™ Board.

Upon successful completion of coursework, students may sit for the rigorous CFP® examination. Our program partners with the Financial Planning Association of Silicon Valley providing you with unique networking opportunities in the Silicon Valley Financial advising community.

Personal Financial Planning certificate program objectives

Understand applied mathematical concepts for financial planning

Identify and solve estate problems from the financial planning perspective

Decode the retirement planning process, including how to determine the adequacy of your client's resources and income

Apply risk management to financial decision-making

Understand the structure, regulation and operation of investment markets

Financial planning event recordings

Courses

1. Required Course(s): Foundation Courses

Applied Mathematics for Financial Planning, 3.0 Units
Personal Financial Planning, Survey, 4.0 Units

2. Required Course(s):

Employment Benefits and Retirement Planning in Personal Financial Planning, 3.5 Units
Estate Planning, 3.5 Units
Income Taxation in Personal Financial Planning, 3.5 Units
Investments in Personal Financial Planning: Principles and Methods, 4.0 Units
Risk Management in Personal Financial Planning, 3.5 Units

3. Capstone Course:

Personal Financial Planning, Practicum, 4.5 Units

4. Completion Review:

Personal Financial Planning Certificate Completion Fee

5. Related Course(s): These courses are not part of the certificate program

Real Estate Investments for Professional Advisors, 1.5 CEU's

Requisite Knowledge

To pursue a certificate in Personal Financial Planning and take the CFP® examination, you should hold a bachelor's degree in any discipline from an accredited U.S. college or university recognized by the U.S. Department of Education.

Recommend Course Sequence

Please follow this sequence. The two foundation courses— Applied Mathematics for Financial Planning and Personal Financial Planning, Survey —must be completed prior to enrolling in the remaining courses. The final course for all candidates is Personal Financial Planning, Practicum .

Substitutions

You may also take one elective outside the certificate curriculum, if you receive prior approval from the Academic Services Department.

Program Requirements

You must take all eight courses and attain an overall average of 3.0 to qualify, including a B or better in "Applied Mathematics for Financial Planning," "PFP, Survey" and "PFP, Practicum," and a C or better in each of the other courses.

Course work must be completed within three years of declaring candidacy.

Courses completed more than five years prior to date certificate is issued cannot be used to fulfill requirements.

To receive your certificate. Upon completion of the course sequence, please apply for your Personal Financial Planning Certificate Completion Review .

*Student Discount on Texts

UCSC Silicon Valley Extension Personal Financial Planning students may buy most required textbooks at a 15 percent savings through Money Education with a student discount code.

Discount is applicable to texts in the following courses:

Personal Financial Planning, Survey | FPLN.X400

Employment Benefits and Retirement Planning in Personal Financial Planning | FPLN.X411

Estate Planning | FPLN.X402

Income Taxation in Personal Financial Planning | FPLN.X410

Investments in Personal Financial Planning: Principles and Methods | FPLN.X401

Risk Management in Personal Financial Planning | FPLN.X405

To receive your student discount code 10 days before your course starts, please enroll at least two weeks before your class starts. If you enroll fewer than 10 days prior to the class starts, please contact the Tanya Doyle, program manager, to request the student discount code.

PROCUREMENT AND SUPPLY CHAIN MANAGEMENT

Cost: $6,000
Required Credits: Total Required: 8 courses/16 units. Take 6 core courses (13.5 units) and 2 elective credit courses (2.5 units)
Duration: A full-time student can complete the certificate in 6–12 months.

Certificate Description

Leadership in strategic, sustainable procurement

Today's supply chain professional ensures that an organization has the resources it needs to accomplish its mission and objectives—from finished goods and raw materials to equipment and services. Our students explore emerging strategies at play in every organization's bottom line. Learn proactive collaboration, negotiation, and the data analytics to support your decisions. Practice continuous process improvement for a path of profitability.

Certificate program learning outcomes

Courses

1. Required Course(s):

Effective Procurement Strategies, 3.0 Units
Evolving Role of Supply Chain Management, 1.5 Units
Logistics and Transportation Management, 3.0 Units
Supply Chain Operations Management, 3.0 Units
Sustainable Supply Chain Strategies, 1.5 Units
Technology Impacts in the Supply Chain, 1.5 Units

2. Electives:

Business Law and Its Environment, 3.0 Units
Effective Negotiations: Principles, Strategies, and Techniques, 1.5 Units
International Business and the Global Economy, 3.0 Units
Managing Global Supply Chains, 1.5 Units
Outsourcing and Contract Management, 1.5 Units
Role of the Project Manager, 1.5 Units
Safeguarding the Supply Chain: Best Practices in Cybersecurity, 2.0 Units
Smart Cities: Foundations, Principles and Applications, 2.0 Units
Supply Chain Decisions and Data Analytics, 2.0 Units

3. Completion Review:

Procurement and Supply Chain Management Certificate Completion Fee

Requisite Knowledge

Please review course descriptions to ensure that you have taken necessary prerequisites or meet the requirements through job experience or previous education.

Recommend Course Sequence

Please follow this sequence.

Begin with **Evolving Role of Supply Chain Management .** After that, courses may be taken in any order provided the prerequisites are met.

Substitutions

You may take one elective outside the certificate curriculum, if you receive prior approval from the Academic Services Department.

To receive your certificate

Upon completion of the course sequence you may request your Procurement and Supply Chain Management Certificate Completion Review .

PROJECT AND PROGRAM MANAGEMENT

Cost: $6,000
Required Credits: Total Required: 7 courses/15–17 units. Take 3 required courses (7.5 units) and 3 elective credit courses (4.5–6.5 units), ending with 1 required capstone course (3.0 units)
Duration: A full-time student can complete the certificate in 6–12 months.

Certificate Description

As practiced by Silicon Valley leaders

We teach aspiring and seasoned project and program managers to serve as organizational pace-setters, motivating teams to produce value for all project stakeholders. You will learn the latest principles, practices, processes and tools to quickly originate project plans that:

Establish business needs;

Define products;

Estimate costs and schedules; and

Manage risk.

Study current industry practices including agile and lean project leadership methodologies such as Scrum, Kanban, Scrumban, and the Adaptive Project Framework.

Project and Program Management certificate program objectives

Plan and execute successful projects

Analyze stakeholder's needs and requirements

Enlist and lead successful teams

Assess and manage project risks

Use both traditional waterfall and lean-agile project models

Make informed and profitable project business decisions

Prepare for the Project Management Institute's PMP® exam

Qualify for the internationally recognized Master Project Manager® credential

Authorized Training Partner

Courses

1. Required Course(s):

Project Integration and Risk Management, 3.0 Units
Project Leadership and Communication, 3.0 Units
Role of the Project Manager, 1.5 Units

2. Electives: Leadership and Management

Clinical Project Management, 2.0 Units
Creating the Successful Team, 1.5 Units
Managing International Projects, 1.5 Units
Managing Projects at Startup Companies, 1.5 Units
Managing Software Projects, 1.5 Units
Managing the Development of New Products, 1.5 Units
Outsourcing and Contract Management, 1.5 Units

3. Electives: Tools and Techniques

Decision-Making Tools and Techniques, 1.5 Units
Effective Negotiations: Principles, Strategies, and Techniques, 1.5 Units
Managing Projects with Microsoft Project, 1.5 Units
Principles of Business Analysis, 3.0 Units
Quality Management for Enterprises, Products, and Programs, 2.0 Units
Schedule Optimization Techniques for Managers, 1.5 Units

4. Electives: Agile Project Management

Achieving Organizational Agility using the Scaled Agile Framework, SAFe©, 1.5 Units
Agile Product Life-Cycle Management (APLM), 1.5 Units
Agile Project Management Using Scrum, 1.5 Units
Extreme-Agile Project Management, 1.5 Units
Foundations of Disciplined Agile for Project Managers, 1.5 Units
Lean-Agile Project Management: Achieving Business Value, 1.5 Units
Practical Emotional Intelligence for Agile and Project Leaders, 1.5 Units
Principle Based Leadership for Project Managers, 1.5 Units

5. Capstone Course:

Applied Project Management, 3.0 Units

6. Completion Review:

Project and Program Management Certificate Completion Fee

7. Related Course(s): These courses are not part of the certificate program

PMP® Examination Preparation: 35 Hour, 3.5 Units

Requisite Knowledge

Please review the course descriptions to ensure that you have taken necessary prerequisites or meet the requirements through job experience or previous education.

Recommend Course Sequence

Please follow this sequence

Begin with Role of the Project Manager . Then you can take Project Integration and Risk Management or Project Leadership and Communication , ending your core requirements wit h Applied Project Management . Electives may be taken in any order provided the prerequisites are met.

Substitutions

You may take one elective outside the certificate curriculum, if you receive prior approval from the Academic Services Department.

To receive your certificate

Upon completion of the course sequence you may request your Project and Program Management Certificate Completion Review .

REGULATORY AFFAIRS

Cost: Track 1: $4,810 • Track 2: $5,515
Required Credits: Total Required: Choose your track. Track I: 15 units (6–7 courses); Track II: 14 units (7 courses). End with certificate of completion review.
Duration: A full-time student can complete the certificate in 9–12 months.

Certificate Description

Medical discovery and commercialization

Students learn the journey of safe and ethical medical device and drug development. You will identify the critical roles in the industry, best practices for product documentation and risk management. Learn industry requirements, federal regulations and audits and global standards. Network with people in the industry.

Choose among two emphases of study

While you can always take any course you need. In the certificate program, you can choose to focus on what interests you most. Each of the two track options aligns with tracks in the Regulatory Affairs Professionals Society (RAPS) Regulatory Affairs Certification (RAC) exam.

RAPS is the largest global organization of and for those involved with the regulation of healthcare and related products, including medical devices, pharmaceuticals, biologics and nutritional products.

Regulatory Affairs certificate program learning objectives

Develop a global regulatory strategy for medical devices and/or drugs and biologics.

Identify how regulatory affairs and quality compliance professionals contribute to an organization's bottom line by keeping up with global regulatory requirements.

Understand and apply good manufacturing practices (GxPS/cGMPS) and quality system regulation for drugs, biologics, and medical devices to help an organization achieve sustainable compliance.

Apply risk management principles when conducting Post Market Surveillance activities such as recalls and market corrections.

Communicate in writing and verbally with corporate executives. Negotiate with regulatory agencies such as the FDA.

Demonstrate knowledge of the design and development life cycle approach for drugs and biologics medical devices and have knowledge on how to compile a design history.

Courses

1. Core Course(s): Track 1 Drugs and Biologics - 15 Units

Communicating and Negotiating with the FDA, 1.5 Units
Drug Safety and Adverse Events Reporting, 1.5 Units
Foundations in U.S. FDA Regulations of Drugs & Biologics and Regulatory Submissions, 2.0 Units
Good Manufacturing Practices, 3.0 Units

Principles of Drug Discovery and Development, 4.0 Units
Regulation of Drugs & Biologics: Strategic Biopharmaceutical Product Development, 3.0 Units

2. Core Course(s): Track 2 Medical Devices - 14 Units

Communicating and Negotiating with the FDA, 1.5 Units
Design Control for Medical Devices, 2.0 Units
Foundations in Medical Devices: Developing Premarket U.S. Regulatory Strategies and Working in a Regulated Environment, 2.0 Units
Global Medical Device Submissions and Strategy, 1.5 Units
Post-Market Regulatory Obligations for Medical Devices, 1.5 Units
Quality Management Systems for Medical Devices: ISO 13485 and FDA Requirements, 2.5 Units
Regulatory Submissions: Devices and Diagnostics, 2.5 Units

3. Completion Review:

Regulatory Affairs Certificate Completion Fee

4. Related Course(s): These Courses Are Not Part of The Certificate Program

Clinical Trials Essentials: An Intensive One-Week Course, 3.5 Units
Data Privacy and Security for Healthcare and Biosciences, 1.5 Units
European Medical Device Regulation: Clinical Evaluation and Post-Market Surveillance, 3.0 Units
Regulation of Drugs and Biologics, 3.0 Units
Regulation of Medical Devices and Diagnostics, 3.0 Units
Value-Added Quality Audits, 1.5 Units

Requisite Knowledge

Please review the course descriptions to ensure that you have taken necessary prerequisites or meet the requirements through job experience or previous education. Students with a basic understanding of the life sciences and strong written and oral communication skills will gain the most from this program.

Recommend Course Sequence

Begin with Quality Systems for Medical Devices FDA QSR and ISO 13485 (formerly Medical Device Quality Systems) or Good Manufacturing Practices , followed by Principles of Drug Discovery and Development or Regulation of Medical Devices and Diagnostics . After that, courses may be taken in any order provided the prerequisites are met.

Substitutions

You may take one elective outside the certificate curriculum, if you receive prior approval from the Academic Services Department.

To receive your certificate

Upon completion of the course sequence you may request your Regulatory Affairs Certificate Completion Review .

Also recommended:

Data Privacy and Security for Healthcare and Biosciences , 1.5 units

SOFTWARE ENGINEERING AND QUALITY

Cost: $5,000
Required Credits: Total Required: 5–7 courses (14 units). Take 3 core courses (6.5 units) and 3–4 electives (7.5–9 units). End with certificate of completion review.
Duration: A full-time student can complete the certificate in 9–12 months.

Certificate Description

Learn QA methodologies and build a strong SQA team

Software errors cost companies millions of dollars; the later bugs are discovered, the more costly the corrective action. When you study quality assurance in the UCSC Silicon Valley Extension Software Engineering and Quality certificate program, you learn to methodically and thoroughly test and manage software projects. You learn to discover and minimize problems early in the life cycle to influence product development and save costs.

We emphasize a rigorous approach to quality assurance that complements established practices in software engineering and user experience design with the latest developments in software testing.

Three QA tracks

We offer three tracks of study to help you prepare for your next software quality assurance job.

Software Engineering and Quality certificate program objectives

Demonstrate competence in the software development lifecycle, from requirements to release

Design and model software systems using object orientation

Develop test plans and quality assurance strategies that minimize defects in software systems

Apply accepted software development techniques, such as Agile, in planning a software system's development

Design clean and consistent user interfaces

Our Students

The students in our Software Engineering and Quality certificate program include:

Software developers who want to build a foundation in software engineering, architecture, and developmental process.

Software QA and test professionals seeking adaptive SQA and testing knowledge and skills.

Software project leaders and managers overseeing their team's on time delivery of high-quality products.

Courses

1. Required Course(s):

Managing Software Projects, 1.5 Units
Object-Oriented Analysis and Design, 3.0 Units

Software Quality Assurance and Testing, 2.0 Units

2. Electives: Software Engineering [Only 1 'Data Structures and Algorithms' course may be applied towards the certificate

Advanced DevOps Technologies, 3.0 Units
Data Structures and Algorithms Using C++, 3.0 Units
Data Structures and Algorithms Using Java, 3.0 Units
Data Structures and Algorithms Using Python, 3.0 Units
Designing, Building and Integrating RESTful API, 2.0 Units
DevOps Technologies, 3.0 Units

3. Electives: Quality and Testing

Agile Software Development using TDD/BDD and Python, 3.0 Units
JUnit Test Framework, 1.5 Units
Quality Management for Enterprises, Products, and Programs, 2.0 Units
Web Applications Testing, Comprehensive, 3.0 Units

4. Electives: User Experience Design

Designing User Experience for AR, Smart Things, Virtual Reality, and Wearable Technology, 3.0 Units
Mobile Interface Design, 3.0 Units
User Experience Design, Advanced, 3.0 Units
User Experience Design Fundamentals, 3.0 Units

5. Completion Review:

Software Engineering and Quality Certificate Completion Fee

Requisite Knowledge

Please review the course descriptions to ensure that you have taken necessary prerequisites or meet the requirements through job experience or previous education. **Required**. Experience with a programming language is required as well as a degree in computer science or engineering or equivalent experience in software development, testing, QA, or project management.

Recommend Course Sequence

Flexible course sequence

Courses may be taken in any order provided the prerequisites are met.

Substitutions

You may take one elective outside the certificate curriculum, if you receive prior approval from the Academic Services Department.

Shared credits

Some Engineering and Technology courses may be listed in more than one program. However, only one course may be shared between two E&T certificate programs unless otherwise noted.

To receive your certificate

Upon completion of the course sequence you may request your Software Engineering and Quality

Certificate Completion Review .

TECHNICAL WRITING AND COMMUNICATION

Cost: $6,575
Required Credits: Total Required: 10 courses/14.5–18.0 units: Take 7 core courses (12 units) and 3 elective credit courses (2.5–6 units). End with certificate of completion review.
Duration: This certificate is not open to new applicants at this time.

Certificate Description

Certificate to be retired in 2022

The Technical Writing and Communication certificate will be retired March 31, 2022. We are not accepting new enrollments into the program.

If you have already earned a TW&C certificate, congratulations! No action is necessary. You can find the link to your digital badge today.

Your next steps

We encourage all students who have taken courses or declared candidacy in this program to reach out to Student Services before Nov. 30, 2021 for help in adjusting your academic plan.

Transform jargon into clear communication

In addition to sharpening your grammar and writing style, our Technical Writing and Communication students learn to translate complex ideas into readable materials such as technical manuals, medical papers and business communications. You will focus on five areas: Technical Communication Fundamentals; Advanced Topics in Communication; Project Leadership; Tools and Technologies; and Engineering Communication. This certificate program offers the latest approaches to information architecture, business communications, and web content management.

Technical Writing and Communication certificate program objectives

Apply technical writing strategies to various types of technical information

Write test cases and work collaboratively on iterative development

Develop information and project plans for technical documentation

Understand human factors and the psychology of users

Decode information architecture and design

Courses

1. Required Course(s): Technical Communications Fundamentals

Developing Technical Information from Plan to Completion, 2.0 Units
Grammar and Style for Technical Communicators, 3.0 Units
Technical Communication: An Introduction to the Profession, 1.5 Units
Technical Writers' Workshop, 1.5 Units
Writing Successful Instructions, Procedures and Policies, 1.5 Units

2. Core Course(s): Advanced Topics in Communications

Final Project: Preparing Your Job Search, 1.5 Units
Information Architecture and Design Basics, 1.5 Units

3. Electives: Choose Three

Adobe Photoshop, 3.0 Units
Human Factors for Technical Communicators, 2.0 Units
Project Leadership and Communication, 3.0 Units
Role of the Project Manager, 1.5 Units
Usability Testing Documentation, 1.5 Units
Visual Design for Digital Media, 3.0 Units

4. Completion Review:

Technical Writing Certificate Completion Fee

Recommend Course Sequence

Please follow this sequence

Start with Technical Communication: An Introduction to the Profession . You must end with Final Project: Preparing Your Job Search .

Substitutions

You may take one elective outside the certificate curriculum, if you receive prior approval from the Academic Services Department.

To receive your certificate

Upon completion of the course sequence you may request your Technical Writing Certificate Completion Review .

TESOL

Cost: $5,500
Required Credits: Total Required: 27 units. Take 6 required courses (18 units) of required credit, 2-4 courses (4 units) of elective credit. End with capstone course (5 units) followed by certificate review.
Duration: A full-time student can complete the certificate in 9–12 months.

Certificate Description

English for a global world

A specialized sequence of courses in linguistics and education prepare you to teach English to immigrants and foreign nationals and prepare you to travel abroad to build to teach English. In this program you will learn best practices to teach English to nonnative speakers at all stages of language acquisition, as well as how to communicate effectively with a diverse audience, in terms of culture and nationality. Empower your students—and ultimately yourself.

TESOL curriculum for home and abroad

Teach English to school-aged and adult learners in the U.S.

Teach English in your home country.

Update your current TESOL teaching methods.

Improve your online strategies for teaching English.

Launch your English teaching career abroad.

TESOL certificate program objectives

Identify current language acquisition learning theories

Compare leading methodologies and techniques for teaching listening, speaking, reading, and writing English-as-second-language skills.

Evaluate the impact of linguistic principles on learners of English as a second language.

Formulate effective teaching objectives, lesson plans and assessments for English learners of all levels

Master key principles of teaching English grammar.

Integrate current instructional technology for English as a second language acquisition and assessment.

What is the job outlook for TESOL instructors?

Thirty-two states, the District of Columbia, and Puerto Rico did not meet the projected need for English Learner instructors, according to a June 2021 report by the U.S. Department of Education Office of English Language Acquisition.

California had the highest percentage of English learners, with over 20% of K–12 students

classified as ELs, according to a January 2021 report .

English language instructors are in increasing demand in the U.S and abroad. The English learner population grew by more than one million students, 28.1 percent, between 2000 and 2017, according to U.S. Department of Education data .

Courses

1. Required Course(s):

Assessment, Evaluation and Placement, 2.0 Units
Culture and Cultural Diversity, 4.0 Units
First and Second Language Development, 3.0 Units
Fundamentals of English Grammar for ESL Teachers, 2.0 Units
Language Structure, 3.0 Units
Methodology of Bilingual and English Language Development, 4.0 Units

2. Electives:

English As a Second Language Through Music and Movement, 2.0 Units
Instructional Design and Delivery, Introduction, 1.0 Units
Teaching Beginning ESL Students: Principles and Practices, 1.5 Units
Teaching Grammar, Level II, 2.0 Units
Teaching Writing, 2.0 Units

3. Capstone Course:

TESOL Practicum, 5.0 Units

4. Completion Review:

TESOL Certificate Completion Fee

Requisite Knowledge

Please review the course descriptions to ensure that you have taken necessary prerequisites or meet the requirements through job experience or previous education.

Recommend Course Sequence

Flexible course sequence

Courses may be taken in any order provided the prerequisites are met.

Substitutions

You may take one elective outside the certificate curriculum, if you receive prior approval from the Academic Services Department.

To receive your certificate

Upon completion of the course sequence you may request your TESOL Certificate Completion Review.

USER EXPERIENCE AND WEB DESIGN

Cost: $6,000
Required Credits: Total Required: 7–10 courses/17 units: Take all three core courses from Part A (7.5 units). Choose one from Part B (3 units), two to four elective courses (4.5 units); and the Capstone course (2 units). End with certificate of completion review.
Duration: A full-time student can complete the certificate in 9–12 months.

Certificate Description

Designing for your users

UCSC Silicon Valley Extension's newly revised User Experience and Web Design certificate program teaches you to anticipate user needs and design the look and feel of new products that are intuitive and easy to use. Learn customer analytics and behavior by working with a design team of peers. Explore different areas of focus to integrate your creativity with the most effective, best practices in the industry.

Areas of focus

User experience design

Visual design

Design implementation

User Experience and Web Design certificate program objectives

Understand the iterative and user-centered design process with the spiral model.

Use the user-centered design strategies and methods to create highly effective, pleasurable, and usable products while meeting business goals and objectives.

Understand and apply the design principles to create effective user interfaces for mobile devices and products that incorporate wearable technology.

Be able to implement a design prototype using various prototyping tools.

Be able to evaluate the user interface through user research and heuristic evaluation.

Learn and apply the visual design principles to create engaging user interfaces.

Be able to use HTML/CSS/JavaScript to prototype websites or single page web applications.

Courses

1. Core Course(s): Part A - All Required

Designing with Cascading Style Sheets: Advanced, 2.0 Units
HTML5 Advanced and Javascript APIs, 3.0 Units
Visual Design for Digital Media, 3.0 Units

2. Core Course(s): Part B - One Required or Take Both & Other Part B Course Will Count as an Elective)

Mobile Interface Design, 3.0 Units
User Experience Design Fundamentals, 3.0 Units

3. Electives:

Adobe Creative Suite, 3.0 Units
Adobe Illustrator, Introduction, 1.5 Units
Adobe Photoshop, 3.0 Units
Designing a UX or Visual Design Portfolio, 2.0 Units
Designing User Experience for AR, Smart Things, Virtual Reality, and Wearable Technology, 3.0 Units
Designing with Cascading Style Sheets: Fundamentals, 2.0 Units
HTML5 Fundamentals, 2.0 Units
Introduction to Web Programming: JavaScript and Python Django, 2.0 Units
Mobile Interface Design, 3.0 Units
User Experience Design, Advanced, 3.0 Units
User Experience Design Fundamentals, 3.0 Units

4. Capstone Course: Required

Capstone User Experience Project, 2.0 Units

5. Completion Review:

User Experience and Web Design Certificate Completion Fee

Requisite Knowledge

Please review the course descriptions to ensure that you have taken necessary prerequisites or meet the requirements through job experience or previous education. Before you begin the program, it's recommended that you take Adobe Illustrator, Introduction and Adobe Photoshop or have the equivalent knowledge and experience.

Recommend Course Sequence

Flexible course sequence

CHOICE If you are familiar with Adobe Illustrator and Photoshop products, most courses may be taken in any order if you have the prerequisites for each course.

ELECTIVES Note that while you must take all three courses in **Core Courses A**, you just need one from **Core Courses B**— **Mobile Interface Design** or **User Experience Design Fundamentals .** You are welcome to take the other Core B course as an elective toward your certificate.

CAPSTONE Your final course should be the **Capstone User Experience Project .**

Substitutions

You may take one elective outside the certificate curriculum, if you receive prior approval from the Academic Services Department.

New students should attend the Information Session to receive course sequence information

To receive your certificate

Upon completion of the course sequence you may request your User Experience and Web Design Certificate Completion Review.

VLSI ENGINEERING

Cost: $5,800
Required Credits: Total Required: 5–7 courses/14 units. Take 2 of the 5 core courses (6 units) and 3–5 elective credit courses (8–9 units). End with certificate of completion review.
Duration: A full-time student can complete the certificate in 9–12 months.

Certificate Description

Integrated circuit curriculum

In the UCSC Silicon Valley VLSI certificate program, you'll explore ASIC, semiconductor, EDA, device, and integrated circuits. In our VLSI lab, our expert instructors will give you the opportunity to get hands-on experience with hardware specification, logic design, verification, synthesis, physical implementation, circuit design, integrated circuit product testing, and the latest EDA tools on Linux.

You'll have the opportunity to learn front-end and back-end ASIC design using premier industry tools from **Synopsys** and **Cadence**. When you leave the classroom, you'll immediately be able to apply your new skills at your job.

You can pursue five tracks of study.

Design Methodology

Logic and Functional Design

SystemVerilog and Verification

Physical Design and Timing Closure

Circuit Design

VLSI Engineering certificate program objectives

Implement Verilog modeling of digital logic

Write assertions for formal verification using SystemVerilog

Build an advanced UVM verification environment

Understand IO technologies such as PCI Express, Ethernet and Fibre Channel

Complete practical designs with Xilinx FPGAs

Courses

1. Core Course(s): (Choose Two)

Advanced Verification with SystemVerilog OOP Testbench, 3.0 Units
Analog IC Design, Introduction, 3.0 Units
Digital Logic Design Using Verilog, 3.0 Units
Physical Design Flow From Netlist to GDSII, 3.0 Units
Practical DFT Concepts for ASICs: Nanometer Test Enhancements, 3.0 Units

2. Electives: Design Methodology

Practical Design with Xilinx FPGAs, 3.0 Units

3. Electives: Logic & Functional Design

Digital Design with FPGA, 3.0 Units
Digital Logic Design Using Verilog, 3.0 Units
FPGA Application in Autonomous Driving Systems, Introduction, 3.0 Units
IO Concepts and Protocols: PCI Express, Ethernet, and Fibre Channel, 3.0 Units
Practical DFT Concepts for ASICs: Nanometer Test Enhancements, 3.0 Units

4. Electives: SystemVerilog & Verification

Advanced Verification with SystemVerilog OOP Testbench, 3.0 Units
System and Functional Verification Using UVM (Universal Verification Methodology), 3.0 Units
SystemVerilog Assertions and Formal Verification, 3.0 Units

5. Electives: Phys. Design & Timing Closure

ASIC Physical Design, Advanced, 3.0 Units
Physical Design Flow From Netlist to GDSII, 3.0 Units
Timing Closure in IC Design, 3.0 Units

6. Electives: Circuit Design

Analog IC Design, Introduction, 3.0 Units
Comprehensive Signal and Power Integrity for High-Speed Digital Systems, 3.0 Units
IO Design Fundamentals, 3.0 Units
Jitter Essentials, 1.5 Units
Wireless Communications and Mobile Antenna Design, Introduction, 3.0 Units

7. Electives: Related Electives

Embedded System Hardware Architectures, Introduction, 3.0 Units

8. Completion Review:

VLSI Engineering Certificate Completion Fee

Requisite Knowledge

Technical expertise You need a degree in a technical field or equivalent knowledge acquired through training and experience in hardware design and development. Experience with UNIX and/or LINUX is required for lab sessions. Knowledge of a programming language such as C, Perl or Bash Shell is helpful. Please review course descriptions Make sure you have taken necessary prerequisites or meet the requirements through job experience or previous education before registering for a course.

Recommend Course Sequence

Beginners should take introductory courses before advanced. If you are pursuing a professional certificate, it is recommended that you take at least one course from the **Design Methodology** track. Other courses can be taken based on your interests and professional levels. Here are the 5 tracks of study:

Design Methodology

Developing the Nanometer ASIC: From Spec to Silicon (2.0)

Practical Design with Xilinx FPGAs (3.0)

Logic & Functional Design

Digital Logic Design Using Verilog (**CORE**) (3.0)

Practical DFT Concepts for ASICs: With Nanometer Test Enhancements (**CORE**) (3.0)

IO Concepts and Protocols: PCI Express, Ethernet, and Fibre Channel (3.0)

Digital Design with FPGA (3.0)

SystemVerilog & Verification

SystemVerilog Essentials: Functional Verification and Simulation (1.5)

SystemVerilog for ASIC and FPGA Design (3.0)

SystemVerilog Assertions and Formal Verification, (3.0)

Advanced Verification with SystemVerilog OOP Testbench,* (3.0)

System and Functional Verification Using UVM (Universal Verification Methodology) (3.0)

Physical Design and Timing Closure

Physical Design Flow From Netlist to GDSII (**CORE**) (3.0)

ASIC Physical Design, Advanced (3.0)

Timing Closure in IC Design (3.0)

Circuit Design

Low-Power Design of Nano-Scale Digital Circuits,(3.0)

Analog IC Design, Introduction (**CORE**) (3.0)

IO Design Fundamentals (3.0)

Wireless Communications and Mobile Antenna Design, Introduction (3.0)

Jitter Essentials (1.5)

Comprehensive Signal and Power Integrity for High-Speed Digital Systems (3.0)

Related Electives

Embedded System Hardware Architectures, Introduction (3.0)

System Design for Low Power Management (1.0)

Substitutions

You may take one elective outside the certificate curriculum, if you receive prior approval from the Academic Services Department.

Shared credits

Some Engineering and Technology courses may be listed in more than one program. However, only one course may be shared between two E&T certificate programs unless otherwise noted.

To receive your certificate

Upon completion of the course sequence you may request your VLSI Engineering Certificate Completion Review .

EARLY CHILDHOOD EDUCATION: ADVANCED TEACHER

Cost: $2,655–$2,800. Estimate includes the certificate fee.
Required Credits: Total 17 units: 14 required course units (4 courses) and a minimum of 3 elective units (1-2 courses).
Duration: A student can complete this specialization in 9–12 months.

Certificate Description

For details, visit our ECE certificates update page .

Advance your ECE classroom

The Early Childhood Education Advanced Teacher program at UCSC Silicon Valley Extension prepares preschool teachers and operators to manage the unique challenges they face in our region.

Aspiring ECE lead teachers will gain both a thorough academic preparation and practical field experience to work in child centers, preschools, day care facilities, infant and toddler centers and other programs serving young children. Our students learn instructional techniques that promote intellectual, social, emotional, physical, and creative growth in children.

The foundation for a successful ECE career

Understand child growth and development.

Build strategies for effective classroom teaching.

Identify developmentally-based curriculum.

Know current research and trends in this field.

Be confident to teach in a daycare center.

ECE: Advanced Teacher certificate learning outcomes

Assess teaching styles to inform future experiences with children.

Master techniques in observation and assessment of the social, intellectual, emotional, physical, and cognitive development of children from birth through adolescence.

Develop positive guidance strategies to use when working with diverse groups of children including those with special needs.

Apply differences in major learning theories and curriculum models as it pertains to early childhood education center philosophies.

Courses

1. Required Course(s):

ECE 5: Positive Guidance and Discipline for the Young Child, 3.0 Units
ECE 6: Culture and Diversity in the Early Childhood Classroom, 3.0 Units

ECE 7: Practicum in Early Childhood Education, 5.0 Units
ECE 9: Language and Literacy for the Young Child, 3.0 Units

2. Electives: At Least 3 Units

Attention Deficit Hyperactivity Disorder (ADHD) in the Classroom, 3.0 Units
ECE: Brain Development in Early Childhood, 3.0 Units
ECE: Creative Arts for the Young Child (Preschool Through Grade 3), 3.0 Units
ECE: Infant/Toddler Growth and Development, 3.0 Units
ECE: Principles of Infant/Toddler Caregiving, 3.0 Units
Math Development in Young Children, 2.0 Units
Science Play: Inquiry-Based Learning Made Easy, 1.0 Units

3. Completion Review:

Early Childhood Education Advanced Teacher Certificate Completion Fee

Requisite Knowledge

To complete the ECE 7: Practicum in Early Childhood Education for this advanced program, you need to have taken the following courses: ECE 1: Development in Early Childhood ECE 3: Curriculum Development in Early Childhood Programs ECE 4: The Young Child in the Family and Community Please see our section on Recommended course sequence for more information.

Recommend Course Sequence

Flexible course sequence

Courses in the Advanced Teacher program may be taken in any order provided the prerequisites are met and your final course is ECE 7: Practicum in Early Childhood Education .

While you may stack or take concurrently your required ECE courses in both the ECE Associate Teacher and ECE Advanced Teacher certificate programs, you must complete the ECE Associate Teacher certificate program **before** applying for the Advanced Teacher certificate.

Please see our section on Requisite knowledge for more information.

Substitutions

You may take one elective outside the certificate curriculum, if you receive prior approval from the Academic Services Department.

To receive your certificate

Upon completion of the course sequence you may request your Early Childhood Education Advanced Teacher Certificate Completion Review .

SPECIALIZATIONS

ADMINISTRATIVE PROFESSIONALS

Cost: $3,000
Required Credits: 4 courses/minimum 6.5 units. Take 2 core courses (3 units) and 2 elective credit courses (3.5–4 units)
Duration: A student can complete this specialization in 6 months.

Award Description

Build Your Administrative Professional Skills

Once you have a solid foundation in administrative support, you can build your own career trajectory. This is especially true in the UCSC Extension Specialization for Administrative Professionals where you learn practical skills in three key areas:

Business Finance

Strategic Communications, and

Effective Writing.

Add on an elective such as facilitation, project management, customer relations, or public relations fundamentals and launch your career in business support.

Learning Outcomes in the Administrative Professionals Program

Develop a broad understanding of financial concepts and tools.

Demonstrate effective organizational communication.

Apply proficiency fundamentals of administrative roles including human resources, financial responsibilities, public relations, and project management.

Career Path Versatility

You can continue to grow your career by applying the units from this specialization to the Business Administration , Human Resource Management and Marketing Management certificates. Make yourself an invaluable member of any dynamic team.

Courses

1. Required Course(s): Two Required

Business Communications, 2.0 Units
Finance for the Business Professional, 1.0 Units

2. Electives: Two Required

CRM: Customer Relationship Management, 2.0 Units
Facilitation Skills, 2.0 Units
Public and Analyst Relations, 2.0 Units
Role of the Project Manager, 1.5 Units

3. Completion Review:

ENTERPRISE AI IMPLEMENTATION

Cost: $3,195
Required Credits: 9.5 CEUs (Not for UC credit)
Duration: 4–6 months

Award Description

A foundation for bringing AI into business

As companies around the world strive to implement artificial intelligence technologies, we prepare you to address the inherent business challenges of an operational transformation at the enterprise level.

In this focused study of AI, you will study the latest advances in AI systems and capabilities. You will build on your experience, gaining industry insight into how to apply new skills, AI technical skills, and knowledge of proven enterprise implementation practices so you can assist with implementation strategy.

In just four to six months of hands-on practice, you will be ready for real-world challenges. Once you've finished these four courses, you'll have a competitive edge for the job market.

A deep dive into the business of AI integration

Core courses

The Business of AI . Learn to create an enterprise roadmap for AI implementation in your specific domain areas. Learn the criteria for choosing high-value use cases and the entire life cycle of strategic planning, proof of concept, and production scale AI deployment.

Natural Language Processing . Build a strong foundation to successfully integrate NLP in enterprise solutions and use cases. Learn how to combine NLP with deep and reinforcement learning to deliver innovative and sustainable business outcomes.

Deep Reinforcement Learning . Gain a practical view of complexities and business decisions in building, training, and deploying deep learning models in an enterprise environment.

Capstone course

Edge Artificial Intelligence Development Capstone . Understand software and hardware trade-offs that affect utilizing machine learning for edge applications and how to develop intelligent edge device applications utilizing machine learning techniques.

Courses

1. Required Course(s): Complete all three

Deep Reinforcement Learning, 3.0 CEU's
Natural Language Processing, 3.0 CEU's
The Business of AI, 1.5 CEU's

2. Capstone Course:

Edge Artificial Intelligence Development Capstone, 2.0 CEU's

3. Completion Review:

Specialization in Enterprise AI Implementation Completion Fee

DEVOPS AND DATA VIRTUALIZATION

Cost: $3,000
Required Credits: 4–5 courses (11 units). Take 2 core courses (5.5 units) and sufficient electives to earn a minimum of 5.5 units. End with Specialization completion review.
Duration: A full-time student can complete the certificate in 6–9 months.

Award Description

Learn to manage, connect, and troubleshoot business systems*

The DevOps and Virtualization specialist manages, connects, and troubleshoots business technology like a pro. In this information technology systems program—the only systems-focused credential of its kind in Silicon Valley—you will study the specialized set of communication tech skills that prepare you to tackle diverse business needs. You will learn to be the person that makes office communication, through a myriad of platforms, networks and cloud-based apps, seem easy for coworkers and be the hero who minimizes downtime.

DevOps and Virtualization program objectives

Discuss CPU, storage and network virtualization

Design, code, and deploy a cloud-focused tool or application

Describe service-oriented architecture and the cloud software development toolchain

Core Courses

System Virtualization Fundamentals
Foundation skills to apply concepts of virtualization to meet critical IT goals such as cost reduction, productivity, scalability, and cloud computing.

DevOps Technologies
An introduction to Agile software development practices and IT automation techniques to achieve rapid rates of high quality deployment.

* Note: This specialization was formerly "Information Technology Systems."

Courses

1. Prerequisite(s): "Networking Fundamentals" or equivalent work experiance.

Networking Fundamentals, 3.0 Units

2. Required Course(s):

DevOps Technologies, 3.0 Units
System Virtualization Fundamentals, 2.5 Units

3. Electives: Two Required

Advanced DevOps Technologies, 3.0 Units
Advanced Network Architecture and Protocols, 3.0 CEU's
Docker Containers In-Depth, 1.8 CEU's

Kubernetes Container Orchestration Fundamentals, 3.0 CEU's
Storage Technology in Data Centers, 3.0 Units

4. Completion Review:

Specialization in DevOps and Virtualization Completion Fee

Requisite Knowledge

It is strongly suggested that you have: **Networking Fundamentals** or equivalent work experience; and **Basic programming experience** using a high-level programming language like Java, Python, C#, or a scripting environment like Bash.

INTERNET OF THINGS (IOT)

Cost: $1,200. (Does not include IoT Creator)
Required Credits: 9 CEUs (Not for UC credit)
Duration: 2 months

Award Description

The journey of IoT data—from sensor to strategy

IoT for the career technologist

Launch your career in the emerging market of the Internet of Things (IoT), which is propelling industry toward a new level of cost savings and environmental conservation. Hundreds of billions of dollars are spent globally to gather data on people, the environment, and the activities around us. The market is expected to triple in size in the next five years creating a host of technical and nontechnical jobs alike. Join the IoT industry professionals who understand the expanding opportunity ahead.

IoT for the technical hobbyist

From idea to implementation, you will build a practical foundation in IoT technology so you can let your inventor's vision loose and build IoT solutions from scratch. In this specialization, you will follow the journey of data, learning a step-by-step process that is accessible to the novice technologist. You'll learn about sensors, networks, cloud services, and the data science that makes sense of it all.

Regardless of your expertise, our courses offer a practical overview of the interdependent technologies across industry so you can head into your new career with your eyes open to the development and implementation process.

IoT Specialization Objectives

You will have an opportunity to work with experts in the industry, make a working IoT product in class using intelligent lighting, and to apply effective data analysis concepts to your business projects and to your everyday life.

Understand how an IoT system works from data acquisition to data processing and transportation to actuation

Practice with basic statistical concepts, such as random variables, variance, covariance, correlation, distributions, confidence intervals, statistical significance, and hypothesis testing

Gain a high-level understanding of IoT components (sensors and actuators, IoT networking and hardware, Python basics, data analytics, database management, cloud services and IoT security)

Use sensors, data processing, cloud services, wireless communication, and LED light sources to complete a real-life intelligent lighting system

Build practical experience using real data and data science math to make evidence-based business decisions regarding capital markets, startups, personal finance and investments, and risk management

Career/Jobs

This IoT specialization is provided in partnership with Microfacturing Institutes , a public benefit

corporation that brings highly marketable technology skills to students of all ages, quickly and affordably.

Current and former students who sign up for the free Microfacturing Institutes Jobs Program become part of an IoT employment database that is used by leading employers around the globe.

See current job listings .

"The Internet of Things, or IoT, has skill sets that are applicable to nearly every growth industry in all sorts of jobs and applications. If you've built these skills and can apply them well, there's a good job for you out there. We'll do our best to help you find it."

— Microfacturing Institutes

This specialization includes:

Related Non-Credit Course

IoT Creator

As you start working in the field of IoT, many people go through a very frustrating and time consuming trial and error phase with early projects. In this course you'll learn a new visual system builder that empowers people to create prototypes in weeks instead of months. It offers you opportunities to connect with a community of experts, engineers and thought leaders so you can envision and prototype new IoT creations.

Courses

1. Required Course(s): Complete all three

Foundations of IoT, 3.0 CEU's
IoT for Work, Life and Play, 3.0 CEU's
Making Money with Data, 3.0 CEU's

2. Completion Review:

Specialization Internet of Things Completion Fee

3. Related Course(s): Not part of the Specialization

IoT Creator, 1.6 CEU's

LEAN-AGILE PROJECT MANAGEMENT

Cost: $3,000
Required Credits: Total required: 4 courses or 6 units. Take 2 core courses (3 units) and 2 elective credit courses (3 units).
Duration: A student can complete this specialization in 6 months.

Award Description

Customer-focused project management

Jumpstart your career for today's rapidly changing organizations with a specialization in Lean-Agile project management methodologies. In this short specialization program, you will learn the current knowledge and practices of Agile product life-cycle management (APLM), including Lean-Agile principles, systems thinking, Scrum and Kanban methodologies, and the Scaled Agile Framework (SAFe©) for Lean Enterprises.

Your new knowledge and skills—including effective customer collaboration, adaptive planning, and leading cross-function teams—will be the essential elements for implementing shorter iterative development cycles with more frequent product releases with higher quality for delighted customers.

Lean-Agile Project Management objectives

Apply Lean-Agile principles and mindful practices within the context of the project team and the larger organization;

Originate and evolve iterative release plans, from concept to cash, based on rapid delivery of business value, using stakeholder collaboration, and empowered cross-functional teams practicing real-time continuous improvement; and

Succeed within the Scaled Agile Framework (SAFe©) for Lean Enterprises to achieve organizational-level agility by leading knowledgeably and effectively with enterprise-wide Lean-Agile teams.

Authorized Training Partner

PMBOK® Guide

Our courses are compliant with A Guide to the Project Management Body of Knowledge, PMBOK® Guide , Sixth Edition.

Courses

1. Prerequisite(s): "Role of the Project Manager" or equivalent work experience.

Role of the Project Manager, 1.5 Units

2. Required Course(s): Two Required

Achieving Organizational Agility using the Scaled Agile Framework, SAFe©, 1.5 Units
Agile Project Management Using Scrum, 1.5 Units

3. Electives: Two Required

Agile Product Life-Cycle Management (APLM), 1.5 Units
Extreme-Agile Project Management, 1.5 Units
Foundations of Disciplined Agile for Project Managers, 1.5 Units
Lean-Agile Project Management: Achieving Business Value, 1.5 Units
Practical Emotional Intelligence for Agile and Project Leaders, 1.5 Units
Principle Based Leadership for Project Managers, 1.5 Units

4. Completion Review:

Specialization in Lean-Agile Project Management Completion Fee

MOBILE APPLICATION DEVELOPMENT

Cost: $2,650
Required Credits: Total Required: 3 courses/9 units. Take 2 required courses and choose 1 elective.
Duration: A student can complete this specialization in 6–9 months.

Award Description

Push to your creative edge

Our Specialization in Mobile Application Development focuses your development expertise in one of the fastest growing fields in technology. Learn to develop iPad, iPhone, and Android applications, and create an engaging interface design. A professional specialization recognizes your experience in this growing industry.

Mobile Application Development program objectives

Demonstrate proficiency with design concepts, theory, and principles relating to the design process and software tools of mobile application designs.

Apply critical thinking and creative problem-solving skills to a variety of web and mobile app design and production cases.

Create a professional quality mobile application with cloud backend services that is in line with the fundamentals of mobile cybersecurity guidelines.

Courses

1. Required Course(s):

Mobile Application Development - Android and iOS, Advanced, 3.0 Units
Mobile Application Development - Android and iOS, Introduction, 3.0 Units

2. Electives: (Choose One)

Designing User Experience for AR, Smart Things, Virtual Reality, and Wearable Technology, 3.0 Units
Mobile e-Commerce, Fintech and Cryptocurrency, 3.0 CEU's
Mobile Interface Design, 3.0 Units

3. Completion Review:

Specialization in Mobile Application Development Completion Fee

Requisite Knowledge

Please review the course descriptions to ensure that you have taken necessary prerequisites or meet the requirements through job experience or previous education. Prerequisite language courses cannot be counted toward the specialization.

Recommend Course Sequence

Flexible course sequence

Courses may be taken in any order provided the prerequisites are met.

To receive your certificate

Upon completion of the course sequence you may request your Mobile Application Development Specialization Completion Review.

PYTHON

Cost: $2,400
Required Credits: 6.5 units
Duration: 4–6 months

Award Description

Meet the Growing Demand for Python Developers

Python, one of the most widely used programming languages in the open source community, is in high demand by employers in just about every industry. It is especially important for people interested in breaking into data science and machine learning.

Fortunately, the elegance and simplicity of Python makes it one of the easiest languages to master. In this 6.5-unit Python Specialization, you can start as a novice and, in just four to six months of hands-on practice, master the fundamentals.

This specialization includes:

Python Programming for Beginners. Learn the fundamental principles of programming with Python, a mind-expanding, new way of thinking for novices.

Python: Object-Oriented Programming. Gain a strong understanding of this most important programming concept, which provides the structure of most Python applications, and the basis of the language itself.

Python for Programmers. Practice the core facilities of Python, as well as the libraries that are most important to professional programmers, and pick up the tools to create your own libraries.

Once you've finished with these three courses, you'll have a competitive edge for the job market.

More details about our 3-course Python specialization program below. Start with a single course! We suggest: **Python Programming for Beginners ,** followed by **Python: Object-Oriented Programming ,** and on to the more advanced **Python for Programmers .**

Courses

1. Required Course(s): You must successfully complete the three courses below.

Python for Programmers, 3.0 Units
Python: Object-Oriented Programming, 2.0 Units
Python Programming for Beginners, 1.5 Units

2. Completion Review:

Python Specialization Completion Fee

SOCIAL MEDIA MARKETING

Cost: $2,700
Required Credits: Total Required: 3 courses (6 units)
Duration: A student can complete this specialization in 6–9 months.

Award Description

Rev up your social media strategy

This is a quick, deep dive into the social media marketer toolbox. Students learn key digital technologies and tools to compete for customers in the digital economy, broaden their online audience, and leverage social media to create measurable business results. Explore how key social media channels, branded communities, blogs, video, and messenger apps fit into B2B and B2C marketing strategies and create a social media marketing plan grounded in analytics. You will learn the best practices of online market research and sponsored content campaigns and understand how social media can add value to particular job functions to exceed performance goals.

Specialization in Social Media Marketing program objectives

Know your audience

Understand the strengths of major social media channels

Develop your own social media campaigns.

Manage, monitor and analyze your social media presence.

Courses

1. Required Course(s):

Advanced Social Media Marketing, 2.0 Units
Social Media Marketing Fundamentals, 2.0 Units

2. Capstone Course:

Application of Social Media for Business Growth, 2.0 Units

3. Completion Review:

Specialization in Social Media Marketing Completion Fee

Requisite Knowledge

Please review course descriptions to ensure that you have taken necessary prerequisites or meet the requirements through job experience or previous education.

Recommend Course Sequence

It is strongly recommended that you take the required courses in this sequence:

Social Media Marketing Fundamentals

Advanced Social Media Marketing: A Practical Approach for Business

Application of Social Media for Business Growth

To receive your certificate

Upon completion of the course sequence you may request your Specialization in Social Media Marketing Completion Review .

WEB DEVELOPMENT

Cost: $2,860–$3,345
Required Credits: 4 courses (9 units). Take 2 core courses (4 units) and sufficient electives to earn a minimum of 5 units. End with Specialization completion review.
Duration: A full-time student can complete the certificate in 6–9 months.

Award Description

Develop web systems and applications for business

Web development and application programming courses are combined in a rich curriculum to help you learn to develop web systems and applications for business and, for the experienced front-end developer, to stay current with the most current computer languages and technologies.

In this focused specialization we train you to work on e-commerce, enterprise applications, interactive websites, and cloud applications. You will study the most popular web programming languages, server development, RIA or dynamic web technologies, and cloud services, and program on all major platforms and frameworks.

Web Development specialization objectives

Design and develop robust, reliable, web systems, and applications to support business needs

Program with JavaScript, PHP, and Python dynamic web application languages

Apply best practices to front-end web development

Develop a test plan to code and test cases for web applications

Core Courses

Designing, Building and Integrating RESTful API
Use data in projects, learn methods of data exchange and how data interacts with business applications.

Introduction to Web Programming
Introduces the basic concepts and programming skills you need to create dynamic web pages, taking you beyond HTML and CSS into the world of JavaScript and PHP.

Specialization Update 2021: We've recently updated the Web Development specialization. Introduction to Web Programming is now one of the required core courses. This course replaces Introduction to Web Programming: JavaScript and Python Django .

Courses

1. Required Course(s):

Designing, Building and Integrating RESTful API, 2.0 Units
Introduction to Web Programming, 2.0 CEU's

2. Electives:

Designing with Cascading Style Sheets: Advanced, 2.0 Units
Developing Enterprise Java Microservices with Spring Boot and Spring Cloud, 3.0 CEU's

HTML5 Advanced and Javascript APIs, 3.0 Units
JavaScript and AJAX, Comprehensive, 3.0 CEU's
Programming for Cloud Computing: Amazon Web Services, 3.0 CEU's
Web Application Development Using React, Redux and TypeScript, 2.0 CEU's
Web Applications Testing, Comprehensive, 3.0 Units
Web Framework Using JavaScript: The MEAN Stack, 3.0 CEU's

3. Completion Review:

Specialization in Web Development Completion Fee

AI APPLICATION DEVELOPMENT

Cost: $2,835
Required Credits: 9 units (CEUs and UC credit)
Duration: Takes about 7 months to complete the specialization.

Award Description

Building applications for our AI future

AI-powered intelligent applications are fast becoming the norm. A fast-moving short specialization, taught by experts in the field.

Develop your Python skills for machine learning, learning its extensive code libraries;

Master introductory deep learning prediction models; and

Launch your own industry standard applications for the enterprise.

A bright job outlook for AI software developers

The global AI software market is expected to reach close to $126 billion by 2025. The market for enterprise applications for AI has grown 270 percent in four years, fueling a level of demand that outstrips the current supply of qualified job candidates, according to a 2019 report from Gartner.

The U.S. Bureau of Labor Statistics predicts a 21 percent growth in software developer jobs by 2028—much faster than average industry growth. People with skills in AI will be in significantly high demand. Learn how to apply industry standards using popular deep learning frameworks in your AI apps and leverage your knowledge in the job market.

The AI Application Development program

Python for Machine Learning and Artificial Intelligence, Essentials
An introduction to the Python programming language essential for data manipulation, statistical analysis, and modeling techniques required for machine learning and artificial intelligence.

Deep Learning and Artificial Intelligence with TensorFlow and Keras
Build deep learning prediction models of different complexities, from simple linear logistic regression to major categories of neural networks including convolutional neural networks (CNNs), recurrent neural networks (RNNs), long short-term memory (LSTMs), and gated recurrent units (GRUs).

Building Integrated AI Applications
A hands-on, industry-oriented training on how to integrate AI into enterprise application development.

Courses

1. Required Course(s): Complete all three.

Building Integrated AI Applications, 3.0 CEU's

Deep Learning and Artificial Intelligence with TensorFlow and Keras, 3.0 Units
Python for Machine Learning and Artificial Intelligence, Essentials, 3.0 Units

2. Capstone Course: (Optional)

Edge Artificial Intelligence Development Capstone, 2.0 CEU's

3. Completion Review:

Specialization in AI Application Development Completion Fee

DEI FOR EDUCATORS

Cost: Varies
Required Credits: Mix of UC credit and CEUs
Duration: Varies

Award Description

DIVERSITY • EQUITY • INCLUSION

Tools for impact: An exploration of inclusive teaching practices

In this highly interactive DEI for Educators specialization we explore the historic, legislative, and cultural barriers that impact the classroom and corporate training, providing concrete strategies to reach diverse learners.

From deficit to divergent

Research-based curriculum addresses various styles of learning, best practices for addressing trauma, and a renewed perspective on race, culture, neurodivergence, age, gender, identity, and physical abilities.

A social and restorative justice approach

With a focus on inclusion and social justice, this program brings to light community-based solutions to centuries of discrimination and exclusion. We see the advantage of culture as a teaching tool and provide the factual, scientific connection to what is happening today. We learn how to challenge social, cultural, and economic inequalities imposed on individuals arising from differential distribution of power, academic resources, and privilege. We also learn how to cultivate environments that empower students to resolve conflicts on their own.

Who this is for

Teachers, trainers, therapists, allies, administrators, human resource professionals, parents, industry consultants, activists.

Curriculum objectives

You will leave these classes with a comprehensive understanding of:

Historical implications of inequities.

Why feelings are affixed to historic trauma.

Scientific data speaking to physiological threat and trauma reactions to discrimination and microaggressions.

Social and restorative justice-based solutions.

Financial costs of diminished opportunities.

Benefits of economic, professional, and health care equity.

Courses

1. Four Required Courses

Culture and Cultural Diversity, 4.0 Units
Learning Theories and Styles, 1.0 Units
Moving Beyond Our History: Diversity Tools for Today, 1.0 CEU's
Neurodivergent Learners, 1.0 Units

2. SPECIALIZATION COMPLETION REVIEW

Specialization in DEI for Educators Completion Fee

DEI FOR EARLY CHILDHOOD SUCCESS

Cost: Varies
Required Credits: Mix of UC credit and CEUs
Duration: Varies

Award Description

Improving student outcomes by l**everaging filters of diversity**

In this DEI for Early Childhood Success specialization we delve into the complex dynamics of culture, race, ability, gender and identity, learning new ways of seeing, listening, and acting to empower young learners.

We will explore cultural histories and pervasive obstacles to success in the classroom, learning to identity, interact, and effectively respond to common behaviors.

DEI for Early Childhood Success

Help educators see the cultural dynamics of each student

Understand how individual values are developed

Identify emotions and perspectives that can be detrimental to students of color or with certain learning styles

Use cultural awareness to filter rather than obstruct interactions and evaluation

Explore new mediums of communication and assignments

Lower language barriers that don't support success

Create a toolbox of best practices for positive inclusivity in the classroom.

Who this is for

Teachers, trainers, therapists, allies, administrators, parents, and industry consultants will benefit from this curriculum.

Courses

1. Four Required Courses

Cultural Equity for Student Success, 1.0 CEU's
Culture and Cultural Diversity, 4.0 Units
ECE 6: Culture and Diversity in the Early Childhood Classroom, 3.0 Units
Neurodivergent Learners, 1.0 Units

3. Completion Review

Specialization in DEI for Early Childhood Success Completion Fee

AI FOR BUSINESS

Cost: $2,025 (Does not include promotional discounts.)
Required Credits: Mix of CEUs and credit
Duration: 6-9 months

Award Description

AI to build business • AI to benefit humanity

In the AI for Business specialization you will study industry-aligned use cases of leading companies in a mentored environment. From health care and automotive manufacturing to finance, we will explore the successful integration of AI into diverse industries. What worked and what obstacles tend to slow progress? Discussions and class projects focus on preparing you with applicable, cross-industry job skills. Instruction is accessible to people at all levels of technical expertise and business knowledge.

Industry-aligned use cases

Cross industry studies

Inclusive AI learning

Project-based learning

Ethics-based implementation

Access • Mentorship • Ethics

We are casting a wide net to bring people into the pipeline and ensure there are career pathways for people at all levels of experience in multiple industry sectors. We're committed to preparing you for the open AI job pipeline, emphasizing current industry needs for people who understand the complex ethical issues surrounding the development and use of AI.

Accessible

Reduced barriers to entry

Affordable

The AI for Business program

The Business of AI
A hands-on, workshop-style environment, for students—technical and nontechnical—to explore the future of AI and its potential on organizational levels.

Introduction to Machine Learning
An opportunity to work with practical data-driven applications and gain applicable knowledge on essential machine learning concepts, tools, and methodology.

AI, Empathy, and Ethics
A nontechnical overview on AI advancements and the ethical challenges we now face as we navigate the development, implementation, and ubiquitous global use of AI.

On the horizon

Career counseling for people seeking AI jobs

* " **How to build AI that society wants and needs** " [World Economic Forum, July 2, 2021]

Courses

1. Required Course(s): Complete all three.

AI, Empathy, and Ethics, 1.0 CEU's
Introduction to Machine Learning, 3.0 Units
The Business of AI, 1.5 CEU's

2. Capstone Course: Optional

Edge Artificial Intelligence Development Capstone, 2.0 CEU's

3. Completion Review:

Specialization in AI for Business Completion Fee

DEI LEADERSHIP

Cost: $1,285
Required Credits: 4.2 (Mix of UC credit and CEUs)
Duration: A student can complete this specialization in about nine months.

Award Description

Visionary leadership and navigating change

With the nation's spotlight on issues of diversity, equity, and inclusion, people are looking to leadership for change and expecting a substantive response. In this DEI Leadership specialization, we explore what it really means to lead an organization committed to your values. We examine leadership styles and systemic barriers to inclusion, providing concrete tools and best practices to unleash the potential of your teams. This is not a lecture series. Your full participation is requested for class discussions.

Curriculum

DEI Leadership and Strategic Impact
with Stephanie Evans-Wemusa, BA, MSHROD

Cultural Proficiency
with Holly Cornelison Hopla, M.Ed.

Global Diversity: A Toolkit for Cross-Cultural Communication
with Jeaneen Wallis, M.B.A., Ph.D.

DEI leadership program learning outcomes

Identify your values and how they influence your leadership of diverse teams

Apply communication strategies to create culturally equitable workplaces.

Mentor diverse colleagues and share feedback in ways that enable them to develop and deliver

DEI leadership job outlook

With racism and inequity on the forefront of the national agenda, there has been a sharp uptick in job openings in the last year for chief diversity officers and leaders who are skilled in diversity-aligned organizational change. This curriculum is ideal for:

C-suite executives

HR professionals and people business partners

Executive coaches

Aspiring organizational leaders

Managers

Chief diversity officers

Courses

1. Required Course(s): Three Required

Cultural Proficiency, 2.0 Units
DEI Leadership and Strategic Impact, 0.6 CEU's
Global Diversity: A Toolkit for Cross-Cultural Communication, 1.6 CEU's

2. Completion Review:

Specialization in DEI Leadership Completion Fee

WORKPLACE CULTURAL COMPETENCY

Cost: $1,985
Required Credits: 6.5 credits
Duration: A student can complete this specialization in 6–9 months.

Award Description

DEI through the lens of HR leaders

Fostering diversity, equity, and inclusion in the workplace has become the priority in organizations committed to an organizational culture where all people can prosper. In the Workplace Cultural Competency specialization, we explore ways to identify and correct systemic issues, help leaders drive strategic initiatives, that support cultural and systemic change.

We work with tools for effective intercultural global business practices and help you guide executives and managers to recognize obstacles, build equitable systems, and implement DEI initiatives that positively impact the bottom line of an organization.

Learning outcomes

Understand the HR role in leading DEI initiatives.

Identify and correct systematic issues prevailing negative impact on organizational culture.

Learn to track DEI initiatives that support workforce engagement and productivity.

Prevent misunderstands that could lead to formal grievances.

Assist leaders with the implementation of DEI initiatives.

Apply research-based strategies to intercultural business activities.

Coach employees through cultural transitions.

Strategize use of cultural resources.

Conduct effective conflict resolution meetings.

Identify and understand different perspectives and approaches to the study of conflict.

Integrate conflict resolution into various organizational cultures.

Recognize mediator and party biases and cultural differences in a resolution process.

Implement the optimal mediation style for a dispute

Understand the mediation process when participating in an EEOC mediation

Employment opportunities

People business partners

DEI program managers

HR professionals

Managers

Courses

1. Required Course(s): Three Required

Conflict Resolution and Mediation, 3.0 Units
Cultural Proficiency, 2.0 Units
Strategic DEI Initiatives for HR Professionals, 1.5 Units

2. Completion Review:

Specialization in Workplace Cultural Competency Completion Fee

DATA SCIENTIST

Cost: Varies.
Required Credits: 12 CEUs
Duration: Month-to-month program. Usually four to five months.

Award Description

Advanced skills for the job-ready data scientist

A fully online, self-directed program

A Gallup study predicted that by 2021, 69% of employers expected that candidates with data science skills would be given preference for jobs in their organizations. Yet only 23% of college and university leaders say their graduates will have those skills by 2021. Pick up the data science solutions for you new career.

Data Scientist specialization objectives

Use Python and SQL to access and analyze data from several different data sources.

Use principles of statistics and probability to design and execute A/B tests and recommendation engines to assist businesses in making data-automated decisions.

Deploy a data science solution to a basic flask app

Manipulate and analyze distributed datasets using Apache Spark

Communicate results effectively to stakeholders

A month-to-month subscription program

How much can you complete in a month?

Most students take four to five months to complete this specialization. In this self-directed, online format, you can pause your studies for up to two months (at the end of any month) and pick up where you left off. You have up to six months to complete this program. Learn more about the month-to-month subscription plan.

The benefits of an Udacity/UCSC program

The curriculum is designed by Udacity, our global online education partner. Here are some of the perks of choosing this program

Top University of California/Udacity technical curriculum.

A certificate of completion from UC Santa Cruz, an accredited university with a global reputation and a 50+-year history of exceptional professional training.

A UCSC Silicon Valley-branded digital badge to show off your acquired skills on LinkedIn and provide aptitude verification for employers.

12 continuing education units (CEUs).

A self-paced, soft skills curriculum (0.5 CEUs) to strengthen your critical interpersonal skills for the job market.

One-on-one career counseling session and workshops with one of our workforce partners for those who are eligible.

Online job search tools and recruitment partners with Handshake, the No. 1 national virtual job fair platform for college students .

A 24/7 online resume-building tool that leverages data science, machine learning, and natural language processing to provide you with instant personalized feedback on your resume based on criteria gathered from employers and global best practices.

Engagement with the UC Santa Cruz community through live, topical webinars and career-related events .

A Udacity Nanodegree certificate.

Courses

Subscription by Month

Data Scientist Specialization (self-paced)

Recommend Course Sequence

The curriculum is provided in sequence. You may progress at your own pace.

Curriculum Details

Segment 1: Solving data science problems

The Data Science Process

Communicating with Stakeholders

Segment 2: Software engineering for data scientists

Software Engineering Practices

Object Oriented Programming

Web Development

Segment 3: Data engineering for data scientists

ETL Pipelines

Natural Language Processing

Machine Learning Pipelines

Segment 4: Experiment design and recommendations

Experiment Design

Statistical Concerns of Experimentation

A/B Testing

Introduction to Recommendation Engines

Matrix Factorization for Recommendations

Segment 5: data science projects

Elective 1: Dog Breed Classification

Elective 2: Starbucks

Elective 3: Arvato Financial Services

Elective 4: Spark for Big Data

Elective 5: Your Choice

Requisite Knowledge

Python • SQL • Statistics Python programming skills
Writing functions, logic, control flow, and building basic applications, as well as common data
analysis libraries like NumPy and pandas • SQL programming: Querying databases using joins,
aggregations, and subqueries • Comfortable with using the Terminal, version control in Git, and
using GitHub **Probability and statistics skills**
Descriptive Statistics: Calculating measures of center and spread, estimation distributions •
Inferential Statistics: Sampling distributions, hypothesis testing • Probability: Probability theory,
conditional probability **Mathematics**
Calculus: Maximizing and minimizing algebraic equations • Linear Algebra: Matrix manipulation and
multiplication **Data wrangling**
Accessing database, CSV, and JSON data • Data cleaning and transformations using pandas and
Sklearn **Data visualization with matplotlib**
Exploratory data analysis and visualization • Explanatory data visualizations and dashboards
Machine learning
Feature Engineering • Supervised Learning: Regression, classification, decision trees, random
forest • Unsupervised Learning: PCA, Clustering **We offer courses to help you prepare for this
specialization.** Big Data: Overview, Tools and Use Cases Dashboards and Data Visualization Data
Analysis, Introduction Statistics Making Money with Data Python Programming for Beginners
Python for Data Analysis Python for Programmers Python for Machine Learning and Artificial
Intelligence, Essentials

PROGRAMMING FOR DATA SCIENCE WITH PYTHON

Cost: Varies.
Required Credits: 12 CEUs
Duration: A student can complete this specialization in about four months.

Award Description

Your data science career starts here

A fully online, self-directed program*

Most U.S. companies plan to add data science positions. By 2020, openings for data science and analysts are projected to grow 15 percent. Hundreds of thousands of people are needed to fill those jobs.

Specialization takeaways

By the end of this program you will understand:

SQL fundamentals such as JOINs, Aggregations, and Subqueries.

How to use SQL to answer complex business problems.

Python programming fundamentals such as data structures, variables, loops, and functions.

How to work with data using libraries like NumPy and Pandas.

Version control and how to share your work with other people in the data science industry.

We recommend that students dedicate about 10 hours each week to complete the four-month program.

A month-to-month subscription program

How much can you complete in a month?

Most students take four months to complete this specialization. If you want to take a break, you can pause and pick up where you left off. You have up to six months to complete this program Learn more about the month-to-month subscription plan.

The benefits of an Udacity/UCSC program

The curriculum is designed by Udacity, our global online education partner. Here are some of the perks of choosing this program:

Top University of California/Udacity technical curriculum.

A certificate of completion from UC Santa Cruz, an accredited university with a global reputation and a 50+-year history of exceptional professional training.

A UCSC Silicon Valley-branded digital badge to show off your acquired skills on LinkedIn and

provide aptitude verification for employers.

12 continuing education units (CEUs).

A self-paced, soft skills curriculum (0.5 CEUs) to strengthen your critical interpersonal skills for the job market.

One-on-one career counseling session and workshops with one of our workforce partners for those who are eligible.

Online job search tools and recruitment partners with Handshake, the No. 1 national virtual job fair platform for college students .

A 24/7 online resume-building tool that leverages data science, machine learning, and natural language processing to provide you with instant personalized feedback on your resume based on criteria gathered from employers and global best practices.

Engagement with the UC Santa Cruz community through live, topical webinars and career-related events .

A Udacity Nanodegree certificate.

Courses

Subscription by Month

Programming for Data Science with Python Specialization (self-paced)

Recommend Course Sequence

The curriculum is provided in sequence, but you may progress at your own pace.

Introduction to SQL

Learn SQL fundamentals such as JOINs, Aggregations, and Subqueries. Learn how to use SQL to answer complex business problems.

Investigate a database

You'll work with PostgreSQL, a relational database, and complete the entire data analysis process—from posing a question and running appropriate SQL queries to sharing your findings.

Introduction to Python programming

Learn Python programming fundamentals such as data structures, variables, loops, and functions. Learn to work with data using libraries like NumPy and Pandas.

Project: Explore U.S. Bikeshare Data

You will use Python to answer analytical questions about bikeshare trip data collected from three U.S. cities. You will write code to collect the data, compute descriptive statistics, and create an interactive experience in the terminal that presents the answers to your questions.

SERIES

CPA PREPARATION

Cost: Varies. Based on your course choices.
Required Credits: 16 quarter units of accounting and 25 quarter units of general business courses.
Duration: Most courses take 4–12 weeks to complete.

Series Description

CPA exam preparation courses for your career

Closely tied to the health of the overall economy, the accounting business grows as the economy grows and more workers are needed to prepare and examine financial records.

Our 15 CPA Preparation courses provide you with most of the accounting and general business credit you need in the areas of business law, project management, and marketing to qualify for the rigorous CPA exam. You'll gain theoretical knowledge knowledge on the complex accounting issues that your clients face and learn best industry practices to grow your accounting career. If you're already an accountant, you can earn more and expand your job horizons.

Learn more about becoming a CPA

Our CPA Preparation curriculum is applicable toward the requisite educational hours to take the CPA exam. Learn more about taking the exam by reading the CPA Exam Handbook .

Courses

Accounting Courses

Intermediate Accounting I, 4.0 Units
Intermediate Accounting II, 4.0 Units
Introduction to Accounting I: Financial Accounting, 4.0 Units
Introduction to Accounting II: Managerial Accounting, 4.0 Units

Business Courses

Business Law and Its Environment, 3.0 Units
Data Analytics for Business Management, 3.0 Units
Finance for the Business Professional, 1.0 Units
Finance I, Fundamentals, 3.0 Units
Implementing Marketing and Sales Strategies, 2.0 Units
Integrated Marketing Communication, 3.0 Units
Organizational Development and Change, 2.0 Units
Power of Market Research, 2.0 Units
Principles of Marketing, 2.0 Units
Project Leadership and Communication, 3.0 Units
Role of the Project Manager, 1.5 Units

Requisite Knowledge

Please review the course descriptions to ensure that you have taken necessary prerequisites or meet the requirements through job experience or previous education.

Recommend Course Sequence

Flexible course sequence

You may follow any course sequence provided prerequisites have been met for each course.

DIGITAL MARKETING SCIENCE

Cost: $1,350 (Regular price: $1,799)
Required Credits: 8 CEUs
Duration: 10 weeks

Series Description

Prove your digital marketing skills

A 10-week online mentored certificate course

A fully online program with optional, but highly recommended, live, weekly, instructor-led classes.

Upcoming sessions

You can sign up for a session up to one week after the start date.

Sept. 13 – Optional live-online classes Mondays, 4–6 p.m. (PT)

Oct. 4 – Optional live-online classes Tuesdays, 4–6 p.m. (PT)

Nov. 1 – Optional live-online classes Wednesdays, 4–6 p.m. (PT)

This Digital Marketing Science certificate course will transform you into a complete digital marketer with expertise in the most in-demand marketing domains. Fast-track your career in digital marketing with practical training and technical certifications you can apply on the job. Delivered online, this comprehensive curriculum is taught by industry experts and supplemented with live/online mentor-led classes.

A digital marketing science playbook

You'll leave the course with proof of your digital marketing skills. For your final project, you will apply your new skills to the website of a real business in the form of a playbook and get feedback from industry experts and peers.

Learning outcomes

Industry-recognized certifications and qualifications

The curriculum in this course qualifies or certifies you for several marketable certifications.

Google Ads Search Certification—Google Ads is one of the most effective advertising tools to get more traffic to your website and generate more leads.

Google Analytics Individual Qualification—A demonstration of proficiency in analytics that is available to any individual who has passed the Analytics IQ exam.

HubSpot Email Marketing Certification—Strategy and tactics to grow your business, and your career.

You'll also learn about several highly marketable certifications offered by Marketo, The Trade Desk, and Facebook as well as tools for:

Web Analytics

Search Engine Optimization

Search Engine Marketing

Social Media Marketing

Email Marketing

Reputation Management

Digital Marketing Strategy

Our students

Career Starters—Recent grads and college students.

Career Changers—People looking to try something new after working several years in a single job or career.

Reentries—People who have spent a few years out of the workforce as a stay-at-home parent and now want to return to work.

Career Enhancers—Professionals seeking to update their skills for promotion or more responsibility.

Entrepreneurs—People who want an overview of key areas of responsibilities and best practices in digital marketing.

Time commitment

You should expect to spend one to two hours in live-online sessions per week, and an additional four to six hours completing assignments and project work. Live sessions are optional, but highly recommended.

GreenFig—Our curriculum partner

This Digital Marketing Science Certificate Course is provided in partnership with GreenFig , a market-driven education company that delivers innovative programs to prepare learners for the demands of today's economy.

DIGITAL MARKETING WEBINARS

Learn more about our new Digital Marketing Science Certificate course curriculum, by checking out our weekly info session and live and recorded webinars.

Digital Marketing Science Info Sessions – Thursdays

Marketing Workout: Facebook Ads

Marketing Workout: Email Creation

Marketing Workout: Google Ads - Please email admissions@greenfig.com for access to this recent webinar.

Courses

1. Applied Business Science Courses

Digital Marketing Science Certificate Course, 8.0 CEU's

DIVERSITY EQUITY INCLUSION

Cost: Varies
Required Credits: CEUs varies
Duration: Varies

Series Description

Change begins with us

Welcome to the new UCSC Silicon Valley Extension Diversity Equity Inclusion series where we invite you to consider new ways of listening, seeing, and evaluating the roles and identities we live in today's society and help you develop practical tools to navigate a more just society.

Our curriculum is created to build awareness and develop DEI leadership in the classroom and in larger organizations and institutions to promote:

Greater understanding
Awareness of the many intersecting identities and roles we have in diversity, equity and inclusion work.

Wiser interactions
Promoting equity, inclusion, and social justice in our workplaces, communities, and beyond.

Effective advocacy
Moving beyond understanding and empathy toward allyship and action.

Three introductory DEI courses

Other related DEI courses

Several of our existing courses in business and education address issues of diversity, equity, and inclusion and we are excited to be developing a rich menu of DEI curriculum for people interested in diving deeper into the executive's potential, the promise of technology, the role of educators, and the mission of the advocate.

Cultural Proficiency

Learning Theories and Styles

Culture and Diversity in the Early Childhood Classroom

Culture and Cultural Diversity

Sustainable Supply Chain Strategies

Advanced Management Communications

Courses

Diversity Equity Inclusion Courses

Advanced Management Communications, 2.0 Units

Cultural Equity for Student Success, 1.0 CEU's
Cultural Proficiency, 2.0 Units
Culture and Cultural Diversity, 4.0 Units
DEI Leadership and Strategic Impact, 0.6 CEU's
ECE 6: Culture and Diversity in the Early Childhood Classroom, 3.0 Units
Global Diversity: A Toolkit for Cross-Cultural Communication, 1.6 CEU's
Learning Theories and Styles, 1.0 Units
Moving Beyond Our History: Diversity Tools for Today, 1.0 CEU's
Strategic DEI Initiatives for HR Professionals, 1.5 Units
Sustainable Supply Chain Strategies, 1.5 Units

EDUCATIONAL CREDENTIALING

Cost: $370
Required Credits: 2–5 units each
Duration: 4–8 weeks each

Series Description

Stay up to date with your training

UCSC Extension offers two online courses for clearing the preliminary credential required for SB 2042 Multiple Subject and Single Subject. Both courses— Technology in Schools, Introduction (SB 2042 Standard 11) ; and Becoming a Professional Educator: Special Populations and Healthy Environments —comply with California Commission on Teacher Credentialing (CCTC) standards.

Courses

1. Required Courses

Becoming a Professional Educator: Special Populations and Healthy Environments, 5.0 Units
Technology in Schools, Introduction (SB 2042 Standard 11), 2.0 Units

HAZWOPER

Cost: $265 per course
Required Credits: Available units & CEUs vary.
Duration: 1-day refresher & continuing education courses

Series Description

Best practices for environmental health

We offer the latest safety and health information from industry experts in hazardous waste operations, environmental health and safety training, certification, and refresher courses.

Courses

HAZWOPER Refresher & EH&S; One-Day Update Courses

8-Hour Annual HAZWOPER Refresher, 0.8 CEU's
Hazardous Waste Handling and Awareness Training, 0.7 CEU's
Toxics Laws Legislative and Regulatory Update, 0.5 Units

LEGAL STUDIES

Cost: Varies per program—$995–$1,295
Required Credits: 4.2 – 5 CEUs
Duration: 7-week, self-paced and fully online program

Series Description

Expand your consulting business

Each industry develops its own unique legal strategies and professional lexicon to grow and navigate the constantly evolving world of law. We're offering legal studies courses in key Silicon Valley industries—engineering, nursing, healthcare, law office technology, and victim advocacy—to give you practical understanding of your consulting role in the legal realm.

Whether you are a legal professional tackling the latest software for your trade, an advocate for victims of crime, an entrepreneur exploring intellectual property law, or a medical professional—this curriculum is tailored to your professional development.

eDiscovery for Paralegals

A seven-week introductory course covering the entire eDiscovery process.

eDiscovery preparation basics

Best practices for electronically stored information collection

The review process.

Most relevant eDiscovery topics

This course is endorsed by ACEDS, the gold standard in eDiscovery training and education.

Employment Law Certificate Course

A multitude of statutes cover the complex relationships between employers and employees. In this course, you'll learn about the National Labor Relations Act, the Railway Labor Act, and other statutes dealing with public employees. You'll focus on topics such as master and servant relationships, wages and hours, anti-discrimination in employment laws, minimum wages and maximum hours guidelines and the regulation of working conditions.

CLS by Barbri (and UCSC Silicon Valley Extension) is recognized by SHRM to offer professional development credits for the SHRM-CPSM and SHRM-SCPSM.

Legal Investigation Certificate Course

Learn to assist attorneys, paralegals, insurance companies, private businesses, and government agencies in the process of civil and criminal investigation. You'll investigative gain skills related to arson, product liability, personal injury and accident forensics, financial matters, professional malpractice and negligence, skip-tracing, and the role of a legal investigator in preparing for civil and criminal litigation. You'll also learn about working in the field: freelance investigation, job search strategies and placements.

Intellectual Property Law for Engineers

Learn more about the patent process to protect inventions and help build strong copyright protections. Click button below for course syllabus available. The class deals with patent applications, research and prosecution; the law of infringement, and computer applications of software (protected by copyright) and hardware (by patents). We cover what other concepts are patented, as well as machines, processes, mixtures, manufacturing, compositions of materials and methods of doing business and research. Not only do we deal with utility patents, but with design and plant patents as well.

Victim Advocacy Certificate Course

The legal terminology and process, victims rights, ethics, victim advocacy, and crisis intervention skills create the foundation for you to make a difference in the lives of crime victims.

Successful graduates of this training program will be eligible at minimum for the NACP Provisional Credential and possibly for the Basic, Intermediate or Advanced Credential based upon experience in the field.

Medical Professional Legal Consultant

Medical professionals interested in the field of forensic testimony and medical-legal issues will gain the fundamentals they need to advise law firms, insurance companies, and governmental agencies regarding medically related issues and to appear in court as expert witnesses. Click button below for course syllabus available.

This program has been reviewed and is approved for a maximum of 45.00 hours of AAPA Category 1 CME credit by the Physician Assistant Review Panel.

Software Essentials for the Law Professional

Technology Legal professionals learn more about the technology available to run an efficient practice and courtroom litigation. Course topics include: computer operating systems and peripheral devices; time tracking and billing software; database, case management and docket control software; litigation support software; electronic discovery, and trial presentation and graphics software. Hands on exercises prepare students to work with popular programs such as MS PowerPoint, Clio, and LexisNexis CaseMap & TimeMap, as well as understand the common functions and purposes of similar programs.

Legal Nurse Consultant Training Course

Nurses (PAs and RNs) in the seven-week **Legal Nurse Consultant Training Course** build on their medical expertise to serve as legal expert consultants and advise law firms, health care providers, insurance companies, and governmental agencies regarding medically related issues and to appear in court as expert witnesses. Click button below for course syllabus available.

Successful graduates will receive a certificate for 42 contact hours of nursing continuing professional development from CLS by BARBRI (formerly Center for Legal Studies) that they may be able to use to fulfill continuing education requirements.

CLS by BARBRI—Our Curriculum Partner

These legal studies courses are provided in partnership with **CLS by BARBRI**, a legal education company (formerly Center for Legal Studies) that is focused on providing affordable, up-to-date, and effective legal education. Student payment plans available through CLS by BARBRI.

Courses

1. Legal Studies Courses

Intellectual Property Law for Engineers, 4.5 CEU's
Legal Nurse Consultant Training Course, 4.2 CEU's
Medical Professional Legal Consultant, 4.5 CEU's
Software Essentials for the Law Office, 5.0 CEU's
Victim Advocacy Certificate Course, 4.5 CEU's

PARALEGAL STUDIES

Cost: Core Paralegal Program: $1,595 • Advanced Paralegal Program: $2,400
Required Credits: Paralegal Program: 9 CEUs • Advanced Paralegal Program: Up to 27 CEUs
Duration: Paralegal: Two 7-week sessions • Advanced Paralegal Program: Six 7-week sessions

Series Description

Launch your paralegal career

The job outlook for paralegals and legal assistants is bright, adding jobs at a brisk 10 percent annually and it's especially good if you've you've got strong computer and database management skills. Whether you're interested in supporting a law office, diving into banking or corporate programs, or hanging your own shingle, the diverse paralegal profession needs skilled paralegals.

Two paralegal programs

We offer two levels of paralegal training to help you gain a comprehensive understanding of the American judicial system—the **Paralegal Certificate Course ©** and the **Advanced Paralegal Certificate Course .** While not UCSC-designated certificate programs, the combined courses meet state of California paralegal certification requirements, and culminate in a certificate of completion.

The Paralegal Certificate Course © is the **cornerstone** of The Center for Legal Studies programs.

These advanced legal studies classes help students build on their knowledge of law by allowing you to specialize in facets of contemporary law. Your study gives you a strong competitive edge over other paralegals.

Completing both the Core Requirements and the Advanced Requirements of the Paralegal Certificate Program provides comprehensive training and skills to work in the quickly-growing paralegal profession. In combination, the two paralegal programs meet the requirements of the California Business and Professional Code §6450.

CLS by BARBRI—Our Curriculum Partner

These legal studies courses are provided in partnership with **CLS by BARBRI**, a legal education company (formerly Center for Legal Studies) that is focused on providing affordable, up-to-date, and effective legal education. Student payment plans available through CLS by BARBRI.

Paralegal Certificate Course©

In two seven-week intensives—Paralegal I and Paralegal II—CLS instructors will teach you practical skills to assist trial attorneys, interview witnesses, investigate complex fact patterns, research the law, and assist in preparing cases for courtroom litigation.

Paralegal I Objectives

The origins and history of the American legal system

The meaning and application of important legal terminology

Attorney and paralegal ethics

Techniques of jury selection and the jury selection process

How to prepare legal documents including demand letters, pleadings, discovery documents, motions and memos

Significant elements of the substantive law of torts, contracts

The important rules of civil procedure and evidence

How to conduct a legal interview

How to conduct legal investigation

How to conduct legal analysis and perform legal problem solving

Paralegal II Objectives

The importance of precedence

What legal authority is, and which authority is the most important

How to conduct legal research and learn how to use the 4 most effective legal research tools found in virtually every law library

How to Shepardize your authority

How to properly cite your authority

How to conduct computerized legal research used extensively in law offices throughout the country.

Proper and effective legal writing style

The basic documents for several important substantive areas of law

Advocacy techniques for usage in formal or informal settings, and

How to begin your job search and perhaps begin a freelance paralegal business after your education

Advanced Paralegal Certificate Course

Focus on topics that interest you. You are required to complete six seven-week sessions of Advanced Paralegal course topics to receive a certificate of completion. Please choose from the sessions listed below.

Advanced Legal Research

Alternative Dispute Resolution (Mediation)

Bankruptcy Law

Business Law

Constitutional Law

Criminal Law

Criminal Procedure

eDiscovery

Education Law

Estate Planning

Family Law

Immigration Law

Intellectual Property

Real Property Law

Victim Advocacy

Water Law

Courses

Advanced Paralegal Program

Advanced Paralegal Certificate Course, 27.0 CEU's

Core Paralegal Program

Paralegal Core Certificate Course©, 9.0 CEU's

Requisite Knowledge

Please review course descriptions. Without any prior degrees or legal experience, you will need to take both courses and receive a certificate of completion to practice in California. Please visit The Center for Legal Studies for more information on California Business & Professions Code §6450.

Recommend Course Sequence

Begin with Paralegal Core Certificate Course © (Paralegal I & II) Students must successfully complete the core requirements before they take the Advanced Paralegal Certificate Course . Advanced course topics can be taken in any order.

SALES OPERATIONS SCIENCE

Cost: $899 ($300 off the regular price of $1,199)
Required Credits: 7 CEUs
Duration: 10 weeks

Series Description

Beyond sales operations fundamentals

A fully online program with optional live, weekly peer roundtables facilitated by sales operations practitioners.

Meets Tuesdays, 4–5 p.m. (PT). Upcoming start dates:

Sept. 13*

Oct. 4*

Nov. 1*

Maximizing your team's sales performance

In this 10-week course, we'll focus on operational efficacy, engage in best practices from leading experts, master critical concepts and strategies, and put your new skills to the test with hands-on practice in your individualized Salesforce Sales Cloud Developer environment. You'll also create a Strategic Sales Operations Playbook to help a real-world company reach more prospects, produce more pipeline, improve key processes, and generate more revenue.

Industry expert guest speakers

Strategic Sales Operations Playbook

14 Salesforce Trailhead badges

Demos and exercises in your Salesforce developer environment

Feedback from mentors

Expect to spend four to six hours each week completing assignments and engaging with content created by industry experts, including hands-on activities and assignments in an online learning portal. Additional one-hour optional weekly mentor-led peer roundtables are available (and recommended) for engaging more fully live and online.

Our Curriculum Partner

This Sales Operations Science Certificate Course is provided in partnership with GreenFig , a market-driven education company that delivers innovative programs to prepare learners for the demands of today's economy.

Courses

1. Applied Business Science Courses

Sales Operations Science Certificate Course, 7.0 CEU's

ARTIFICIAL INTELLIGENCE

Cost: Varies.
Required Credits: Varied CEUs and UC Credit
Duration: Varies

Series Description

The wave of artificial intelligence data and technology sweeping across industry is transforming how we work, how we develop new products and services, how we measure our success, and how we plan for the future. That is why we are creating the most comprehensive AI curriculum in the UC Extension system.

The UCSC Silicon Valley AI curriculum prepares you for today's workforce. We are focusing on providing you hands-on, practical technical skills as well as strategic business acumen to meet a skyrocketing demand for people who understand what it takes to develop and implement AI technology across industry. It is a multi-billion dollar market and growing and we are casting a wide net to ensure the future is created by many for many. Explore our curriculum and learn about the technology and business decisions shaping companies, products, and services for all of us.

UCSC Silicon Valley's unique focus

Interactive online classroom with industry leaders

Industry-aligned curriculum

Cross-industry skills prep

Active curriculum guidance and classroom mentorship

Tech-focused and business-focused programs

Lowered barriers to entry for people interested in learning

AI Opportunity

Startups have raised over $8.5 billion in disclosed equity funding in the U.S. in 2020. [CB Insights]

AI opens doors—AI for All

As AI reshapes our workforce, costing jobs in many sectors, it will also create many new jobs. We want to make sure everyone is ready for the transition—the technically focused, the business-minded, and the seasoned tech worker—as well as the underrepresented populations that often face high barriers to entry into the well-paying tech workforce.

Passionate about teaching AI?

Please let us know if you're interested in joining our esteemed instructor team.

Courses

1. Artificial Intelligence (AI) Courses

AI, Empathy, and Ethics, 1.0 CEU's
AI-Led Enterprise Transformation: Technologies and Use Cases, 0.5 Units

Artificial Intelligence for Robotics, 1.0 CEU's
Building Integrated AI Applications, 3.0 CEU's
Deep Learning and Artificial Intelligence with TensorFlow and Keras, 3.0 Units
Introduction to Machine Learning, 3.0 Units
Natural Language Processing, 3.0 CEU's
Predictive Analytics: Applications of Machine Learning, 3.0 Units
Python for Machine Learning and Artificial Intelligence, Essentials, 3.0 Units
The Business of AI, 1.5 CEU's

Recommend Course Sequence

Please be sure you meet the prerequisites for each course. You may choose courses in any order according to your interest.

Nontechnical AI Courses

The Business of AI

Edge Artificial Intelligence Development Capstone

AI-Led Enterprise Transformation: Technologies and Use Cases

AI tech courses

Natural Language Processing

Deep Reinforcement Learning

Python for Machine Learning and Artificial Intelligence, Essentials

Computational Intelligence, Introduction

Introduction to Machine Learning and Data Mining

FPGA Application in Autonomous Driving Systems, Introduction

Deep Learning and Artificial Intelligence with TensorFlow and Keras

Other AI-related specializations

Python Specialization

Programming for Data Science with Python

Data Scientist

On the horizon

This is just the beginning of our comprehensive AI offerings. Much more is in the works. Please check back here for our next program launch and new courses in the areas of:

AI for Business

AI Cybersecurity

Robotics AI

AI Ethics

AI for Healthcare

DEI for AI

Please fill out the inquiry form above and we'll let you know when any course is open for enrollment.

SILICON VALLEY STARTUP

Cost: Varies
Required Credits: CEUs varies
Duration: Individual courses are four to 12 weeks.

Series Description

Bringing Silicon Valley insight to every launch

For the entrepreneur • For the executive

At the heart of Silicon Valley is a networked community of inventors, technologists, business development evangelists, and experienced mentors collaborating to launch products and new companies. This new series of highly interactive business development courses brings their integrated experience together in short, focused business development courses for the new entrepreneur and the seasoned executive.

From hunch to actionable insight

Some of Silicon Valley's top minds will share key elements of business development and best practices, providing ongoing feedback and mentorship to help you develop strategy that's based on actionable insight.

Build out your business acumen.

Develop brand

Fit to market

Build partnerships

Assess valuation

Grow customers

Successfully launch products and companies

Bring the exceptional Silicon Valley entrepreneurial mindset to your product and company launches, strengthen your portfolio of applied experience, and meet people who can help you shape your business.

Silicon Valley Ignite—our curriculum partner

The curriculum for the Silicon Valley Startup series is created by Silicon Valley Ignite, an entrepreneurial ecosystem, and a one-stop destination for resources, mentorship and mindset.

More courses coming soon.

Silicon Valley Startup bootcamps

Custom corporate training programs

Courses

Silicon Valley Startup Courses

Actualizing and Marketing Products for Profit, 1.8 CEU's
AI for Startup Executives and Business Managers, 1.2 CEU's
Business Development for Founders, 1.6 CEU's
Create Your Startup Story to Inspire Sales, 1.0 CEU's
Customer Discovery in Product/Market Fit, 0.8 CEU's
Foundational Legal Issues of Emerging Growth Companies, 1.4 CEU's
Strategic Partnership Development, 1.2 CEU's
Verbal Identity: Creating Your Strategic Brand, 1.2 CEU's

SALES DEVELOPMENT SCIENCE

Cost: $599 (Save $600 off the regular price of $1,199.)
Required Credits: 7 CEUs
Duration: 10 weeks

Series Description

Launch a career in sales, the top in-demand job in 2021

In-demand skills

Salesforce credentials

A strategic sales development playbook that showcases your sales knowledge and selling capabilities

Get the employable skills, Salesforce credentials, and real-world experience you need to launch your sales career and earning potential. Our Sales Development Science certificate course is designed with one goal in mind: to provide you with the skills, credentials, and knowledge to successfully land and launch a career in Sales.

A 10-week, flexible online course with weekly, live-online, mentor-led peer roundtables
Live sessions are optional but highly recommended.

Meets Wednesdays, 4–5 p.m. (PT)

September 13

October 4

November 1

Skills for the job

Career Planning

We'll break down roles within the sales organization and discuss potential paths for advancement in the discipline. You'll have an understanding of the key steps you can take to accomplish a successful on-ramp into sales.

Ideal candidates

Individuals considering a sales-related career

Professionals wanting to strengthen their sales skills and gain in-demand Salesforce Trailhead badges

Early stage sales or business-focused professionals looking to fill in their knowledge and skills gaps and upgrade long-term growth potential

Entrepreneurs and small business owners looking to maximize lead, pipeline development and revenue generation

Courses

1. Applied Business Science Courses

Sales Development Science Certificate Course, 0.7 CEU's

BUSINESS ANALYTICS SCIENCE

Cost: $1,499 (Save $500 off regular price of $1,999.)
Required Credits: 8 CEUs
Duration: 10 weeks

Series Description

Where's the data?

Learning business analytics fundamentals to drive growth

In a data-driven economy, creating value means leveraging data to identify, strategize, and solve business problems.

In this certificate course, you'll learn the fundamentals in gathering, analyzing and presenting strategic data effectively to different audiences.

Data scientists and analytics experts working in some of the most successful global companies—**Looker, Facebook, Novartis,** and **Prudential**—will teach you how to drive growth and influence decision-making using the data in your organization.

A fully online program with optional, but highly recommended, live, weekly, instructor-led classes.

Upcoming courses*

Sept. 13 – Optional live-online classes Wednesdays, 4–6 p.m. (PT)

Oct. 4 – Optional live-online classes Mondays, 4–6 p.m. (PT)

Nov. 1 – Optional live-online classes Tuesdays, 4–6 p.m. (PT)

Topics of study

Ideal candidates

Recent graduates looking to build practical, hands-on skill sets

Business professionals looking to improve their analytics skills

Experienced professionals re-entering the workforce

Working professionals looking to make a shift into business analytics or expanding potential by becoming more knowledgeable about data-informed decision making

Entrepreneurs seeking to grow their business by utilizing a set of analytics tools

Courses

1. Applied Business Science Courses

Business Analytics Science Certificate Course, 0.8 CEU's

Course Descriptions

8-Hour Annual HAZWOPER Refresher

0.8 CEU's

Professionals who have completed the "40-Hour Hazardous Waste Operations and Emergency Response Training" class must attend an annual eight-hour refresher course. This course is designed to meet the Cal-OSHA GISO 5192 and 29 CFR 1910.120 requirements. Students are required to bring to the class their valid certificate for the "40-Hour Hazardous Waste Operations and Emergency Response Training" or a previous "8-Hour Annual Refresher for Hazardous Waste Operations and Emergency Response Personnel." Professional Credit: CSPs can claim COC points 0.8. This event contains 0.8 CEUs or 8 hours of technical contact time and is eligible for ABIH CM credit.

(5363)

Accounting Certificate Completion Fee

Once all of the certificate requirements have been met and your final grades are posted, please access your Student Portal to enroll in the "Certificate Completion Fee" to begin the review process. Please allow 4-6 weeks to receive your certificate.

Achieving Organizational Agility using the Scaled Agile Framework, SAFe©

1.5 Units

Few companies survive without sustainably releasing to market quality, cost-effective products and services ahead of competition. Your future projects will likely bring you to work with lean-agile teams using the SAFe© framework. This Agile class empowers you to practice lean thinking, achieve agility, and be ready to immediately work effectively with SAFe© teams. When you learn scaled agile project management for software development, you help companies develop three times more productively, complete four times faster, and deliver with five times fewer defects. Since 2016, enterprises have adopted SAFe© as the No. 1 approach for scaling agile, ahead of Scrum of Scrums, and well ahead of any other approach. Learn SAFe© to get ahead and stay ahead.

Learning Outcomes

At the conclusion of the course, you should be able to

Demonstrate why organizations need to adopt SAFe© framework, and under what circumstances

Collaborate productively with/in SAFe teams

Evaluate what it takes for organizations to succeed in adopting SAFe

Select ample references to free resources for continuously monitoring and learning advances in lean agile

Topics Include

Overview of Lean Agile Principles and Thinking

Agile and Lean Practices

Introduction to SAFe®

SAFe® Lean-Agile Principles

Starting SAFe®

PI Planning

Professional Credit

The Project Management Institute (PMI)®--PMP® 15 Professional Development Units.

Actualizing and Marketing Products for Profit

1.8 CEU's

More than 500,000 startups launch annually in the U.S. Over 90 percent fail in the first five years. Entrepreneurs everywhere are busy developing apps, baking cupcakes, designing everything from clothing to cutlery, hoping to create thriving businesses. And, the fact is, most won't survive without effective marketing.

This comprehensive 12-week course is marketing practice, total immersion into today's digital marketing methods, and timeless marketing strategies, to build, brand, and grow a sustainable business. Budding and seasoned entrepreneurs are introduced to a proprietary, step-by-step marketing template to actualize ideas into valuable offerings, then market them, for profit. Students will learn the three stages of marketing a business to thrive—from developing a unique product, service or nonprofit message of value to creating campaigns that brand the business and sell their offerings.

TOPICS

Implement the productization process—a 10-step process for validating ideas and developed offerings (better late than never!) into uniquely valuable products and services, tightly targeted to specific markets.

Perform competitive analysis, and identify your offering's unique differentiators.

Project horizontal and vertical offerings; define a profit model; and write an elevator pitch.

Develop branding for product and company names, logo identities, taglines, and multimedia brand standards.

Create effective content marketing utilizing professional graphic design techniques to create attention-grabbing campaigns with SEO copy content.

Understand basic online operations: URLs, webhosting, CMS, and data analytics, including digital and print reproduction.

Obtain low to no cost visual content with impact, and establish an image library to utilize in your digital and print campaigns.

Produce marketing content—websites, landing pages, social media marketing, emails, online and print advertising, public relations, and collateral.

Discover resources for raising capital and create a pitch deck for venture capital or crowdfunding.

By the end of the course, students will have learned the complete process of marketing potential and developed offerings into profitable ventures. This course provides a plug-n-play marketing template to actualize ideas into valuable products and services and effectively market them for sustained business growth.

Adobe Creative Suite

3.0 Units

Adobe Creative Suite is the industry standard for the creation of professional graphics used by graphic, web and interface designers, administrative professionals, photographers, artists, editors, social media marketers, and creative hobbyists.

The instructional format in a Macintosh environment provides room for hands-on exploration and discovery. You will learn technical skills and creative development through lecture, demonstration, and in-class exercises as you navigate the dense interface of Adobe menus, tools, options, panels, and keyboard helpers.

You will be introduced to foundational skills of vector-based drawing with Adobe Illustrator, photo editing with Adobe Photoshop, and page layout with Adobe InDesign. Take your graphics to a new level as you learn how these three powerful applications work seamlessly together to create a symphony of visual communication.

Adobe Illustrator, Introduction

1.5 Units

Illustrator's vector-based, small graphic format makes it a must for print and Web graphics. This hands-on course introduces the essential features and tools of Adobe Illustrator. Students develop basic competency in the use of this complex software, with emphasis on the Pen tool. Topics include:

Using the Pen tool to draw curved, corner and cusp points

Using templates

Selection techniques

Layers

Color swatches

Transformation tools

Moving dialog boxes

Painting objects

Gradients and blends

Gradient Mesh tool

Transparency

Type basics: point, area, path

Patterns and brushes

Compound paths, masks

Skills Needed: Working familiarity with the Mac and/or Windows operating system including the fundamentals of file management and navigation.

Adobe Photoshop

3.0 Units

Adobe Photoshop is the industry standard for image editing used by Graphic Designers, Web Designers, User Interface Designers, Administrative Professionals, Artists, Photographers and Business Professionals to give their images, graphics, and presentations a professional edge. Students are introduced to a broad range of Photoshop skills and foundational concepts including important file formats, the interface of Photoshop menus, tools, options, panels, keyboard helpers, type, workflow, insights into how Photoshop "thinks" and much more. By the end of this course, you will have a good foundation of Photoshop to combine, edit and enhance photographs and the ability to create professional images for your projects. The online Canvas/Zoom platform provides opportunity for student engagement via hands-on computer skills, lecture, demonstration, screen sharing, class recordings and weekly assignments.

Topics Include:

Discuss Photoshop in terms of color and light, size and resolution.

Identify what makes an efficient and organized Layers Panel.

Sophisticated techniques for non-destructive editing.

Creating composite images.

Prerequisites: Familiarity with Macintosh OS

Adobe Photoshop installed on your computer.

Access to a camera.

Reliable internet.

Focused time and a suitable environment for Zoom classes.

Advanced DevOps Technologies

3.0 Units

As more and more industries use DevOps practices and technologies, the demand for skilled DevOp technologists is skyrocketing. This course builds on the DevOps training in our introductory course, expanding on the methodologies and techniques necessary for students to understand real-world DevOps-based deployments. Through examples and hands-on assignments, students explore core concepts, data center basics, advanced virtual machine and container deployments, container orchestration, cloud-based deployments, automated deployment tools, and system monitoring. Students also work with networking, Bash shell and Python scripting, package installation/management, Linux server configuration, and automated source code control mechanisms. Upon successful completion of this course, students will be able to understand, design, and implement complex deployments within data centers and cloud-based environments. Topics include: Bash and Python scripting, Infrastructure as Code (IaC), Git/GitHub, Microservices, virtual machine configurations using Vagrant, container configuration using Docker, container deployment/orchestration using Docker Swarm and Kubernetes, automated deployments using Terraform, continuous integration and deployment (CI/CD) using Jenkins, cloud-deployments in Amazon Web Services.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Design and implement complex deployment scenarios

Perform automated server setup using virtual machines and containers

Implement multi-mode cluster setups and cloud-based deployments

Prerequisite(s): Students must understand the topics covered in "DevOp Technologies" or have professional-level experience deploying systems in a data center or cloud and programming experience or a course in Bash scripting or Python.

Advanced Management Communications

2.0 Units

This class focuses on the nexus of communication and leadership. Through a blend of pre-work, lecture, video, discussion, immersive group activities, and problem-solving assignments, students will develop and practice advanced techniques for guiding teams.

You will develop new methods for interviewing people and listening and have the opportunity to role play real life scenarios with classmates. You will write and deliver reports, presentations, and stories, and engage in coaching, research and reflection. You will graduate the class with new communication and leadership skills and the confidence to apply them.

Learning Outcomes

Give effective direction to the employees of an organization.

Create consciousness among employees about their duties and responsibilities by supplying

information.

Employ strategies to maintain team cohesion and engagement of work-from-home and hybrid workforces.

Apply concepts for problem solving, conflict management, and negotiation.

Formulate communication considerations and guiding ethical principles to use with different organizational and global cultures.

Explore how ethics affects communication in the workplace.

Improve ability in the practice of active listening and humble inquiry, and giving and receiving feedback in virtual and face-to face environments.

Increase one's emotional intelligence through recognizing and overcoming blind spots, and appreciating a nuanced work environment with a diversity of genders, generations, cultures, and technologies.

Recommended Prerequisite Skills: Business Communications or equivalent. Ability to read English and be ready to begin to speak effectively in group settings. Managerial experience is preferred.

Advanced Network Architecture and Protocols

3.0 CEU's

This class is an in-depth, advanced study of the most popular mainstream internet protocols and emerging network architecture and protocol currently in use.

We will examine the protocol stack layer-by-layer—from the data link layer all the way to the application layer—exploring common internet protocols at that layer. The class also explores emerging networks architectures like software defined networks (SDNs) and OpenFlow, a key communications protocol.

People interested in an information technology career such as engineers in networking, site reliability, and production positions will benefit from this course, as well as people wanting to expand their knowledge about this pervasive and influential technology.

Learning Outcomes

At the conclusion of the course, you should be able to

Identify the main protocols that constitute the backbone of our current internet

Describe how each protocol works and typical exchanges

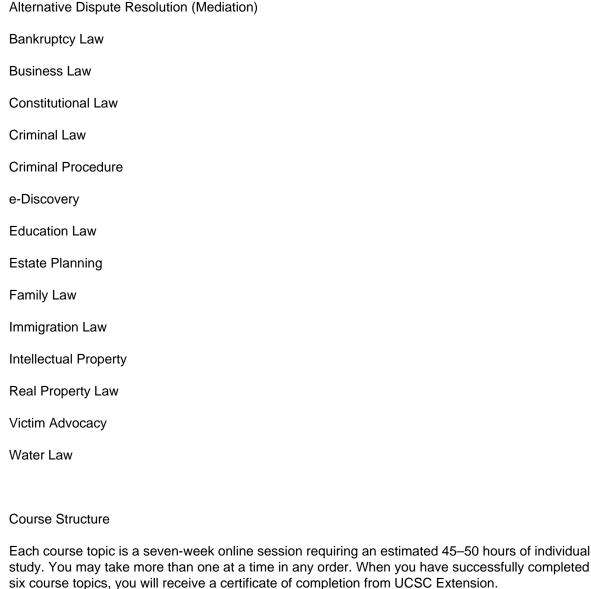Run tools to visualize internet protocols at work

Explain end-to-end flow of requests and protocols involved in handling familiar requests to users like navigating to a URL on their web browser

Implement basic networking applications using the BSD socket interface

Advanced Paralegal Certificate Course

27.0 CEU's

In this challenging course designed to meet the requirements of California Business and Professions Code §6450, participants focus on areas of study that interest them most. You will choose six Advanced Paralegal Course topics, gaining expertise that you can apply to your work in the field. Topics include: Advanced Legal Research

Alternative Dispute Resolution (Mediation)

Bankruptcy Law

Business Law

Constitutional Law

Criminal Law

Criminal Procedure

e-Discovery

Education Law

Estate Planning

Family Law

Immigration Law

Intellectual Property

Real Property Law

Victim Advocacy

Water Law

Course Structure

Each course topic is a seven-week online session requiring an estimated 45–50 hours of individual study. You may take more than one at a time in any order. When you have successfully completed six course topics, you will receive a certificate of completion from UCSC Extension.

Enrollment and Course Materials

Students are required to enroll and purchase WESTLAW access for this course directly from The Center for Legal Studies. You can learn more about curriculum details, enroll and purchase required text books and Westlaw access at Advanced Paralegal Certificate Course , or by contacting CLS at (800) 522-7737 or info@legalstudies.com .

Refund Policy Students enrolling in the Center for Legal Studies programs and courses are accountable to the Center for Legal Studies refund policy and the associated fees. Learn more by visiting the Center for Legal Studies Course Policies.

Advanced Social Media Marketing

2.0 Units

Formerly titled "Advanced Social Media Marketing: A Practical Approach for Business."

Have you ever wondered how to pinpoint customer pain points so you can position yourself as a thought leader rather than jumping in with premature and often inappropriate solutions?

Once you develop a clear picture of the customer, how do you apply these insights to social media marketing? What measures have you put in place to ensure campaign performance?

Advanced Social Media Marketing applies a pragmatic approach to answering these questions. Using digital tools, customer data, and social media analytics, students learn methods that result in innovative social media marketing programs and bottom-line ROI. Real-world assignments demonstrate why the buyer's journey is significant to constructing campaigns on platforms such as Twitter, Instagram, YouTube, and Facebook.

Learning Outcomes

At the conclusion of the course, you should be able to:

Explain the latest digital tools, technologies, and trends.

Create measurable return on investment with SMART goals and metrics.

Increase target audience awareness, engagement, and conversion rates.

Create campaigns with audience targeting and content such as infographics and e-books.

Develop partnerships with active micro and macro influencers to increase leads.

Build a competitive analysis using social media analytics.

Construct messaging with transformative and data storytelling.

Emphasis is placed on understanding how social media fits into the overall marketing mix and how it can be used to create results. New skills will be reflected in the social media marketing strategy each student creates and presents.

It is recommended that students have a marketing background, or take "Principles of Marketing" prior to enrolling in this course.

Advanced Verification with SystemVerilog OOP Testbench

3.0 Units

SystemVerilog is the new IEEE-1800 standard combining the hardware description language and hardware verification language. This course focuses on the use of advanced verification features in SystemVerilog. Students will learn the step-by-step processes of creating flexible verification components, which form the basis of modern industry-standard methodologies such as UVM (Universal Verification Methodology). They will also gain experience developing an industrial-strength object-oriented programming (OOP) testbench that is layered, configurable, constrained-random, and coverage-driven. The course starts with a brief review of SystemVerilog language semantics and simulation fundamentals such as event ordering, delta cycles and race conditions, which will then feed into closely related entities in program block, clocking block, and interfaces. Students will learn how to develop a complete verification environment by building flexible testbench components via the use of virtual interfaces, classes, mailboxes, dynamic arrays, and queues, etc. Functional coverage in the form of covergroup, coverpoint, and SystemVerilog Assertion (SVA), will round up the development of a complete verification environment. You will become familiar with the flexibility of an OOP-centric technique, the power of constrained random verification and the use of functional coverage tools to ensure the success of a verification project.

Concepts introduced in class are reinforced in the lab. In addition to in-class hands-on labs and weekly take-home assignments, students will work on a required project to build an advanced OOP testbench and verification environment for a selected application (such as a 10G Ethernet MAC design), with transaction-level and layered architecture. Students will form a project team, create a test plan, develop an OOP-centric verification environment, perform functional coverage, and submit a complete project report. This course builds the foundation for the course "System and Functional Verification Using UVM (Universal Verification Methodology)."

Learning Outcomes:

At the conclusion of the course, you should be able to:

Describe the shortcomings of Verilog-HDL testbench, and the benefits/flexibility of Object Oriented Programming (OOP) Testbench

Explain the building blocks of a well-designed OOP Testbench: program block, clocking block, interface, classes, inheritance, polymorphism, randomization

Demonstrate Functional Coverage, and how to use coverage as an objective and quantitative measurement to achieve coverage closure

Develop industrial-strength OOP testbench that is layered, constrained-random and coverage-driven

Skills Needed: A course in SystemVerilog and knowledge of VHDL, Verilog, C/C++, and some hardware verification experience. Ability to install and configure open-source software on own computers.

Agile Product Life-Cycle Management (APLM)

1.5 Units

This course introduces the fundamentals and practices of Agile Product Life-cycle Management (APLM).The first half of the course focuses on the roles and responsibilities of product owners (PO). Product owners play critical roles on agile projects, connecting the wants and needs of the customer and the business directly to the development teams in a dynamic and responsive way. The course then emphasizes the product delivery model. In this stage, POs help envision the product, define the minimum marketable features, work with the product backlog, and manage requirements at the team, program, and portfolio levels.

Learning Outcomes

At the conclusion of the course, you should be able to

Better manage agile product development teams and customers

Create value-driven product release roadmaps and delivery schedules

Apply prioritization techniques for selecting the products minimal marketable features

Support large projects through scaling

Topics Include

PO roles and responsibilities

Product Delivery

Product Ownership

Agile PPM

Scrum PPM

Value-driven product release roadmaps and schedules

Professional Credit

The Project Management Institute (PMI)®--PMP® 15 Professional Development Units.

Agile Project Management Using Scrum

1.5 Units

This course introduces the principles and practices associated with Agile project management using the popular Scrum framework. We will discuss the project management processes of initiating, planning and executing, as well as monitoring, control and closing, all in the context of Scrum. Theory and real life examples will be used to demonstrate the benefits of the Scrum framework in promoting open collaboration and flexibility in adapting to changing market requirements.

Learning Outcomes

Upon successful completion of this course, students will be able to:

Articulate and implement the theory and values behind the SCRUM framework

Introduce the SCRUM methodology into their project organization and/or company

Coordinate and lead a development team, define artifacts and establish ceremonies for

implementing the SCRUM methodology

Define and elicit the individual responsibilities of the Development Team, Product Owner, and Scrum Master

Facilitate sprint planning meetings, daily standup meetings, sprint demos, and team retrospectives

Implement collaborative techniques for facilitating team decision making

Topics include:

History of Scrum

Business benefits from using Scrum

Scrum process – planning and executing Sprints

Scrum roles and their significance

Scrum ceremonies

Scrum artifacts

Scrum example scenarios

Scrum culture

How to adopt Scrum in an organization

The Project Management Institute (PMI)®--PMP® 15 Professional Development Units.

Agile Software Development using TDD/BDD and Python

3.0 Units

This course provides an overview of agile software development with an emphasis on popular software development practices like test-driven development (TDD) and behavior-driven development (BDD). It covers best practices, techniques and tools used in TDD and BDD, providing an overview of testing methodologies, including black box and white box testing in the evolving Agile/Scrum model. You will learn how to use Git for version controlling and GitHub for source code management. The course introduces xUnit framework based test automation using Python pyUnit and nose as well as Selenium WebDriver based functional test automation. Test coverage concepts, strategies and tools such as coverage are also addressed. By the end of the course, you will gain hands-on exposure to cutting-edge tools heavily used in the software industry. You are encouraged to bring laptops to class.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Describe all the common software testing categories and their general usages

Discuss and apply agile development using TDD/BDD, automation of unit, functional, and web-based testing

Explain code coverage, continuous integration and continuous testing/deployment processes

Identify strategies to apply unit testing very early in the development process

Skills Needed: Coding knowledge of any general purpose programming language such as Python, Java, C++, Ruby, or C# is required. Students without prior programming experience in Python are encouraged to go through a quick learning guide such as www.learnpython.org before the first lab starts.

AI, Empathy, and Ethics

1.0 CEU's

This nontechnical course provides an overview of artificial intelligence advancements and the ethical challenges we now face as we navigate the development, implementation, and ubiquitous global use of AI.

When we demystify AI technology, we encounter intrinsic ethical challenges such as privacy, bias, diversity, equity, explainability, and robustness—all foundational aspects of effective business stewardship.

In this course, we confront the ethical considerations of enterprise AI adoption while providing a deep understanding of how to leverage AI in ways that benefit both corporate and society at large.

We begin the course with an introduction to AI, including an overview of machine learning, deep learning, neuro-linguistic programming, and autonomous systems. Then, we explore the broader impact of AI technology on enterprise and society and discuss ethical values and frameworks in industry case studies, the future of work, and the training, reskilling, and retention of needed talent.

Key topics

AI hype v. reality

Business and managerial implications of AI

Successful integration of AI into your organization

Key principles of building responsible and explainable AI

Various aspects of ethics and how to apply ethical parameters to AI

Ethical frameworks supporting collaboration between people and AI machines

Ongoing industry initiatives on AI ethics

By the end of this course, you will be able to create a business roadmap and ethical framework for the implementation of AI in your specific domain areas and present a 20-minute pitch on incorporating and building ethical AI frameworks in existing or new projects.

AI for Startup Executives and Business Managers

1.2 CEU's

Artificial intelligence has emerged as a key skill for managers and executives in any innovation unit or startup.

In this foundational business course you'll explore AI basics, its application in various functional areas, machine learning fundamentals, common algorithms, and new developments in deep learning. A study of AI use cases will clarify how it applies in key functional areas such as marketing, sales, service, supply chain, and revenue management. We'll also discuss some of the far-reaching ethics and risks of AI implementation.

By the end of the course, you'll have an understanding of how to apply AI solutions at your startup or in key business units, including the areas of team building, decision making, and cross-team collaboration. This is an opportunity to become comfortable in taking the lead in setting up AI strategy to grow your company.

Learning outcomes

Learn AI fundamentals and key applications

Understand machine learning, deep learning basics, and widely used algorithms

Define your team and organizational business needs and see where AI applications can be implemented—marketing, sales, customer service, supply chain, revenue management

Clarify ethics, policy, and risks management for AI

Develop strategy for an AI application

Build a convincing business plan or capital investment pitch deck for executives

Understand the people aspects of building a successful business application using AI

Prerequisite Courses

None

No software needed. Recommended texts will be provided in the class materials.

AI-Led Enterprise Transformation: Technologies and Use Cases

0.5 Units

Artificial Intelligence (AI), already pervasive in our environment, is described as "the new electricity" because it is transforming our lives, the economy, academia, and industry. We ask Siri for directions to the nearest charging station and consider products suggested by Amazon Echo. Advanced AI applications include self-driving cars, medical image analysis and diagnoses, and cyber intelligence. Google, Facebook, Microsoft, and IBM have announced that AI is a central component in all of their product development. In this sweeping introductory course, students will study the concepts and technologies that comprise AI, its current applications, and the future of the technology. You will obtain a general understanding of enterprise-grade frameworks such as TensorFlow, Keras, Theano, and applied use cases in machine learning and deep learning environments. You will also build an understanding of 'AI at the edge' applications where a huge number of startups are creating new infrastructure. The class prepares you to pursue our developing AI program series.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Describe the differences of AI, Machine Learning and Deep Learning

Discuss the various applications of AI, Machine Learning and Deep Learning

Explain the process of developing intelligent applications using AI, Machine Learning and Deep Learning

Discuss various technologies being used in AI powered intelligent applications

Topics Include:

Overview of artificial intelligence, machine learning, and deep learning

The current state of artificial intelligence and machine learning

Applications of artificial intelligence and machine learning

Deep learning: an advancement in AI

The development and deployment processes of AI applications

The technologies behind artificial intelligence and machine learning

Closing the talent gap

Future directions in AI

Industry job opportunities and basic requirements to qualify for these jobs

Analog IC Design, Introduction

3.0 Units

Today's mobile, wireless, and consumer electronics employ ASICs and high integration SOCs (System on Chip) that often include the analog blocks for signal processing and the associated analog-to-digital interface circuits. Most MEMS, sensors, photovoltaic and electro-optical devices also require analog components. Understanding the basics of analog IC is essential for application engineers as well as circuit and system designers in a wide variety of electronic fields. This course introduces analog IC design fundamentals including single/multiple-transistor amplifiers, current mirrors, current/voltage reference, output stages, frequency response, feedback, stability, noise, nonlinearity, and mismatches. Transistor models and CAD tools for analog design will also be covered. Students will gain a basic understanding of analog IC design and become familiar with circuit analysis and simulation tool flow. The fundamentals presented in this course prepare students to tackle advanced analog IC topics such as Op-amp, PLL, ADC and DAC.

Students will have access to simulation and waveform tools to test the performance of analog IC designs in our lab. Upon completion, students will have gained experience with circuit simulation and an in-depth understanding of the basic analog functions in IC.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Identify basic building blocks in analog integrated circuits

Analyze performance parameters such as gain, impedance, and bandwidth using small-signal models

Design analog ICs of small to medium complexity and verify them using simulation tools

Skills Needed: Basic knowledge of microelectronics circuits, semiconductor devices and physics. Experience with UNIX/Linux systems and commands is required for the lab.

Apache Spark with Scala, Introduction

3.0 Units

Apache Spark is a unified data analytics engine that can support batch, interactive, iterative, streaming, and graph processing use cases. The combination of elegant application programming interfaces (APIs) and a fast in-memory, general-purpose cluster computing system makes it an attractive option for companies to leverage for various data processing needs. Written in Scala, Apache Spark APIs are available in three programming languages: Scala, Java, and Python. This course, however, focuses on the API in Scala language, a functional programming language. In this foundational course you will explore Apache Spark, its architecture, and the execution model. We'll start with a short introduction to Scala, its basic syntax, case class, and collection APIs. You'll learn how to process large amounts of data using DataFrame, Apache Spark's structured data processing programming model that provides simple, powerful APIs. In addition to batch and iterative data processing, Apache Spark also supports stream processing, which enables companies to extract interesting and useful business insights at near real-time.

The second half of the course covers stream processing capability and developing streaming applications with Apache Spark. We will briefly cover machine learning and how the Apache Spark MLlib component makes practical machine learning scalable and easy.

By the end of the course, you'll have a good foundation in Scala language and a strong understanding of Apache Spark's architecture, execution model, and programming model. You'll be able to manipulate DataFrame through Apache Spark's API and develop Apache Spark applications in Scala for batch, interactive, and stream processing applications. You will gain fundamental concepts in machine learning and be able to leverage MLlib library to build simple machine learning applications.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Describe the Apache Spark's architecture, execution model and programming model

Perform data processing by manipulating Apache Spark DataFrame APIs

Build batch and streaming data processing applications using Apache Spark

Build small to medium Scala applications using Scala programming language

Skills Needed: Programming experience with Java is required. Knowledge of Hadoop is recommended.

Application of Social Media for Business Growth

2.0 Units

This course builds on top of the courses "Fundamentals, Social Media Marketing" and "Advanced Social Media Marketing: A Practical Approach for Business," enabling students to apply the range of their newly acquired social media and marketing skills in a simulated real world environment. Students will expand upon the social media marketing strategies they have created during the "Advanced Social Media Marketing: A Practical Approach for Business" course, adding the depth required to succeed in a Silicon Valley work environment.

Emphasis is placed on creating a social media campaign that:

Teaches students to support all of their decisions with facts

Acknowledges the reality of often limited resources and competing priorities

Presents a clear assessment of the best marketing mix without a bias for social media

Demonstrates the application of cutting-edge social media tools, techniques and concepts

Gives students the opportunity to present and defend their ideas in front of a Silicon Valley employer

The course will further hone students' social media marketing proficiency by introducing concepts like cross-platform campaigns, programmatic marketing, as well as the application of social media management tools for teams.

Learning Outcomes

At the conclusion of the course, you should be able to:

Allocate resources to each step of your project

Assign objectives, metrics, and tools to each channel

Create highly targeted ads using advertising networks and platforms

Conduct additional market research to validate your social strategies

Evaluate the practicality of marketing automation and analytics tools for your project, in the areas of planning, execution, decision-making, monitoring, and reporting

Apply best practices for cross-platform campaigns across different devices

Expand your target audience personas

Create a professional looking project presentation

It is recommended that students have a marketing background, or take "Principles of Marketing" prior to enrolling in this course.

Applied Digital Media Planning and Platforms

2.0 Units

Formerly titled "Applied Digital Marketing for Business: Tools, Technologies, Techniques and their Applications."

The Applied Digital Marketing course introduces students to the world of integrated digital marketing. This program provides students with strategic and tactical skills they will need to identify, engage, and develop successful relationships with customers in today's digital environment. The course is designed to explore best practices and practical applications of search (SEO/SEM), display, mobile, video, social media, email (CRM), and the reporting/analytics behind running successful multichannel campaigns.

Learning Outcomes

At the conclusion of the course, you should be able to:

Explain the core concepts of multi-channel and digital marketing strategies and tactics

Employ digital best practices to drive desired marketing results in their media mix

Use current digital marketing tools for research, planning and execution of digital initiatives

Build a digital marketing plan

Applied Mathematics for Financial Planning

3.0 Units

This course covers the basic analytic tools and mathematical techniques used in personal financial planning. The emphasis is on understanding and applying quantitative concepts and techniques such as present/future value analysis, discounted cash flow, internal rate of return, measurements of investment performance, analysis of equities and fixed-income investments using statistical tools, evaluation of mortgages, and cash-flow planning for retirement and education. The course is specifically oriented toward practical problem solving.

Note(s): An HP-12C financial calculator is required.

Learning Outcomes

At the conclusion of the course, you should be able to:

Apply TVM principles to solve problems in various financial planning and investment applications, including retirement and education funding, consumer purchases, bond pricing and the analysis of investment alternatives. Create personal balance sheets and income and expense statements and

perform relevant analysis, including the calculation of personal financial ratios.

Understand and calculate the impact of inflation on savings and investment plans and goals.

Define and calculate the various measures of "average return", and identify where used.

Calculate volatility in investment returns and interpret results.

Achieve a basic understanding of equities (stocks), options, mutual funds and bonds in order to complete computations relevant to pricing and other analyses.

Define and measure risk for different types of investments (bonds, equities) and calculate industry defined risk adjusted return metrics.

Master the HP12C calculator for various computations.

Applied Organizational Behavior and Coaching

3.0 Units

An evidence-based course that demonstrates how to use scientific, applied, hands-on coaching management concepts on a daily basis to maximize employee performance, Applied Organizational Behavior and Coaching helps to increase leadership skills. The course explains how to use scientific principles of behavior management to accurately measure the rate at which organizational and individual performance increases. Areas important to becoming a better performance and leadership coach include understanding how a manager's daily interactions with employees impact performance, management and employee responsibilities, objectively setting and measuring performance standards that also withstand legal challenge, managing within the law, using emotional intelligence, developing cultural intelligence, and working in international environments.

Students will learn how to assess and correct performance behaviors quickly, how to write accurate job descriptions; how to legally manage, appraise and counsel employees, and how to manage employees from different countries. Course material will explain the underpinnings of lean and change processes, and is applicable to profit, non-profit, and governmental organizations.

Learning Outcomes

At the conclusion of the course, you should be able to:

Explain the importance of basing management decisions on facts, rather than belief, assumptions, and past practices regarding organizational management

Understand how employee and management behaviors impact organizational goals and

Analyze how behavioral systems impact operational systems and strategic

Explain shaping - a managers' and a coach's most important responsibility

Describe how to define objective performance plans

Professional Credit:

HRCI®---PHR®, SPHR® and GPHR® general recertification credit: 27.5 hours.

Effective February 22, 2020, this course is valid for 27.5 PDCs for the SHRM-CP® or SHRM-SCP®.

Applied Project Management

3.0 Units

This is the final course in the certificate program and enables students to apply what they've learned from previously completed project-management courses, by developing a simulated but realistic team project. Students will be given project-management tools to facilitate the development of their project. Emphasis will be placed on practical application of project-management principles, processes, and techniques, including project control, cost management, project tracking, and project outsourcing.

Students will also learn how to control project schedules, budgets, and scope, using methods that minimize or completely eliminate "scope creep." Techniques such as fast-tracking, critical-path crashing, stochastic estimating, and exploiting activity lead-lag times will enable students to develop fast, accurate project schedules. In-class exercises and case studies lead students to skills they can take back to work and immediately apply to their own projects.

Learning Outcomes

At the conclusion of the course, you should be able to

Work in a self-organizing agile team to iteratively develop and deliver complex products

Define project scope definition of deliverables with clear traceability to requirements

Define a delivery release plan using a phased-gate Work Breakdown Structure

Construct and utilize schedule networking diagrams for planning project schedules

Develop project schedules using critical path and critical chain processes

Determine the most cost-effective schedule compression techniques

Apply techniques for identifying and quantifying project threat and opportunity risks

Identify and develop cost effective risk responses

Apply detailed project cost analysis and future value cash flow projections

Monitor and control projects using the Earned Schedule management process

Understand how to effectively identify and outsource portions of your project

Topics Include

Project portfolio management techniques

How to estimate project costs and forecast investment returns

How to apply cybernetic-control techniques to schedules and budgets

How to use earned-value management (EVM) to track and control projects

How to fast-track and crash the project's critical path

How to use stochastic techniques to ensure accurate project schedules

How to apply project management principles in a simulated team project

Professional Credit

The Project Management Institute (PMI)®--PMP® 30 Professional Development Units.

Artificial Intelligence for Robotics

1.0 CEU's

The AI robotics industry is rapidly growing, creating numerous jobs for people who understand enterprise implementation. In this AI for Robotics course, you will learn the role AI plays in enabling robotic technologies to solve a variety of enterprise problems. We will focus on advanced AI techniques for perception, manipulation, reasoning, and learning, and explore methods for integrating these techniques with robots and drones. You will learn to train your own custom machine learning models to perform object detection and explore the AI software development life cycle and its specific nuances—data preparation, model training, and validation.

Learning Outcomes

Through discussion, technical demonstration and hands-on practice, you will learn to:

Design, develop, and deploy AI applications for robotics.

Translate industry use cases into AI for robotics application in large enterprises.

Apply machine learning techniques such as computer vision and natural language processing for robotics.

Topics

Industry use cases and case studies in AI for robotics

Robotics architecture

Data acquisition and sensor fusion

SLAM

Computer vision

Crack detection

Mobile picking robots

Natural language processing

Collaborative robots

Demonstrations and project presenations

Deep learning applications

Prerequisite Skills

Students should be proficient in programming languages, such as C++ or Python. Knowledge of AI/ML solutions and related frameworks is suggested as well as familiarity with algebra and higher-level mathematics.

ASIC Physical Design, Advanced

3.0 Units

This lab-based course covers advanced topics of ASIC front-to-back design automation. At 32nm node and below, ASIC physical designers have to face multi-vdd, multi-vt, high power, noise, and an explosion of process design rules—all while accounting for chip reliability. The course further develops the students' advanced ASIC design skills by introducing state-of-the-art EDA back-end design tools and methodology. The course provides a 28nm library for students to practice techniques learned in class. After reviewing the design challenges, the course covers UPF-based synthesis and placement. The instructor will give an example of congestion analysis and reduction, and proceed with detailed route analysis and optimization. Students will learn the Clock Tree Synthesis (CTS) and how to optimize timing sign-off in nanometer technology. The course also introduces the hierarchical design flow, power mesh synthesis, and IR drop analysis. The instructor will share tips from extensive professional experience in ASIC implementation over many generations and will also provide basic scripts to facilitate lab exercises.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Demonstrate advanced knowledge of ASIC backend design skills

Perform digital design work across all aspects of the design flow from RTL to GDS

Utilize tools such as Synopsys's Design Compiler, IC CompilerII, IC Validator, StarRC, and PrimeTime

Topics include:

Advanced physical design challenges

DC-topo multi-vt/multi-vdd UPF synthesis

Power mesh synthesis and optimization

Placement and IR drop analysis and reduction techniques

Congestion analysis and reduction

CTS analysis and optimization

Detail route analysis and optimization

Sign-off optimization

Hierarchical multi-vt/multi-vdd flow

Skills Needed: Basic knowledge of the backend design flow from netlist to GDSII. Knowledge and hands-on experience with Linux/Unix will be required for lab exercises. **Students enrolling in this class should be able to answer 'yes' to six of the eight questions on the linked** Google Quiz.

Assessment, Evaluation and Placement

2.0 Units

The expert teacher understands the value of assessment, applies authentic and systematic methods of evaluating learning outcomes and supports a rational student placement system. In this seminar, you'll review the purpose, methods and limitations of assessment, evaluation and placement. You'll gain hands-on practice writing, analyzing and evaluating a variety of test types in TESOL.

Assistive Technology for Learning Differences

3.0 Units

Technology can help struggling students leverage their learning strengths and bypass weaknesses to improve performance, independence, and self-confidence. In this online course aimed at teachers, learning specialists, educational therapists, and parents, you will learn about a wide range of tools to support students with learning disabilities, attention-deficit/hyperactivity disorder (ADHD), executive functioning deficits, and issues with processing information and memory. Through readings, lectures, video demonstrations, and hands-on activities, you will learn:

How various tools address specific learning needs.

How to match students with appropriate tools.

Practical methods and strategies to implement technology solutions and integrate with curricula.

How technology can facilitate Universal Design for Learning (UDL) practices in the classroom.

Laws that govern assistive technology (AT) in education.

Local, national, and online resources for AT information, equipment, training, and services.

Instruction is primarily online and asynchronous (self-paced). Live weekly sessions supplement online instruction with class discussion and technology assistance.

SKILLS NEEDED:

Students should have a basic understanding of the academic challenges faced by individuals who have learning disabilities, ADHD, and executive function issues. This can be satisfied in various ways, including (but not limited to):

Professional experience addressing the needs of students with learning differences.

Completion of "Understanding Learning Differences" (EDTH.X309) or equivalent coursework.

Prior review of material on learning differences (provided by the instructor).

Other requisites may be approved in advance by the instructor.

We recommend students understand the basics of using the Google Chrome browser (e.g., installing Chrome extensions) and Google Core Apps such as Docs, Sheets, and Drive.

TOOLS NEEDED:

Hands-on exploration of certain technologies is an essential part of this course. For these activities, students will need access to the following minimum tools:

A computer: A PC with Windows 10 or above, a Mac with macOS 10.14 Mohave or above, or a Chromebook with the latest Chrome OS.

The Google Chrome browser or Microsoft Edge browser.

A personal Google account. (recommended: Google account specifically created for use with this course).

The ability to download and install free and trial software, especially Chrome extensions. Specific titles to be provided in class.

FOR MORE INFORMATION, you can visit the instructor-created website .

Attention Deficit Hyperactivity Disorder (ADHD) in the Classroom

3.0 Units

The average classroom may include several students who exhibit symptoms of Attention Deficit Hyperactivity Disorder (ADHD). Many educators need to build skills to meet the educational needs of these children. This course provides the tools needed to better understand, identify and evaluate the ADHD student. It addresses school-related problems associated with ADHD. In-depth coverage of practical, effective instructional strategies is offered as well as social skills training activities that can be easily incorporated into the regular curriculum. You'll learn how to implement effective classroom behavior management systems.

Learning Outcomes:

At the end of the course, students should be able to

Gain a strong sense of what it is like to have ADHD

Be familiar with the DSM V definition of ADHD

Understand the myriad ways ADHD impacts every aspect of a person's life

Understand that ADHD requires a multi-disciplinary approach

Develop strategies for both the classroom and private practices

Becoming a Professional Educator: Special Populations and Healthy Environments

5.0 Units

Meets the California Commission on Teacher Credentialing requirements in (a) healthy environment and special populations for SB 2042 preliminary Multiple or Single Subject. This course offers an overview of the field of special education and the expanded role of the teacher in providing health and substance abuse prevention in the "mainstreamed" classroom.

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Benefits Management: A Comprehensive Study of Employee Benefit Programs

2.0 Units

This course presents a comprehensive view of benefits, including the latest approaches for analyzing and negotiating benefits programs and funding options. A key focus will be developing strategies to reduce healthcare costs. Students will learn to evaluate employee needs and help them better understand and use their coverage.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Describe the role and responsibilities of a Benefits Manager's job.

State a corporation's Employee Benefits philosophy and goals.

Define various laws and regulations that govern administration of Employee Benefits programs.

Describe principles of risk and how this relates to design of insurance benefits plans.

Describe the role of the Broker and the relationship with the Benefits Manager.

Define managed care and consumerism in health care benefits plans.

Describe various funding alternatives for insurance benefits programs.

Understand financial benefits including 401(k) and stock option plans.

Topics Include:

Health and welfare plans, including cafeteria plans

The Affordable Health Care Act and Covered California

Qualified retirement plans such as 401(k) plans

Vacation and sick leave programs, incidental benefits

Overall benefit cost management workforce

Professional Credit:

HRCI®---PHR®, SPHR® and GPHR® general recertification credit: 19.25 hours.

Effective February 22, 2020, this course is valid for 19.25 PDCs for the SHRM-CP® or SHRM-SCP®.

Big Data: Overview, Tools and Use Cases

3.0 Units

Big Data has emerged as a powerful new technology paradigm. To manage the massive data generated by social media, online transactions, Web logs, or sensors, Big Data incorporates innovative technologies in data management (unstructured, semi-structured and structured), processing, real time analytics, and visualization. It is also useful for reporting in circumstances where a relational database approach is not effective or too costly. This course is designed for managers, analysts, architects and developers seeking an understanding of Big Data concepts, the related technology landscape and deployment patterns. The course starts with the evolution, characteristics and significance of Big Data. You will learn data management (acquiring, cleansing and normalizing Big Data) and discuss use cases related to log analytics, fraud detection, social media patterns, call centers and more applications in various industries. The course will introduce the concepts and methodology of NoSQL, a database management system designed to handle Big Data. You will also learn the technology infrastructure, Hadoop, storage, MapReduce and Query (SMAQ) stack, and basic Map/Reduce functionality used in Big Data. The course concludes with a review of Data Visualization Tools (DVT), analytical tools and the deployment patterns used in

various industries.

The course offers an overview of the Big Data landscape, tool infrastructure and industrial applications. There will be a final project for students to work in teams and study Big Data solutions for specific industries. Students will primarily be exposed to overview of the tools. Tool usage, programming, algorithms and application development are covered in related courses.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Understand Big Data Concepts, characteristics, Data Management and Warehouse

Understand significance of Big Data and industry use case references

Comprehend grid computing and deployment architecture

Compare and contrast NoSQL with Hadoop

Skills Needed: A fundamental understanding of databases, programming and data analytics is strongly recommended.

Biochemistry: An Introduction

3.0 Units

This course covers biochemistry concepts central to the biotechnology industry with an emphasis on the enzymatic and metabolic processes of living systems at the molecular level. Topics include the structure and function of biomolecules including proteins, carbohydrates, lipids and nucleic acids; enzymes and enzyme kinetics; and metabolism, including energy production and storage. The course is beneficial for scientists and non-scientists interested in the critical biochemistry processes underlying core technologies in the pharmaceutical, medical devices, diagnostics, biotechnology and biofuel industries. Skills needed: A college-level chemistry course. Some knowledge of organic chemistry is required.

Learning Outcomes:

At the end of the course, students should be able to

Explain elementary features of chemical bonding, electronegativity, chemical thermodynamics and kinetics and identify the structure and nomenclature of common functional groups of organic compounds and their basic structure-reactivity relationships

Describe the 3-dimensional aspects of organic compounds in terms of stereochemistry

Understand basic features of monosaccharides, disaccharides and polysaccharides and carbohydrate chemistry including the structure-reactivity of hemiacetals and acetals

Describe the basic structure, acid-base properties and classification of amino acids and the structure of peptides and proteins in terms of amino sequence and their structural motifs

Describe the basic structure of lipids and biomembranes and understand the basic mechanisms of signal transduction and membrane transport

Understand the basic chemical properties of enzymes and selected catalytic mechanisms and the roles of vitamins and cofactors

Discuss the basics of cellular bioenergetics, ATP and the roles of glycolysis, the tricarboxylic acid cycle and electron transport

Describe the basic structures of the nucleotides found in DNA and RNA and gain an overview of nucleic acid replication, transcription, the genetic code and protein biosynthesis

Describe the basic metabolism of lipids, amino acids and carbohydrates with focus on glucose

Bioinformatics Certificate Completion Fee

Once all of the certificate requirements have been met and your final grades are posted, please access your Student Portal to enroll in the "Certificate Completion Fee" to begin the review process. Please allow 4-6 weeks to receive your certificate.

Bioinformatics Tools, Databases and Methods

3.0 Units

Bioinformatics plays a crucial role in the storage, search, and analysis of biomolecular sequence and structure data. A significant amount of data is now available on the web, along with software tools for data search and analysis. It is essential that professionals working with biological sequences or structures in public and private sectors are knowledgeable about these databases and tools.

This practical course introduces the main public domain tools, databases and methods used in bioinformatics, including DNA and protein databases such as Genbank and PBD, software tools such as BLAST, and methods for aligning sequences. Topics include multiple alignment, phylogenetic analysis, microarrays and system biology. The course emphasizes the needs of the user of bioinformatics tools and databases, rather than complex algorithm development and advanced computational methods.

The course includes computer lab exercises and online demonstrations of the various databases and tools on the web. It is intended both for life scientists and computer engineers and is the recommended first course for those wanting to gain skills in bioinformatics.

Learning Outcomes:

At the conclusion of the course, you should be able to

Understand the need and importance of bioinformatics in industry and research

Learn how to access and use bioinformatics tools and databases on the internet

Learn how to evaluate DNA and protein sequences using bioinformatics tools from the internet

Learn how to predict and understand protein structure using homology and comparative modeling

Learn how bioinformatics is used in the fields of genomics and proteomics

Biology of Cancer

2.0 Units

Understanding the molecular and cellular basis of cancer is essential for the development of new therapeutic strategies and diagnostic tools. This course explores the basic biology of cancer, including the key cellular processes and players, whose alteration leads to uncontrolled cell proliferation. Topics include the pathology and genetic basis of cancer, the immune system, and the role of infectious agents and environmental carcinogens in the disease process. You'll also discuss emerging therapies and strategies for cancer prevention.

Professional Credit: CA BRN/LVN Credit--Provider #CEP13114.

Biotechnology Certificate Completion Fee

Once all of the certificate requirements have been met and your final grades are posted, please access your Student Portal to enroll in the "Certificate Completion Fee" to begin the review process. Please allow 4-6 weeks to receive your certificate.

Building Integrated AI Applications

3.0 CEU's

This course provides developers a hands-on, practical, and industry-oriented training on how to integrate artificial intelligence (AI) into enterprise application development. You will learn to apply your skills to cutting edge AI applications using deep learning and widely used deep learning frameworks during hands-on classroom sessions. We'll start with an introduction to AI and neural networks, focusing on convolutional neural networks and how they work, then perform training and inference using Tensorflow/Keras for image detection, recognition and segmentation. The end of the course culminates in a final project encompassing the new technologies you've learned such as:

Advanced python and applying data science libraries—SciPy, SciKit-Learn, Numpy, Pandas, Pillow—for pre and post model processing

DNN and how it fits in AI and traditional ML techniques

Concepts of supervised deep learning models

Deep learning models

Training and performing inference on a CNN

Tensorflow/Keras

Application building with a deep learning model

Various use cases for classification, segmentation and detection

Prerequisites

Python knowledge and programming experience. Recommended courses include: "Python for Programmers" and "Python Programming for Beginners"

Building Online Learning Communities

2.0 Units

Technology has dramatically affected many aspects of our lives, including the areas of teaching and learning. The virtual classroom presents unique challenges for instructors who want to create a positive and collaborative learning environment. In this course, participants learn how to overcome the barriers to interaction and build online communities through activities and assignments that empower the learner and build peer interaction, partnerships, and virtual teams.

We will explore what learning communities are and why such communities can play a significant factor in effective online instruction. Students will have opportunities to try out various community-building techniques to increase their effectiveness as instructors. A significant segment of this course will be conducted as an independent study project with guidance from the instructor. Students will be encouraged to experiment using free web-based tools.

In addition to their projects, students will have some online lessons and discussions with the instructor and classmates. These discussions will be conducted using the online discussion tool, through email, and using various meeting tools including POTS (plain old telephone system), teleconferencing, and others. Participants will learn both from the content in the materials and from the direct experience of using the tools.

Additional topics and more in-depth examination of issues will be discussed based on the specific concerns of the participants.

Business Administration Certificate Completion Fee

Once all of the certificate requirements have been met and your final grades are posted, please access your Student Portal to enroll in the "Certificate Completion Fee" to begin the review process. Please allow 4-6 weeks to receive your certificate.

Business Analytics Science Certificate Course

0.8 CEU's

In a data-driven economy, creating value means leveraging data to solve problems. In this 10-week, live-online, mentored course, You'll learn the fundamentals in gathering, analyzing and presenting strategic data effectively to different audiences. Professionals working in some of the world's most successful global companies will teach you how to drive growth using the data in your organization.

Key Topics

Data Modeling—Determine the data set for answering key research questions. Understand application workflows and design tables, determine primary keys and use the right data types effectively.

Accessing Data with SQL—Retrieve and summarize data with SQL. Develop SQL queries and learn techniques such as filtering, working with joins and using aggregate functions.

Data Visualization and Technology—Design research questions and select tools, techniques and visualization types to highlight insights, and get hands-on with Tableau.

KPIs, Business Objectives—Develop business objectives and articulate their relationship to business performance.

Note: This course will be taught by several instructors, including data scientists who've worked with global companies such as Prudential, Novartis, Facebook and Looker.

This course is provided in partnership with GreenFig.

Enroll in the Business Analytics Science Certificate Course.

Business Communications

2.0 Units

Learn key communication and leadership skills vital to success: listening, storytelling, public speaking, and meeting facilitation, while building confidence and your ability to positively influence others. Students in this eight-week course will get to practice new communication skills each week, learning through a blend of lecture, video, discussion, immersive group activities, and problem-solving team assignments. You'll have the opportunity to deliver impromptu and prepared speeches, sharpen your listening skills, enhance your credibility, and learn new modes of business communication. You will hone your individual meeting facilitation skills and develop the mental ability to be creative, flexible, and adaptable in real time. Assignments include reading, researching, and creating content to share in class. There is no prerequisite for this course.

Learning Outcomes:

Think on your feet, get your butterflies to fly in formation, and effectively communicate in the moment.

Design and deliver powerful presentations of different types.

Increase your credibility, raise your visibility, address dissent, recover from a mistake, have difficult conversations, and build a credible reputation.

Understand the role of influence, persuasion and power to inform relationships and how you can enhance your effectiveness in the workplace.

Leverage the power of story in your speeches, training, coaching, and one-on-one work with others.

Sharpen your listening skills with individuals and in group environments as well as on the phone and in meetings that are in person and virtual.

Master results-oriented techniques for planning and implementing effective meetings.

Unleash your creativity through writing and speaking, and partnering in small and large groups.

Business Development for Founders

1.6 CEU's

Fine tuning your startup plan—From elevator pitch to customer acquisition.

When you're launching your own startup or joining a stealth venture, you need an actionable roadmap for balancing your key, sometimes competing, objectives such as raising capital, proving market viability, and developing business.

In Business Development for Founders, a course for aspiring entrepreneurs, we'll focus on:

Fine tuning your offering, target marketing, and positioning

Exploring various business models: revenue, operational, capital structure and financing

Communicating your startup vision to raise capital, recruit team members and partners, and capture customers

Creating a one-page, Lean Canvas business plan

Developing a business plan and a lean execution roadmap

Establishing an agile organization that is poised to rapidly adapt and pivot as needed based on customer and market feedback.

Business Economics

2.0 Units

This course provides an overview of the principles and concepts in both microeconomics and macroeconomics. The microeconomic concepts will provide information on economic decision making and operations of the economy at the individual and firm level. The macroeconomic concepts will provide information on the national and global economies.

Learning Outcomes

At the conclusion of the course, you should be able to:

Describe, discuss, and interpret fundamental business economic relationships, measurements and events through an appreciation of abstract models

Explain and identify that economics analyzes how individuals, households and firms make decisions and how they interact in markets. Quite often, optimal microeconomic decisions are intimately intertwined with developments in the macroeconomy

Apply economic analysis to everyday problems in real world situations, to understand current events and evaluate specific policy proposals, and to evaluate the role played by assumptions in arguments that reach different conclusions to a specific economic or policy problem

Understand how to use empirical evidence to evaluate the validity of an economic argument, use statistical methodology, interpret statistical results, and conduct appropriate statistical analysis of data

Solve problems that have clear solutions and to address problems that do not have clear answers and explain conditions under which these solutions may be correct

Develop critical and quantitative thinking skills specific to business and accounting

Communicate effectively in written, oral, and graphical form about specific issues, and to formulate well-organized written arguments that state assumptions and hypotheses supported by evidence

Skills needed: Elementary Algebra. Advisory: Demonstrated proficiency in English by placement as determined by score on the English placement test OR through an equivalent placement process OR completion of Composition and Reading and Advanced Reading; Intermediate Algebra.

Business Intelligence Solutions

2.0 Units

In this comprehensive course aimed at business intelligence (BI) developers and analysts, students get to review BI tools in a hands-on environment. You will learn to convert relevant information into knowledge that supports better strategic decisions through the exploration of various business intelligence tools capable of integrating multiple data sources, processing data analysis, and building interactive dashboards. You will also work with databases that are often used with data management, reporting, and analytics capabilities. Using the Microsoft BI stack as an example platform, you will learn how to create supercharged pivot tables with Power Pivot, a Microsoft Excel add-in application and a data model that makes Power Pivot perform amazingly fast allowing you to analyze the data in new and interesting ways.

We'll also use Power Query to do some data munging—shaping, cleaning and transforming data using intuitive interfaces without having to use code. Additionally, we'll build dashboards, charts, and maps using Power BI, Microsoft's premiere analytics and reporting tool.

By the end of the course, you will have experience building BI solutions with multiple data sources using popular tools.

Note that while SQL Server experience is not required, the basic concepts of relational database design will not be covered in this course.

Learning Outcomes:

At the conclusion of the course, you should be able to

Describe the principles of business intelligence and apply these principles to real-world projects

Discuss with business management the best BI tool to purchase which will shed light on your business challenges

Explain how to build an enterprise level BI data flow

Identify key performance indicators to measure success in your business

Business Law and Its Environment

3.0 Units

The business environment has become more complex and litigious; therefore, knowledge of general principles of law is more important than ever. This course reviews the American legal process, commercial law and its development, and organizational structures in the context of the managerial challenges in today's highly litigious environment. Instruction incorporates analysis of actual cases, class participation, group projects, lectures and readings.

Learning Outcomes

At the conclusion of the course, you should be able to:

Understand the US court system and basic legal terms and doctrines

Describe legal issues and laws that impact businesses in the US and internationally.

Explain strategies to minimize legal risks to businesses and employees.

Identify legal risks and strategies for more effective business administration and decisions.

Topics include

Contracts

Negligence

Product liability

Constitutional law as it applies to business

Federal and state civil procedure

Torts

Business entities, including limited liability companies

Uniform Commercial Code

Real-property concepts

Creditor, debtor and bankruptcy issues

Employment discrimination and sexual harassment

Law of agency

Criminal law

An overview of the American legal system.

Professional Credit:

HRCI®---PHR®, SPHR® and GPHR® general recertification credit: 29.25 hours.

Capstone User Experience Project

2.0 Units

One of the most important ways to impress potential employers is to show strong examples of your user experience projects. This final project course in the certificate program gives you the opportunity to bring all your skills together and create a site or project that demonstrates your abilities. You will seek out your own real-world client and work independently to complete your design project. Your instructors will be available to offer guidance as you carry it out. During this course, you will complete the entire process of analysis, design, development and deployment of a website. Before the first class, you'll prepare a requirements document that defines the client, the site objectives, the users, and the target technology platform. You will receive feedback on your project proposal on the first night of class. Then you will begin to design the information architecture, interface and visual design before implementing the site using HTML5, CSS3, and JavaScript as needed. The course addresses cross-browser compatibility and briefly reviews jQuery and other JavaScript libraries. Because the use of a CMS tool requires advanced skills, you must provide a well-defined need for it in your proposal, and obtain instructor approval before proceeding.

By the conclusion of the course, you will have presented your design and implementation process, and will have produced a fully functional website or a front-end interface for a Web page to add to your portfolio. You can choose from development frameworks such as Bootstrap, Materialize, Foundation or SemanticUI, with guidance from your instructors. Current trends in website design patterns and frameworks will be discussed.

This project course does not repeat instructions of prerequisite courses. You should already have the skills needed to implement your design project.

Topics include:

How to produce a requirements document

How to produce design deliverables

How to produce a website

How to validate a website

Note(s): Students should have server space available for posting their projects.

Skills Needed: To take this course students should already have experience designing Web page or executing user experience design process. Visual design and design implementation courses are strongly recommended. Also required is a code editing tool suitable for Web development, such as TextWrangler, BBEdit, Notepad++, Sublime, Dreamweaver, etc. in order to implement the design and complete the project.

Cellular Biology

3.0 Units

Recent advances in stem cell biology and cancer research illustrate the importance of understanding complex biological processes at the cellular level. This course covers the essential concepts of cellular biology, including the functions of cellular macromolecules, subcellular organization, nuclear control of cellular activity, cell signaling and cancer. You'll also learn the experimental approaches used to explore cellular activities.

Professional Credit: CA BRN/LVN Credit--Provider #CEP13114.

Clinical Data Management

2.0 Units

High-quality clinical data are at the heart of a successful clinical trial. If the data are not complete or do not reflect the actual reported results, the analysis and the conclusions drawn from that analysis may not be reliable. This course provides clinical trial personnel a solid understanding of the steps involved in clinical data management from study site data collection through data extraction for analysis. Topics include:

A planned approach to clinical data management

Basic design and specification of the database and cleaning rules

Required documentation, standard operating procedures (SOPs), and quality control

Compliance with FDA/ICH guidelines

Working with other clinical groups and external contract research organizations (CROs)

Using electronic data capture (EDC)

Data security and confidentiality

At the conclusion of the course, students will write their own data management plan. No previous data management experience is necessary although familiarity with Microsoft Excel is required.

Professional Credit: CA BRN/LVN Credit--Provider #CEP13114.

Clinical Project Management

2.0 Units

This course presents the effective planning and management of drugs and biologics clinical research trials. Exercises and case studies will illustrate how to develop and manage activities, timelines and budgets; examine staffing and resource requirements; and lead and motivate effective teams. Strategic clinical development plans, team and clinical site performance problems are also discussed.

This course will benefit clinical research professionals who are planning to begin or like to manage clinical research studies.

Learning Outcomes

At the conclusion of the course, you should be able to

Describe critical elements of a clinical trial projects, methods of project management and documentation

Discuss role of a clinical trial manager and/or clinical project manager, and strategies of risk assessment and mitigation

Discuss Clinical Trial Management Planning (Budgeting & Timeline)

pathways and resources needed for successful clinical research trials, and tools of project management

Professional Credit

CA BRN/LVN Credit--Provider #CEP13114, 20.0 Hours.

Clinical Research: The Study Site Perspective

1.5 Units

The conduct of clinical research requires effective working relationships between the study sites that execute clinical trials and the sponsors that design the trials and provide product for testing. This course offers practical insight into the clinical research process from the viewpoint of the study site. Lectures and class exercises explore the roles, responsibilities, interactions, and concerns of study site personnel and highlight important differences in perspective between clinical study sites and industry sponsors. Course content applies to all study sites, including academic medical centers, community hospitals, rural clinics, physician private practices, hospital networks, and Phase 1 units. Whether you work at a study site, for a sponsor, or are interested in opportunities at these organizations, this course will provide you with a deeper understanding of the study site's role in clinical research. Topics include:

Types of clinical trials, sponsors and study sites

The study site team's roles and responsibilities

The clinical research team and the study site's relationship with each player

Study site and sponsor expectations

GCPs and essential documents for clinical trials

Study start-up activities

Subject recruitment, screening, informed consent and enrollment

Case report forms and source data/documents, HIPAA/PHI and electronic records

Resources and tools for study site personnel

Professional Credit: CA BRN/LVN Credit--Provider #CEP13114.

Clinical Statistics for Non-Statisticians

2.0 Units

Clinical studies succeed or fail on the strength of their statistics. This course takes a practical approach to address the fundamental statistical concepts essential for non-statisticians involved in clinical research. Through lectures, discussions and in-class exercises, the instructor explores clinical study designs, hypothesis testing, sample size calculations, assumptions, controls, endpoints, data-management principles, data presentations and analysis plans, methods of analysis, and conclusions. You'll learn how to interpret the statistics commonly encountered in clinical research as well as how to communicate effectively with statisticians. The approach is practical, simple and qualitative. No previous background in statistics is required.

Professional Credit: CA BRN/LVN Credit--Provider #CEP13114.

Clinical Trials Design and Management Certificate Completion Fee

Once all of the certificate requirements have been met and your final grades are posted, please access your Student Portal to enroll in the "Certificate Completion Fee" to begin the review process. Please allow 4-6 weeks to receive your certificate.

Clinical Trials Essentials: An Intensive One-Week Course

3.5 Units

Well-planned and well-executed clinical trials are the cornerstones of effective drug and medical device development. Offered in an accelerated format and taught by leaders in the biopharmaceutical industry, this course provides a unique opportunity for professionals from all disciplines to learn about the many facets of clinical trials--the complex process that ensures the safety and effectiveness of medical products. Participants leave the program with an appreciation of the drug and device development process; as well as good clinical practice (GCP) and other regulations (ICH and FDA) that guide the conduct of trials and protect human volunteers. Also covered are clinical trial phases and design strategies; the importance of informed consent and the

role of the IRB; investigator selection and responsibilities; study site management and trial monitoring; statistical data analysis; and regulatory responsibilities and the role of the FDA.

This course benefits anyone working in the biopharmaceutical and medical device industries and the biomedical community who is interfacing with or conducting clinical research, including new clinical research associates and study coordinators, medical directors, physicians, nurses, pharmacists, and other health professionals, biomedical scientists, statisticians and database administrators, and business professionals.

A team of clinical research experts, including many instructors from the UCSC Extension Clinical Trials Design and Management Certificate Program, address the following: Topics include:

Drug and Medical Device Development Processes

Clinical Trial Design

Applied Statistics in Clinical Trials for the Non-Statistician

Regulation of Clinical Research

Roles and Responsibilities of Key Clinical Research Players

Monitoring Clinical Trials

Clinical Data Management

Clinical QA, Auditing and Compliance

GMP and the Transition to Full Scale Manufacturing

Business of Clinical Research

Globalization of Clinical Research

Professional Credit: CA BRN/LVN Credit--Provider #CEP13114.

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Cloud Computing, Introduction

0.5 Units

Cloud computing refers to a set of services that provide companies and application developers with the means to scale their application's resource usage through the Internet on demand. It lowers the IT capital expenditure while giving users and developers many flexibility, performance and reliability advantages. It is an evolving technology with potentially wide-ranging impact to e-commerce and enterprise applications. This course introduces students to the core concepts and technologies involved in cloud computing. Beginning with a survey of technologies deployed by Amazon, Google, Microsoft, and various academic and open-source providers, the instructor moves on to explore how cloud computing services can provide on-demand access to data storage, computing resources, and messaging. Discussions then focus on the enabling technologies that comprise the infrastructure behind a cloud computing service, including Web 2.0, virtualization, grid computing and utility computing. Finally, case studies are used to examine technical-business aspects of cloud

computing and highlight recent success stories. Upon completion of this course, students will have a good grasp of the concepts and technologies that comprise cloud computing and insight into the direction the field it is heading.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Survey and discuss Cloud Computing concepts:

Infrastructure as a Service (IaaS)

Platform as a Service (PaaS)

CPU's, Virtualization

Storage

Networks

Explain Amazon Cloud Services (AWS) as a IaaS platform

Describe Google App Engine as an PaaS platform

Topics include:

What is Cloud Computing

Where to get information on Cloud Computing

Who provides Cloud Computing Services: Amazon, Google, Microsoft, Eucalyptus, Nimbus, and others

Cloud Computing Services: storage, cpu's, messaging

Case Studies: Successful usage of Cloud Computing

Enabling Technologies: Web 2.0, virtualization, grid computing

Unresolved issues with Cloud Computing

Skills Needed: A basic understanding of the Internet, databases, messaging and programming experience sufficient to follow code examples.

Communicating and Negotiating with the FDA

1.5 Units

Regulatory affairs professionals interact with the U.S. Food and Drug Administration (FDA) throughout the life cycle of a biomedical product. Lectures, case studies and roleplaying are used to explore the range of interactions that industry has with the FDA, including inspections and key meetings. Students learn how to prepare for these important events. This course highlights the structure, mission, jurisdiction and roles of the FDA, reviews centers within the agency, and the field offices, and examines key societal, political, industrial and biomedical drivers that impact policies, priorities, and the current U.S. regulatory environment. This course benefits new and experienced regulatory professionals and anyone who interfaces with the FDA.

Learning Outcomes:

At the end of the course, students should be able to

Understand the importance of effective, objective-driven communication

Understand the role of the audience and objectives in determining the type of communication and message to be communicated

Develop a fundamental core competency in regulatory negotiation; communicate effectively and persuasively based on the science and framework of regulations

Understand the key elements of planning for successful meetings and correspondences

Note(s): This course was formerly titled " Interacting with the FDA "

Compensation Management

2.0 Units

This course presents wage theories and practices and their application to problems in business and industry. A workshop approach will be applied to the study of wage survey techniques, job analysis, classification and evaluation, methods of individual wage determination, and incentive plans.

Learning Outcomes

At the conclusion of the course, you should be able to:

Describe corporate compensation philosophy and goals Recognize what competitors are paying for comparable employees in relevant labor markets to permit the organization to attract and keep competent employees.

Understand the relationships among job requirements, employee KSAs, and employer-provided compensation.

Develop a clear link between work required, performance demonstrated, and pay provided to each employee.

Develop incentive and indirect compensation programs to recognize achievement of individual, group and organizational objectives, improving the organization's ability to attract and retain quality employees.

Link individual rewards to achievement of organizational objectives, corporate performance and total returns to shareholders plans.

Professional Credit:

HRCI®---PHR®, SPHR® and GPHR® general recertification credit: 19.25 hours.

Effective February 22, 2020, this course is valid for 19.25 PDCs for the SHRM-CP® or SHRM-SCP®.

Comprehensive Signal and Power Integrity for High-Speed Digital Systems

3.0 Units

High-speed signaling technologies with multi-gigabit data transfer rates are critical to high-bandwidth communications. However, the physical limitations of the channel (in board, package, and connector), the transceiver circuits, as well as voltage and timing noises introduced along the signal paths, make the design of high-speed links very challenging. Accurate modeling and analysis of high-speed digital systems requires a good understanding of physical effects and system architecture in order to optimize the design parameters in the channel, transmitter, and receiver subsystems. This course gives students a set of skills for problem solving and strategies that they can use to design successful high-speed systems. This course starts with a comprehensive overview of signal and power integrity analysis for high-speed systems. The instructor promptly moves on to cover the state-of-the art modeling and analysis techniques used in high-speed links. The course introduces accurate interconnect modeling including high frequency and second-order effects, and behavioral modeling of IO and ESD, including IBIS. Students will learn the concepts of equalization design and various signaling techniques (such as differential, NRZ, pulse, multi-level, etc.). At the system level, topics include clocking schemes and timing jitter analysis, as well as power analysis topics such as IR Drop, AC noise, simultaneous switching noise, and decoupling capacitor. The course concludes with a discussion of variations in manufacturing and methods to handle them in simulation and design.

Upon completing the course, students will have a strong understanding of signal and power integrity concepts and terminology. They will acquire the skills to design, model, and analyze high-speed interconnects. They will be able to relate various link blocks and parameters to system performance and make trade off decisions.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Understand signal and power integrity concepts and terminology

Perform design, modeling, and analysis of high-speed interconnects and systems

Explain the impacts of inter-symbol interference, jitter, power supply noise on the performance of high speed systems

Apply equalization, modulation, and advanced signaling techniques to increase system bandwidth

Identify and relate various high-speed link components and parameters to system performance and make trade off decisions

Skills Needed: Students must have a basic understanding of signal integrity, electromagnetic compatibility, printed circuit boards or packages.

Computational Intelligence, Introduction

1.5 Units

Computing professionals are required to solve increasingly complex problems using new algorithms, systems or programming paradigms. Fortunately, "black-box" computational intelligence tools can be configured to allow their application to problems, without the user's intimate knowledge

of the low-level details. This course is well-suited to computational professionals who are interested in exploring new techniques for solving problems that are ill-defined, have conflicting constraints, or contain data with high noise levels. Industrial applications can be found in software algorithm development, electronic design automation, data mining, medical diagnosis, and pattern matching, etc. You will learn the strengths and weaknesses of various computational and artificial intelligence (AI) techniques using supplied software.

The course introduces the following topics:

Search spaces and their importance for assessing problem complexity

Evolutionary computation, the fundamental engine behind many AI techniques

Genetic programming with many examples

Neural networks and the iris problem

Swarm intelligence, the power of collective, decentralized systems

Support vector machines demonstration using a popular tool for simple classification

Fuzzy logic, including a solution of the traveling salesman problem

You will learn to solve AI problems using software on a provided bootable USB Stick and learn techniques for representing and structuring real-world problems using AI. By the end of the course, you will understand common algorithms and techniques used to solve real-world optimization problems, and also gain experience applying them to practical problems.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Determine if a particular task is suitable for a computational intelligence technique

Apply the appropriate methods to the problem of interest.

Skills Needed: Experience with a computer programming language and basic algebra skills.

Computer Programming Certificate Completion Fee

Once all of the certificate requirements have been met and your final grades are posted, please access your Student Portal to enroll in the "Certificate Completion Fee" to begin the review process. Please allow 4-6 weeks to receive your certificate.

Conflict Resolution and Mediation

3.0 Units

This introductory, interactive, and entertaining course provides human resource professionals the methodology and techniques required to effectively resolve workplace, interpersonal, and group conflicts.

We will explore conflict resolution coaching and mediation techniques, introducing different mediation styles—facilitative, transformative, and evaluative—and examine when each approach would most effectively mediate employee conflicts.

You will end the course with a comprehensive understanding and practical skills to nurture and guide positive resolutions among diverse parties.

Learning Outcomes

Identify different perspectives and approaches to the study of conflict

Understand the role of conflict management techniques and mediation in the resolution of disputes

Describe the stages of human conflict and identify techniques to help parties resolve workplace conflicts

Identify and implement strategies for preventing or defusing rising conflict

Integrate conflict resolution into organizational cultures

Recognize how biases and cultural differences can affect the resolution process

Identify which style of mediation should be used for different types of disputes

Describe the advantages and disadvantages of each mediation style

Understand the process of an EEOC mediation

Topics Include

Core concepts of workplace conflict

Dynamics of human conflict

Common types and styles of mediation

De-escalation techniques

The role of confidentiality in mediation

Conflict management strategies for face-to-face and online process

Preparation for workplace conflict resolution meetings

Consumer Insights: Data Analysis and Interpretation

2.0 Units

In this class students will build products that customers want and businesses cherish using real-life examples. We will study state-of-the-art qualitative and quantitative research tools, such as

regression and conjoint analysis, to learn insights about our customers. We will forecast the success of a new product through modeling the size of the addressable market.

During in-class labs we will build positioning, promotional, and pricing product strategies used in the digital marketing industry today. Learn about the latest tools used to collect data, including customer research surveys, and begin to data analysis using statistical and inference models. You will visualize results and create actionable recommendations.

The best part: Even though this class is data-driven, there is no programming required.

Learning Outcomes

Explain how to put ideas to test

Examine what the customer wants

Describe regression and conjoint analysis

Discuss how to estimate the market size

Topics include

Customer metrics

Idea creation

Customer survey research

Conjoint analysis

Actionable customer insights: value versus pricing

Market size estimation

C Programming, Advanced

3.0 Units

C remains one of the most popular programming languages. It is widely available on most, if not all, computing platforms. This language is highly valued for its speed, low-level capabilities and platform independent characteristics. It is also actively used in the development of other languages. This course will broaden your skills as a C language programmer by introducing sophisticated problem-solving and optimization techniques. This course delves into the design, implementation, and use of advanced data structures. Students will solidify their understanding of strings, arrays, pointers, structures, unions and bit manipulation. Emphasis will be on programming that employs and improves upon a variety of data structures. Through this course, you will learn to write efficient programs by understanding the complexities of various algorithms.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Define a data type and understand the memory layout for different variables.

Manipulate arrays of any data type, program with loops and control flow, play with pointers.

Define user created structures, use files to read the input data and write output.

Allocate structure memory dynamically, manipulate linked lists.

Sort complex data though simple and advanced sort routines.

Create tree structures, assign data elements in tree format and traverse trees.

Create a B-Tree structure to store multiple elements of data in a tree node with multiple children.

Create graph nodes to traverse through them, find shortest path from a graph between two nodes.

Identify a minimum spanning tree of a graph created with the node information.

Topics Include:

Data types, variables, operators, and operator precedence

Arrays in general, including two-dimensional and multi-dimensional configurations

Dynamic memory allocation

Pointers, strings, file input and output

Data structures such as linked, circular and doubly linked lists, stacks, queues, and hash tables

Binary trees in general, including implementation, traversal and drawbacks, AVL trees, B trees, and B+ trees

Recursions and implementation of recursive algorithms

Huffman algorithm

Sorting routines, Big O notation and the complexity of algorithms

Graphs: their traversal and applications

Skills Needed: Students should have a good understanding of programming using data types such as pointers, control flow, structures and functions.

C# Programming, Comprehensive

3.0 Units

Microsoft's .NET technology provides a development and deployment standard for distributed, Web-based and Windows applications. The .NET technologies include a common-language runtime engine, support for multiple programming languages, application and component assembly, and deployment. This course is for beginners as well as intermediate programmers. It introduces students to .NET programming using Microsoft's C# programming language and the Visual Studio development environment. The course includes a review of the basic constructs of C# language with detailed explanations of the C# regular expressions, delegates, events, generics and collections. It also covers exception handling, threading and synchronization. Sample applications will be used to illustrate core concepts, and the instructor will present real-world code examples in

class.

Upon completing the course, students possess the skills necessary to start developing .NET applications using the C# programming language. C# beginners can start on this course. **Learning Outcomes:**

At the conclusion of the course, you should be able to:

Use C# language for basic-intermediate-advanced level of programs

Design and Debug software based on C# basic-intermediate-advanced features

Topics Include:

C# language basics

Developing and Debugging programs using Visual Studio

Objects and Types

Inheritance and Polymorphism

Arrays

Errors and Exceptions

Strings and Regular Expressions

Generics and Collections

Exceptions, Threading and Security

File input/output

Case Study for Windows Application

Skills Needed: Some programming experience with a high-level language such as C, C++, Java or Visual Basic. C# knowledge is not required.

C++ Programming, Comprehensive

3.0 Units

C++ is a general-purpose object-oriented programming language that offers portability, speed, and modularity, as well as compatibility with C and other languages. Because most automation, embedded applications, gaming, and many large data processing applications are written in C++, it is essential that software developers understand and master it. Hardware engineers are increasingly using C++ and OOP in system verification tasks. This course offers an excellent foundation in developing optimized C++ applications. The participants will learn to write faster and modular code, and the debugging techniques, for real-world applications. There will be assignments and exercises to accompany the lectures. **Learning Outcomes:**

At the conclusion of the course, you should be able to:

Apply object oriented concepts to software development problems in C++

Understand and use the basic programming constructs of C++

Manipulate various C++ data types, such as arrays, strings, and pointers

Write C++ code using principles of object-oriented programming

Understand design patterns in C++ using singleton pattern

Manage memory appropriately, including proper allocation/deallocation procedures

Topics Include:

Principles of object-oriented analysis and design

Stream classes for input/output and to read/write files

User defined data types using structures and classes

Declarations of identifiers, pointers, function pointers and references

Reuse code and extend existing data types through inheritance

Memory management and dynamic array declarations

Create class/function templates and understand STL

Use static member variables and static member functions

Singleton design pattern using static member functions

Declare friend functions and friend classes

Function overloading and operator overloading

Polymorphism concept using virtual function

Understand exceptions handling techniques using try/catch syntax

Note(s): Students must have access to a C++ compiler.

Skills Needed: Experience with a high level programming language such as C. Advanced C programming is recommended.

C Programming for Beginners

2.0 Units

C language is popular for engineering and commercial applications. It allows developers to maintain the structure and portability of a high-level language while having the detailed control, efficiency and speed of an assembly language. C is the leading language used in hardware application and in software compilers, libraries and interpreters. This course gets you started with application development using the C language. The course begins with programming and tools overview. It introduces the functions, data types, input/output, strings, operators, precedence, and expressions. It also demonstrates the use of control statements, arrays, and pointers for problem solving. Students will receive assignments to write non-trivial programs and learn to create modular programs with efficiency and readability. This course will benefit individuals who want to learn C programming language but have little or no programming background. The lectures stress the strengths of C providing students with the means of writing efficient, maintainable and portable code. Each instruction is supplemented with programming exercises.

Learning Outcomes

At the conclusion of the course, you should be able to:

Utilize C language to write non-trivial programs

Use variety of data types suitable to specific programming needs including your own data types

Use functions from C library and create and use your own functions

Use arrays and pointers as part of the software solution

Demonstrate the use of the various control flow features

Utilize modular features of the C language and demonstrate efficiency and readability

Topics Include:

Compiling, linking, executing, debugging and running a C Program

Functions, data types

Input and Output, character strings

Arrays

Operators and precedence

Expressions

Control statement

Pointers

Advanced topics

Skills Needed: Technical aptitude and experience with a computer operating system or equivalent knowledge.

Create Your Startup Story to Inspire Sales

1.0 CEU's

A good startup story sells itself. In this interactive workshop for entrepreneurs, enterprising students, and business leaders, we will take the pain out of selling by focusing on proven sales methods. Imagine guiding clients to their goals, helping them see a better life, and gaining their confidence. Learn how to move from selling to inspiring change.

It all begins with story. This is good news for people who have qualms about selling themselves and their products. We'll focus on how the story makes the sale by showing how a startup improves someone's life and compels customers to take action.

We will unmask common pitfalls of instructional selling and learn the conversations that improve sales success and practice developing, sharing, and crafting your own persuasive story.

You will build three conversations covering trust, empathy, and goals; learn to settle buyer concerns; and understand the principles and methods of connected selling.

Course objectives: See why selling can be so difficult

Master how to effectively lead a sale

Help customers feel their own authentic win rather than feel sold

Learn to write and share storylines, elevating persuasion, confidence, and activating motivation

Create compelling conversations clients want to hear

Creating the Successful Team

1.5 Units

In this course for technical and non-technical professionals, students learn to establish high-performance teams by exploring the fundamental principles and characteristics that make them effective. By examining what makes individuals standout, you will better understand how to develop and leverage their contributions to a successful project team. The course focuses on key team development skills—trust building, goal setting, role agreement, and how to sustain commitment for the duration of a successful collaborative project.

The course also covers how to design and manage virtual teams. Through participating in a virtual team, you will learn to identify and respond to typical challenges, including group meetings and team decision-making. Concepts learned in the course are applicable to building highly effective strategic and tactical teams at all levels of an organization.

Learning Outcomes

At the conclusion of the course, you should be able to:

Hire right talent and assign them to right role

Effectively manage a geographically dispersed team

Set right expectations and coach on team behavior

Effectively deal with conflicts in a team

Build trust between team members

Handle tough conversations

Professional Credit

The Project Management Institute (PMI)®--PMP® 15 Professional Development Units.

CRM: Customer Relationship Management

2.0 Units

It is critical that companies provide a consistent experience to their customers across all channels of interactions, and listen and respond to them regardless of time, place and language. This course covers the history of customer relationship management (CRM) and its evolution to customer experience--the business needs that ultimately require an effective CRM strategy, and its accompanying tools and technologies. The course includes case studies and live demonstrations of software solutions. By the end of the course, you will know how to create a CRM strategy for your organization.

Learning Outcomes

At the conclusion of the course, you should be able to:

Describe why CRM is an important part of every organization's survival strategy

Apply an approach to create a CRM strategy for their organization, regardless of size, industry or geography

Explain how to use industry standard CRM software tools

Topics may include

What is CRM?

How has it evolved over the years into Customer Experience?

How has it evolved over the years into Customer Experience?

The adoption of CRM strategies by organizations

How does CRM affect the marketing, sales and customer support functions?

Key success and failure factors for CRM project implementations?

Role of Social Media in a CRM strategy

CRM tools and technologies

Cultural Equity for Student Success

1.0 CEU's

In this deeply informative and highly interactive course for current and aspiring teachers, school administrators, superintendents, and school staff, we compile a toolbox of strategies for effectively and efficiently cultivating culturally equitable classrooms.

Building a DEI classroom

We will dive into the historic foundational practices and valuable strategies for classroom management, including: Historical, legislative, and current societal implications of diversity in education;

Components of cultural equity as it relates to students from diverse backgrounds;

Strategies for creating inclusive classrooms where all students feel valued and celebrated;

Elements of systemic racism and how it impacts teacher education, student achievement, and parent involvement; and

The importance of effective and appropriate allyship with underrepresented colleagues, students, and other stakeholders.

Learning Outcomes

You will end the course with concrete practices to implement in your own classroom, including new awarenesses and understanding that allow you to: Define diversity as it relates to educational settings;

Identify and mitigate inequities as it pertains to student populations;

Articulate principles of inclusion in the classroom and on campus;

Recognize the historical implications systemic racism has had on the educating of marginalized groups;

Identify components of culturally responsive pedagogy; and

Demonstrate how to create culturally responsive curriculum.

Cultural Proficiency

2.0 Units

Because Silicon Valley companies draw their workforce from around the globe, both staffers and managers quickly learn that their "default" communication styles aren't always effective. "Dos and don'ts" books about other cultures might be useful in some situations, but most of us need tools for working effectively in a global environment every day. In this highly interactive, practical course, you'll learn how to apply the latest research to intercultural business activities. This course includes studies in the following areas: Competition and teamwork; Feedback and clarification; Appraisal and motivation; Optimal use of time; Coaching employees through cultural transitions; Strategic use of cultural resources. **Topic Include:** Defining cultural proficiency

Developing self-awareness about beliefs, stereotypes, and communication styles

Making observations about self and others that will assist in deeper cultural understanding

Describing the difference between workplace politics and diplomacy

Beginning a practical plan for becoming a more effective communicator

Culture and Cultural Diversity

4.0 Units

What is culture, and how does it affect the way we teach and learn? This course explores various definitions of culture, the impact of culture on everyday life, and the impacts on teaching and learning specifically. You will assume an anthropological view of culture as a phenomenon of learned practices, products and perspectives in a community, rather than isolating perceived cultural groups and analyzing each individually. You will analyze how culture is depicted in fiction and write a social, cultural, and historical analysis of a cultural group in California. By understanding culture and cultural diversity in this way, future and current teachers will expand their ideas of how language, culture, and teaching and learning matter in the classroom and beyond. **Objectives:**

Gain an understanding of culture

Explore the relationship between language, culture, and teaching and learning

Consider real-world examples of how and why complex understanding of culture matter for the classroom

Apply learned principles to explore a community group of your choice

Customer Acquisition Strategies

2.0 Units

Formerly titled "Customer Acquisition 2.0: Strategies, Retention and Win-Back."

What determines whether or not your product proves to be a hit in the marketplace? An excellent customer acquisition strategy that targets the right customers in a cost-effective way is the key. A robust strategy encompasses an end-to-end customer focus: understanding what your target customer really wants, developing products that the target customer will embrace, designing compelling marketing communications, and delivering satisfying customer experiences. The course will cover online and offline measurable marketing techniques to gain awareness, educate prospects, and influence customers' buying behaviors. Numerous real world case studies are presented.

Learning Outcomes

At the conclusion of the course, you should be able to:

Critique the models for Customer Purchase Process, including the critical decision-points

Understand the conflicting needs of Consumers, appreciating how this informs Purchase Decisions and adds complexity for the Marketer

Consider how Marketers influence the Hierarchy of Effects to encourage action by Consumers

Evaluate Marketing Tools, including Advertising, Advocacy, Promotion and Cause Marketing, which are used to encourage Trial, Repeat and Loyalty

Topics include

Gaining insight about customers

Describing the target market

Positioning

Metrics

Advertising

Packaging

Promotions

Distribution strategy

Pricing

Online and offline marketing

How to create acquisition strategy

Word of mouth

Consumer trends

Customer Discovery in Product/Market Fit

0.8 CEU's

Startups fail when they can't connect with customers. How do you determine the right customers? You use core marketing and customer development frameworks to make sure you are in a good market with a product that can satisfy that market, to make sure you have product/market fit.

In this foundational course for entrepreneurs, we discuss how to identify target customers, determine the degree of product/market fit, and evaluate various monetization options. We will:

Learn core concepts in marketing, product/market fit, and business model design.

Use various frameworks for evaluating product/market fit.

Evaluate the profit-making potential of a startup idea.

Frame ideas in a succinct validation pitch.

Create customer profiles, value maps, and use them to analyze what it will take to achieve product/market fit.

Dashboards and Data Visualization

3.0 Units

This course introduces dashboard and data visualization technologies with a hands-on approach. Dashboard is a presentation of key performance indicators (KPIs) important to an enterprise. Database and data analytics professionals often build, use, and support dashboards. Data visualization is the application of data science to extract intelligence from data sources, often in a graphical format. The course introduces the characteristics of dashboards and the principles of data visualization. It also covers how to select KPIs, identify dashboard content requirements, design and implement dashboards and scorecards, and apply data visualization techniques. In addition, you will learn how to identify and select the software tools used to create dashboards and their visual content, as well as common mistakes, tips, and best practices relevant to dashboards and data visualization.

You will learn how to choose data sources, extract required data, perform data analysis using an example tool, and visually present the results on a dashboard using tables, charts and maps. As a course project, you will identify and specify dashboard requirements (including selecting the appropriate KPIs), design the dashboard views, reports, layout and navigation, as well as create the dashboard and the data visualizations to be incorporated in it. You will learn new visualization techniques like 'word cloud', 'Sankey Charts','Tooltip visualization', and about the HYPER data format that enhances performance. In addition to these, you will also learn the newer features of the Tableau software. Your grade will be based on the project, in-class participation, a midterm and a final exam.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Describe the core aspects of Dashboards and Visualization

Discuss the difference between Dashboards and Data Visualization

Explain the importance of Key Performance Indicators

Identify the use cases and demonstrate with examples

Topics Include:

Key performance indicators (KPIs)

Understanding dashboards and scorecards

Data visualization principles

Advanced data visualization techniques

Dashboard planning, design and implementation

Best practices, common mistakes and tips

Identifying and selecting dashboard tools and vendors

Course Note: The Tableau software is available to students for learning purposes only for approximately three months. Students are required to install software on own computers (Windows Vista or newer or Mac OSX 10.8.1 or newer) and are encouraged to bring laptops to class. Also note that this is not a specific tool usage training course. Tableau is introduced as an example tool for data visualization.

Skills Needed: Knowledge of database concepts and any business experience related to decision-making.

Data Analysis, Introduction

3.0 Units

Data analysis is the process of transforming data into useful information to support decision making. It is the foundation for data mining, business intelligence, and predictive analytics. This course presents the tools, techniques and common practices used in the industry, including how to obtain, manipulate, explore, model, simulate and present data. It will help you build the essential technical skills to perform as data analyst or data scientist, and to continue other course studies in the certificate program.

The course examines different approaches to a data analysis project, with a framework for organizing an analytical effort. Popular tools for data analysis, such as R and Python can be used to carry out analysis, but R is used primarily in class instruction and examples. The course covers how to obtain and manipulate the raw data for use, as well as the basic exploratory analysis and common data analytical techniques such as regression, simulation, estimation and forecasting. It includes several graphing and visualization tools to understand the data and to present findings and results.

By the end of the course, you will learn a working framework to approach any data analysis project. You will be able to use R (or Python) to complete a large data analysis project, including a write-up with findings, insights and visuals. All tools used are open sourced.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Describe the framework to approach for the Data Analysis

Discuss the importance of Data Analysis for Data Science, Data Visualization & exploration

Explain the basic concepts of R and using R for Data Analysis

Identify the right tools, concepts and functions that are required for Data Analysis

Topics Include:

Approaches to data analysis: Templates, write-ups and illustrative examples

Overview of tools for data analysis: R, R-Studio (IDE) and comparison with Python

Obtaining data: Finding data sets and Web scraping, file formats

Data manipulation techniques: Data quality, reshaping data, appending and joining data sets

Plotting and visualization: Exploration and presentation

Exploratory data analysis: Visual inspection, descriptive analytics, insights

Regression models: Simple, multiple and logistic

Analysis report write-up and presentation, including graphs

Simulation techniques: Fitting distributions, simulating stochastic processes

Forecasting methods and applications: Smoothing, moving averages, time series, ARIMA

Skills Needed: Some programming experience is recommended. (R will be covered in class and used in examples. Python experience can be helpful.) Basic knowledge of probability and statistics required (at the level of basic statistics textbooks (see example: www.stattrek.com).

Data Analytics for Business Management

3.0 Units

Formerly titled "Business Statistics I."

An introduction to the business use of statistical concepts and tools, this course covers the basic concepts of descriptive statistics--such as means and variances, uses of probability, and statistical inference--and their application to business processes and decisions. In addition, the course addresses the use of statistical estimation techniques, decision theory (hypothesis-testing process), and the use of regression and correlation.

Learning Outcomes

At the conclusion of the course, you should be able to:

Describe the basic concepts and procedures used in data and statistical analysis

Discuss the ethical dimensions of "big data analytics"

Identify when to use a particular tool / concept within statistics to solve a real-world problem.

Database and Data Analytics Certificate Completion Fee

Once all of the certificate requirements have been met and your final grades are posted, please access your Student Portal to enroll in the "Certificate Completion Fee" to begin the review process.

Please allow 4-6 weeks to receive your certificate.

Data Engineering with Hadoop

3.0 Units

Big Data platforms are distributed systems that can process large amounts of data across clusters of servers. They are being used across industries in internet startups and established enterprises. In this comprehensive introductory course, you will get up to speed on the use of current Big Data platforms and gain insights into cloud-based Big Data architectures. We will cover Hadoop, Spark and other Big Data platforms based on SQL, such as Hive. The first half of the course includes an overview of the frameworks for MapReduce and Spark. You will learn how to write MapReduce/Spark jobs and how to optimize data processing applications. The second half of the course covers SQL based tools for Big Data. We use Hive to build ETL jobs. The course also includes the fundamentals of NoSQL databases like HBase and Kafka.

The course consists of interactive lectures, hands-on labs in class, and take home practice exercises. Upon completion of this course, you will possess a strong understanding of the tools used to build Big Data applications using MapReduce, Spark, and Hive.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Describe the role Hadoop plays in the analysis of big data

Discuss the inner workings of Hadoop's computing framework, including MapReduce processing and Hadoop's file system (HDFS)

Develop MapReduce applications - with exposure to both traditional MR2 and Spark

Use Hive and NOSQL databases for data analysis

Leverage the Hadoop ecosystem to become productive in analyzing data

Topics Include:

Big Data applications architecture

Understanding Hadoop distributed file system (HDFS)

How MapReduce framework works

Introduction to HBase (Hadoop NoSQL database)

Introduction to Apache Kafka

Developing MapReduce applications

Introduction to Spark and SparkSQL

Developing Spark/SparkSQL applications

Managing tables and query development in Hive

Introduction to data pipelines

Note(s): This course uses EMR Hadoop distribution. Students are required to bring laptops—with 64bit CPU and a minimum of 8GB of memory—to class.

Skills Needed: Basic SQL skills and the ability to create simple programs in a modern programming language are required. An understanding of database, parallel or distributed computing is helpful.

Data Modeling, Introduction

2.0 Units

Data modeling defines and applies structure to the information systems in an enterprise. Data stored in various relational databases needs data modeling to depict the relationship between entities in the databases. The models provide pictorial views of how the data flows across the enterprise, departments, or business areas. Before creating a database for any application, you need well-constructed data models to maintain the integrity of data and improve query performance. This course provides in-depth knowledge and hands-on practice in data modeling and design. After introducing the basic concepts and principles, the course addresses data modeling techniques and practices in four modeling areas: conceptual, logical, physical and dimensional. The course first addresses the collection of user requirements, followed by design approaches for logical and physical models. You will study real-world examples of data models for transactional systems, data marts and enterprise data warehouses. Expert instructors will share their practical experiences.

This is a hands-on course using an industry-leading data modeling tool in class. By the end of the course, you will be able to create data models for enterprise applications.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Describe the various types and advantages of Data Modeling

Discuss the quantifiable values of Data Modeling

Explain the intricacies of Data Modeling

Identify the use cases for Data Modeling

Topics Include:

Overview of data modeling

Principles of data modeling

Types of data modeling: Conceptual, Logical, and Physical

Logical data modeling: Building data models; Cardinality rules; Transformation rules

Physical data modeling: Database standards; Domains and classwords; Roll-ups and roll-downs; Data model repository options

Dimensional data modeling: Star schema modeling; Snow flake modeling

Top ten mistakes to be avoided

Data Privacy and Security for Healthcare and Biosciences

1.5 Units

Many companies in the healthcare and bioscience industries utilize Protected Health Information (PHI) or Personally Identifiable Information (PII) to develop and test products such as medical devices and mobile applications, or to perform other services, including data analysis, on their customer's healthcare related data. This course examines the important data privacy and security issues that govern these industries. You will develop a complete understanding of the regulations and requirements relevant to your industry and learn how to develop a plan of action for compliance with those standards. Topics include:

Relevant state, national and international data privacy and security regulations, including public and private sector laws and rules

Inappropriate disclosure of PII

Guiding principles for information privacy

Medical device security and privacy

Mobile health (mHealth) security and privacy

PII and PHI

HIPAA and HITECH Act requirements and implementation guidelines

Audit criteria, with particular focus on ONC audits

FTC requirements

HIPAA training and risk analysis requirements

Breach notification requirements and procedures

Upcoming data privacy and security issues and regulations

The skills presented in this course are valuable to any company that deals with healthcare or patient data. It is intended for regulatory, clinical or IT professionals working in healthcare, the biopharmaceutical, mobile health (mHealth), biotechnology, medical device and healthcare startup sectors, and anyone interested in regulatory issues faced by these industries. This is a great opportunity to learn how to develop a plan to make these companies compliant with privacy and security regulations.

Professional Credit: CA BRN/LVN Credit--Provider #CEP13114

Data Scientist Specialization (instructor-led)

If you already have experience with machine learning, this advanced, five-segment specialization gets you ready for the higher-level data scientist jobs by taking what you know and building on it. You'll master skills necessary to become a successful data scientist by working on projects designed by industry experts. Learn to run data pipelines, design experiments, build recommendation systems, and deploy solutions to the cloud. Key assignments include writing a data science blog post identifying questions about a dataset and analyzing to get your answers. We'll review essential software engineering skills, such as creating unit tests and building classes; build disaster response pipelines with Figure Eight; and design a recommendation engine with IBM. The specialization culminates with a capstone project incorporating what you've learned into a job-ready portfolio piece.

Takeaways

Use Python and SQL to access and analyze data from several different data sources

Use principles of statistics and probability to design and execute A/B tests

Use recommendation engines to assist businesses in making data-automated decisions

Deploy a data science solution to a basic flask app

Manipulate and analyze distributed datasets using Apache Spark

Communicate results effectively to stakeholders

Format

This specialization, estimated to take four months, is an instructor-led format that meets together weekly as an online class to discuss material and assignments.

Month-by-Month Subscription at $899 per month:

This model allows you to pay in full upfront or on a month-by-month basis. Learn more about the subscription model in our FAQ section.

Prerequisites:

Python

SQL

Statistics

Data Scientist Specialization (self-paced)

If you already have experience with machine learning, this advanced, five-segment specialization gets you ready for the higher-level data scientist jobs by taking what you know and building on it. You'll master skills necessary to become a successful data scientist by working on projects designed by industry experts. Learn to run data pipelines, design experiments, build recommendation systems, and deploy solutions to the cloud. Key assignments include writing a data science blog post identifying questions about a dataset and analyzing to get your answers.

We'll review essential software engineering skills, such as creating unit tests and building classes; build disaster response pipelines with Figure Eight; and design a recommendation engine with IBM. The specialization culminates with a capstone project incorporating what you've learned into a job-ready portfolio piece.

Takeaways

Use Python and SQL to access and analyze data from several different data sources

Use principles of statistics and probability to design and execute A/B tests

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Deploy a data science solution to a basic flask app

Manipulate and analyze distributed datasets using Apache Spark

Communicate results effectively to stakeholders

Format

This specialization, estimated to take four months, is taught in a self-paced, online curriculum format.

Month-by-Month Subscription at $399 per month

The model allows you to pay in full upfront or on a month-by-month basis. Learn more about the subscription model in our FAQ section.

Prerequisites:

Python

SQL

Statistics

Data Structures and Algorithms Using C++

3.0 Units

Most engineers know computer languages, as well as some data structures and algorithms. This may not be enough to write code for a real product. This course covers the use of efficient algorithms with powerful data structures in object-oriented code using the C++ programming language. The course begins with a quick review of C++, moving on to the analysis of complexity of algorithms. Emphasis is placed on common problems, implementation details, examples, and testing throughout the course. Each class session will include lecture and discussion of code. This course prepares students to achieve the skill level of practicing engineers in the software industries. Students write and test approximately 5000 lines of C++ code. Upon completion of this course, students are prepared to improve data structures and algorithms in existing code, as well as write industry standard code for a new product. **Learning Outcomes:**

At the conclusion of the course, you should be able to:

Describe a solution to a real world problem using efficient data structures and algorithms

Discuss the need of rewriting or modifying the existing code

Identify and explain the problems with the existing implementation and suggest an efficient solution

Topics Include:

A quick review of C++

The importance of algorithms

Introduction to the complexity of algorithms

Dynamic array and stack

Linked lists

Searching and sorting

Hash tables

Heap and binary tree

Graph algorithms using C++ templates

Skills Needed: Working knowledge of C++ is required.

Data Structures and Algorithms Using Java

3.0 Units

There are two sides of a program: data structures, which are used to represent data, and algorithms. While entry-level programmers focus on learning programming languages, today's employers seek professionals who know how to program with high reliability, and with efficiency, in terms of resource and performance. The way you represent a program's data is as central to program design as the algorithm. This course focuses on the use of efficient algorithms with powerful data structures in the Java language—and offers the skills you need to stand out. This course covers data structures such as dynamic array, dynamic string, long numbers, lists, heap, hash, trees and graphs. You will learn to create objects from scratch using object-oriented Java programming concepts, and then build bigger objects using the objects that have already been built and tested. You will write algorithms on these objects using techniques such as recursion, greedy, divide and conquer, back tracking and dynamic programming. The course discusses algorithms such as searching and sorting, union find problems, knapsack problems and NP complete problems. You will also learn to compute the worst case complexity of the algorithms in terms of time and space in order to choose the best techniques, and to ensure that the objects scale with arbitrarily sized inputs.

The course emphasizes common problems and implementation details in Java and does not cover advanced Java features. It provides ample examples and testing of codes. Many of the problems

solved in the class are coding questions that are asked in interviews and on popular coding websites.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Create effective and efficient programs using Java

Express ideas using efficient data structures

Apply operations to these structures

Prove the complexity of the data structures method in terms of primitive operations

Topics Include:

Introduction to data structures and algorithms

Review of Java used for this course

Need for algorithms

Tools for computing complexity in terms of problem size rather than hardware used

Data structures for building extremely large objects like array, stack, heap, hash, trees and graphs

Algorithm techniques for solving problems like greedy, divide and conquer, back tracking and dynamic programming

Implementing objects and algorithms that scale for arbitrary large size problems

Proving the worst case complexity of each algorithm in terms of time and space

Skills Needed: Working knowledge of Java or C/C++.

Data Structures and Algorithms Using Python

3.0 Units

Deep knowledge of how to organize data and data structures, in addition to performing operations that result in meaningful algorithm answers is essential in all the fields of arts, science, engineering, and medicine. In this rare course, which teaches algorithms specifically for interviews, students will use Python, a widely-used, general-purpose, high-level programming language, to learn a variety of data structures including array, list, stack, queue, heap, hash, binary trees, disjoint sets, and graphs. Python, which has a design philosophy that emphasizes code readability, has a syntax that allows programmers to express concepts in fewer lines of code than would be possible in languages such as C++ or Java. It is considerably easier to learn.

Students progress to algorithm techniques like brute force, greedy, dynamic programming, and backtracking, and implement algorithms exploiting those techniques. Both time and space complexities will be analyzed for all the code we write in this class.

This course is a gold mine for job seekers. By the end of the course, you will have experience with many data structures and algorithms and be able to implement them easily using Python. Most importantly, you should be able to solve many common interview questions known as "algorithms for interviews" (AFI) on LeetCode and HackerRank websites and confidently attend Google, Amazon, and Facebook interviews.

Learning Outcomes:

At the conclusion of the course, the student should be able to:

Describe and use abstract data types including stacks, queues, lists, tree, hash, and graphs.

Implement different algorithmic techniques such as divide and conquer, greedy algorithms, dynamic programming, and backtracking.

Explain the asymptotic performance of the algorithms studied in this course and understand the practical implications.

Analyze complex Python programs written by another author.

Solve interview problems efficiently on the LeetCode and HackerRank interview websites.

Prerequisite(s): A course on C/C++/Java/Python.

Decision-Making Tools and Techniques

1.5 Units

Project managers are, above everything else, decision makers and problem solvers. A project manager's effectiveness is directly proportional to his or her decision-making ability. This course is for those professionals who want to improve their decision-making skills through the use of modern-day computer tools and techniques. Participants learn how to make effective decisions relating to project schedules, product design trade-offs, project cost estimating, problem solving and project risk analyses. Examples, in-class exercises and homework using spreadsheet techniques and Internet tools enable participants to become confident in the use and application of practical decision-making methods.

Learning Outcomes

At the conclusion of the course, you should be able to

Recognize need of soft skills and make effective group decisions using soft skills

Understand and apply decision making process while making decisions

Make effective decisions using Analytical Hierarchical Process and Decision Trees

Effectively handle project cost and budget uncertainties by making right decisions and tradeoffs

Topics Include

Spreadsheet modeling and decision analysis

Decision tools for project schedule management

How to make multicriteria decisions using the Analytic Hierarchy Process (AHP

Making effective project cost decisions

How to use computer tools to optimize product designs

Decision trees: when and how to use them

How to make decisions when dealing with schedule and cost uncertainties

How to select the most appropriate decision-making tool

Professional Credit

The Project Management Institute (PMI)®--PMP® 15 Professional Development Units.

Deep Learning and Artificial Intelligence with TensorFlow and Keras

3.0 Units

Deep learning is a branch of Artificial Intelligence and Machine Learning that uses multi-layered neural networks to create highly accurate prediction models for tasks such as image recognition, object detection, language translation, speech recognition, and others. In this course, students will use open-source and industry-standard machine learning libraries, TensorFlow and Keras to build and deploy deep learning models. Students will build deep learning prediction models of different complexities, from simple linear logistic regression to major categories of neural networks including convolutional neural networks (CNNs), recurrent neural networks (RNNs), long short-term memory (LSTMs), and gated recurrent units (GRUs). By the end of the class, students will be proficient in best practices of using TensorFlow and Keras.

The class prepares students to pursue a career in data sciences and AI model development.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Use the common deep learning architectures such as CNN and RNN that are used in the industry

Discuss the significance of hyper-parameters in the architectures

Prepare data for deep learning using Pandas and NumPy, the de-facto standard for data prep in Python

Write scalable TensorFlow and Keras code that can be used to train deep learning architectures on real-world business problems

Debug and understand the inner working of deep learning architectures

Topics Include:

Deep learning and TensorFlow/Keras

Multilayer perceptrons

Advanced multilayer perceptrons

Convolutional neural networks

Image processing CNN architectures

Recurrent neural networks

RNN - prediction with multilayer perceptron

RNN - prediction with long short term memory networks

Note(s): Students are required to bring laptops for the classroom and work with Python3/ Jupyter Notebook environment.

Skills Needed: Moderate level of computer programming ability in Python, comfortable with an editor, familiarity with command-line operations on a laptop, and a basic understanding of Machine Learning models.

Deep Reinforcement Learning

3.0 CEU's

This advanced course starts with a quick review of some deep learning architectures followed by an introduction to fundamental concepts of reinforcement learning (RL) that we illustrate with concrete examples. Next, we'll explore the Bellman equation, policies, models, Q-learning, the SARSA algorithm, and temporal difference (TD) learning. In this deep reinforcement learning (DRL) course, you will learn how to solve common tasks in RL, including some well-known simulations, such as CartPole, MountainCar, and FrozenLake. You will be introduced to concepts such as clipping regions and policy gradients, as well as an extensive collection of algorithms, including DQN, prioritized experience replay, DDQN, D4PG, A2C, PPO, TRPO, DDPG, A2C, and SAC.

Eventually the course introduces additional algorithms, such as ACER and ACTKR, as well as DRL libraries, such as Google Dopamine and Tensor Flow-Agents. In almost all cases, the code samples are written in TF2.Keras, along with a limited number of code samples in PyTorch. The development of a plethora of DRL algorithms has improved the accuracy of diverse areas, such as natural language processing and robotics. In addition, DRL-based systems represent the state-of-the-art in Go as well as highly sophisticated multi-player games (including StarCraft and Dota).

Topics Include:

Deep learning architectures

Markov decision processes

Reinforcement and deep reinforcement learning

Policy gradients and various algorithms

Proximal policy optimization

Various actor/critic algorithms

Deep RL libraries

Learning Outcomes:

At the conclusion of the course, the student should be able to:

Describe how a bi-LSTM differs from a standard LSTM

Explain how n-grams work

Describe the BERT architecture

Describe Q learning, models, and policies

Define the purpose of the Bellman equation

Discuss the advantages/disadvantages of reinforcement learning

Explain how the epsilon-greedy algorithm differs from a pure greedy algorithm

Discuss how deep learning enhances reinforcement learning

Describe GANs and how they pertain to autonomous vehicles

Prerequisites - Please note that this course covers advanced topics, and students are expected to have completed one of the prerequisite courses or have equivalent experience."

DEI Leadership and Strategic Impact

0.6 CEU's

This course is designed to help executives unleash their potential to create diverse, equitable, and inclusive environments that cultivate high-performing teams. You will have a chance to unpack your values and reflect on the impact your leadership style has on who you hire and how people interact within your organization's everyday work culture.

As we discuss how to become a more inclusive leader, one that cultivates a culturally equitable workplace, you will wrestle with real-world workplace cultural challenges, have the opportunity to reflect on historical inequities, and gain valuable peer feedback for the future.

Once you discover how to leverage your leadership style, you will have a more successful mentoring influence on the people around you.

DEI Leadership and Strategic Impact objectives

Identify your values and how they influence your leadership of diverse teams

Understand how your leadership style influences equity and inclusion in the workplace

Apply or adapt your leadership style to create a culturally equitable workplace

Mentor diverse colleagues and share feedback in ways that enable them to develop and deliver

Design Control for Medical Devices

2.0 Units

The successful development of medical devices requires that the design be controlled to ensure product safety and that the device can fulfill its intended use. This course provides a practical understanding of the engineering value of design control throughout the product lifecycle as it pertains to product quality. You'll learn to use the nine elements of design control to make design objectives clearer, products more testable, and to better satisfy customer requirements, thereby shortening the path to product and business success. The course highlights the practical implementation of the design history file, reviews and records, transfer planning, requirements engineering and project planning. You will also learn topics related to design verification and validation testing, such as process validation, biocompatibility, shelf-life, sterilization and packaging validation. **Topics Include:**

Design control, the quality system and ISO 13485: A brief introduction

Design and development planning

Design input, design output

Design review and peer review

Design change control

Design transfer to manufacturing

Design verification

Design validation and use of statistics

Design history file (DHF)

Designing a UX or Visual Design Portfolio

2.0 Units

You're a designer, and you're good at designing. But design skills are one thing, and selling these skills is another story entirely. An online portfolio site can market your services to clients around the world. It helps explain your vision and your process, and showcases examples of your best work. This class will teach you the steps to designing an expertly curated portfolio, including selecting a

website hosting service, constructing a Wordpress website, customizing your website with various themes, plugins, and widgets, and optimizing your website for search engine results. By the end of the course, you will build a portfolio that best reveals who you are as a designer, as well as the value you can offer clients or your future employer.

Learning Outcomes:

At the end of the course, students should be able to:

Apply best practice guidelines for layout, navigation, content selection, basic HTML and CSS coding, and file structure to building a Wordpress portfolio site

Select portfolio work samples that reflect the goals of the designer and the portfolio site

Effectively categorize projects and apply navigation that allows for easy viewing of work samples

Create visual comps and polished drafts that guide development of the portfolio site pages

Apply basic techniques for polishing site content and planning for future site expansion

Apply image optimization techniques, improve overall site performance, and optimize for search engine results

Prerequisite Skills: Have basic HTML and CSS knowledge.

Designing, Building and Integrating RESTful API

2.0 Units

Databases, websites, and business applications need to exchange data. This is accomplished by defining standard data formats such as Extensible Markup Language (XML) or JavaScript Object Notation (JSON), as well as transfer protocols or Web services such as the Standard Object Access Protocol (SOAP) or the more popular Representational State Transfer (REST). Developers often have to design their own Application Programming Interfaces (APIs) to make applications work while integrating specific business logic around operating systems, languages or servers. This course introduces these concepts with a focus on the RESTful API. The course also introduces the data exchange mechanism and common data formats. For Web exchange, you will learn the HTTP protocol, including how to use SOAP with XML. The course compares SOAP and REST, then covers the concepts of stateless transfer. It introduces software API design and best design practices. The second half of the course focuses on RESTful API design and implementations using Python Django, the most popular web development framework. You will learn how to build and consume RESTful services using JSON and XML, and integrate RESTful API with different data sources through hands-on coding projects. Through four coding assignments, which form the course project, you will apply what you have learned to implement a Single-Page Application (SPA) with both the front-end (provided by the instructor) and the Django-based backend with REST web service.

This course is intended for software developers who use data in projects. It is also useful for data professionals who need to understand the methods of data exchange and how to interact with business applications.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Develop RESTful services and their clients using Python Django

Apply RESTful API design best practices to real-world software solution including integration

Demonstrate API design skills using real-world use cases and review of APIs

Note: Students are required to bring laptops for coursework.

Skills Needed: Python programming experience is required for the exercises and the project.

Designing Online Instruction

2.0 Units

Online learning opportunities are expanding rapidly. To be successful, online teachers need the skills to translate face-to-face instruction into content for the online environment. This course looks at the benefits and challenges inherent to this venue for teaching, and covers best practices in the design of online instruction. The course focuses on ways to promote learning as well as dialogue with the instructor and fellow students. Students develop an online module that includes a variety of engaging instructional activities for learners. Assessment strategies will be discussed as part of the design process.

Designing Training Programs

2.0 Units

This course details how to design a training program or event. You'll gain insight into the instructional design process, including adult learning principles and training needs analysis with a focus on defining learning objectives; and you'll learn to use experiential methods to plan learning activities, structure a training program and evaluate your program. The course emphasizes using the appropriate instructional design skills and methods to create a learning activity. You'll get the chance to design a training activity that applies directly to your work, and receive constructive feedback from the instructor and your peers at various stages of the design process throughout the course. Topics Include:

Fundamentals of training programs

Overview of the instructional design process

Principles of adult learning

Current issues in training

Use of the ADDIE model to design a training program: Analysis, design, development, implementation and evaluation

By the end of the course, you should be able to:

Complete a learning needs assessment

Write concrete learning objectives for desired training outcomes

Create appropriate experiential learning activities

Develop a training plan and create a learning program structure

Design a training program evaluation

Develop and present a training program proposal

Designing User Experience for AR, Smart Things, Virtual Reality, and Wearable Technology

3.0 Units

Consumers have entered a multi-device environment where they own multiple connected devices such as watches, smart products, virtual reality (VR), augmented reality (AR), smart glasses, activity trackers, Internet of Things (IoT), smartphones, tablets and home automation, and use them cohesively. As these devices evolve, so does the process of mobile design, including the mobile UI and mobile UX that work across these products. This course encourages you to create UX/UI features for real-world mobile app products.

This course offers a hands-on approach to the UX/UI design guidelines for these devices. You will learn the principles of creating effective user interfaces that incorporate wearable technology. In addition, you will be introduced to rapid prototyping tools. The course covers flat design, responsive design, and parallax web design. You will also learn new lean models that will help you cultivate new design processes and solve problems for your products. The course emphasizes product coherence among multiple devices. Topics include future UI design trends such as mHealth, mPayment, mCommerce, voice-user interface, augmented reality, VR and emotional design. At the end of this course you will have a design portfolio and prototype that you can showcase to employers.

Topics Include:

Apple Watch human interface guidelines

Android Wear human interface guidelines

Augmented Reality (AR) UX design

Virtual Reality (VR) UX/UI design (Oculus Rift and Samsung Gear VR)

Designing smart things UX/UI

Autonomous Cars UX

Drone Mobile UX Design

Connected home and IoT UX/UI

Chatbots UX/UI design (Facebook, Slack)

Car dashboard UX/UI design (Apple, Google, Tesla)

UX of voice interaction (Amazon Echo, Google Home, Siri)

Smart tracking (Tile)

Healthcare, sport, smart baby devices

InVision mobile prototyping tool

How to create emotional design and micro interactions UX

Responsive design/parallax design

Designing glasses for AR

Creating multi-device experiences

Skills Needed: Familiarity with a drawing tool is required to complete class exercises (e.g. Adobe Illustrator, Photoshop, Fireworks or Sketch.)

Designing with Cascading Style Sheets: Advanced

2.0 Units

This course provides an in-depth exploration into the expanding world of Cascading Style Sheets (CSS), covering responsive website designs that work with smartphone, tablet or desktop monitors. Lectures and hands-on exercises cover essential CSS3 properties, concepts, techniques, and applications of @media queries, Flexbox and Grid layout properties, styling forms and the application of structural pseudo-classes. The course also covers web typography and the use of CSS rules such as the @font-face and the @keyframes rule for animation. Consideration for designing for accessibility will also be discussed.

By the end of the course, you'll know how to use the latest CSS capabilities to create Web pages with clean, efficient and cutting-edge designs that meet the demands of mobile, tablet and desktop users.

Topics Include:

Designing Web pages that respond to media types (mobile phones, tablets, desktops)

Using browser development tools for testing purposes Vendor prefixes Child, sibling and structural pseudo-class selectors

CSS3 properties, including:

* Border radius

* Box and text shadows

* Gradients Web Typography CSS Animation properties Flexbox Grid Layout Drop-down menus

Style forms

Validation of HTML and CSS code Testing for Accessibility

Skills Needed: It is required that students take the prerequisite courses or have equivalent experience. HTML and CSS basics will not be repeated in this course.

Designing with Cascading Style Sheets: Fundamentals

2.0 Units

For Web designers, cascading style sheets (CSS) is an essential and mandatory coding language for controlling the presentation of a modern Web site. Combined with proper HTML markup, CSS allows for precise control over Web page appearance. Because a style sheet can be linked to many Web pages, changing one element in a style sheet can affect the look of an entire site. This introductory course includes demonstrations and hands-on exercises covering the application and syntax of CSS; hand-coding CSS properties for font and text formatting; backgrounds; the box model; creating vertical and horizontal navigation menus and two and three column page-layouts. Inheritance and specificity are also discussed. Consideration for designing for accessibility will be discussed. At the end of the class, students will be able to design table-less Web pages by applying cascading style sheets and will understand the techniques, which adhere to current CSS specifications. Topics include:

Tools and techniques to write and validate CSS

Separating a page's content from the visual presentation of the page

External, internal, and inline styles

CSS selectors such as element, class, ID, pseudo-class and attribute selectors

CSS properties for font and text formatting, lists and backgrounds

Inheritance and Specificity

The Box Model

Styling Tables

CSS for Printing

Horizontal and vertical navigation bars

Creating two and three column layouts

Positioning including relative, absolute and fixed

Working with the z-index

Skills Needed: "HTML Fundamentals" or equivalent experience.

Developing Enterprise Java Microservices with Spring Boot and Spring Cloud

3.0 CEU's

Spring Framework is a popular full-stack Java application framework that simplifies enterprise application development and promotes best practices by offering a set of highly powerful and independent services. Spring Boot makes it even easier to create Spring applications with intelligent defaults to get you started quickly. Microservices are an evolving system architecture and implementation based on service-oriented architecture (SOA). They exist to handle the diversity of devices, systems and business logic. Major Internet companies and websites have adopted the new architecture and development methodology in recent years. This hands-on course introduces several software tools for working with Java applications, including project configuration, dependency management using Maven, source control using Git, and the IntelliJ IDEA integrated development environment. The course includes an overview of Spring, including core concepts such as Inversion of Control (IoC) and dependency injection.

You will build a sample Java application that creates RESTful Web services. The project relies on Spring Boot and the MySQL database server as the datastore. You will also learn how to create microservices and applications using Spring Boot and work with databases using Java Database Connectivity (JDBC). The course emphasizes testing all parts of your code with test automation, using JUnit and its Spring integration.

The course offers hands-on experience with open-source tools, Cloud services, and databases. Students are required to bring laptops to class.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Build basic REST APIs using Spring Boot and interact with databases

Demonstrate a working knowledge of Microservices deployment architecture

Utilize Git, Maven and an IDE

Explain the testing using JUnit

Topics include:

Tools for building enterprise software: IntelliJ IDEA IDE/Spring Boot, project configuration, dependency management (Maven) and source code management (Git)

Spring: Dependency injection / Inversion of Control

Service-oriented architecture (SOA)

Microservices deployment

Creating RESTful Web services with Spring MVC

Spring Boot applications

Testing using JUnit and its Spring integration

Spring Data – JDBC and MySQL

Developing Technical Information from Plan to Completion

2.0 Units

This course focuses on technical communication skills. It introduces the types of information commonly produced by technical writers. Participants integrate the fundamental technical-writing strategies with the principles of print and online document design to create information that is effective and appropriate to specific audiences. Participants assess and improve a document draft's organization, clarity, conciseness and consistency. The course includes practical experience in writing technical information, analyzing tasks, negotiating with subject-matter experts, setting production schedules and managing multiple projects. In this course the instructor will address how to apply technical writing strategies to various types of technical information; determine appropriate formats for technical audiences; identify styles, standards and design for online and print documents; and demonstrate the life cycle of technical writing projects.

DevOps Technologies

3.0 Units

DevOps is a combination of software development and IT operations methodologies and technologies. DevOps introduces many functional and technical changes in how companies design, develop, and deploy technologies, infrastructures, and applications. DevOps combines Agile software development practices and IT automation techniques to achieve rapid rates of high quality deployment.

This course will focus on the technologies and tools used by DevOps engineers. Upon completion of this course students will understand the core technologies and tools used within DevOps environments. **Learning Outcomes:**

At the conclusion of the course, you should be able to:

Understand the core concepts used in virtual and containerized environments

Understand Microservices and SoC (separation of concerns)

Write scripts to automate the deployment and configuration of Virtual Environments

Write scripts to automate the deployment and configuration of Container-Based Environments

Topics Include:

Why DevOps? What do DevOps engineers/teams do?

Automating Deployments

* Using BASH

* Programmatic ssh

Virtual Environments

* Virtual Machine Concepts

* Tools: Vagrant

* Automating N-Tier VM Deployments

Microservices

* Why Microservices

* Hybrid Microservice Architectures

Containers and Docker

* Concepts

* Deploying Microservices in Containers

* N-Tier Container Deployments

Deploying Containers in Virtual Machines

* Docker + Vagrant

Infrastructure as Code

* Git

* GitHub

Skills Needed: Students must have basic programming experience using a high level programming language like Java, Python, C#, or a scripting environment like Bash.

Digital Design with FPGA

3.0 Units

Field-programmable gate array (FPGA) offers quick-turn, re-configurability, high density, high performance and low non-recurring engineering costs. To meet design requirements, designers must understand the FPGA fabric and how they affect the actual design of the logic functions. This course provides the knowledge and hands-on experience in designing digital logic blocks in FPGA. The course covers the major FPGA architectures from Xilinx, introduces how to build designs in FPGA and presents specific designs of various digital blocks. Starting from combinational logic, look-up tables, carry chains, and multiplexers, students will learn to design arithmetic and comparator functions using FPGA and test them in action. The instructor then explains sequential flops, fast counters and shift register look-up. The course also explores the various embedded

RAM, ROM and finite state machine designs using Xilinx architecture.

The course builds on the knowledge of digital Verilog designs and emphasizes the interaction of FPGA fabric on design without elaborating on FPGA applications. Students gain insight and experience with FPGA design. The course uses Xilinx parts as examples; topics covered are applicable to all major FPGA architectures.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Describe a solution to complex logic design problems and implement on a FPGA

Discuss how to exploit FPGA architecture for a specific design problem

Explain how to implement and test complex combinational logic, sequential logic, arithmetic circuit, memory, DSP and finite state machine exploiting a specific FPGA architecture

Identify a poor performance design and improve its performance by exploiting the architecture of a particular FPGA

Note(s): This course requires the purchase of a development board ($150, not included in the course fee) and uses the vendor development kit to implement logic functions. Detailed board information will be provided at the first class meeting.

Skills Needed: Students must have Verilog coding experience to carry out design assignments. FPGA experience is not required.

Digital Logic Design Using Verilog

3.0 Units

This course is a practical introduction to digital logic design using Verilog as a hardware description language. Students learn Verilog constructs and hardware modeling techniques using numerous examples of coding and modeling digital circuits and sub-blocks. Verilog remains the legacy hardware description language for digital designs in the industry. The course starts with the basic concepts of hardware description, then goes into the key Verilog language elements and data types. Students tackle key challenges and learn structural, dataflow and behavioral modeling in Verilog, including common constructs, considerations and coding examples. Instruction in the coding and testing of digital logic includes examples of combinational circuits (gates, mux/demux, encoders/decoders, and general Boolean expression), sequential circuits (various latches, flip-flops, shift registers, counters, RAMs and ROMs), and complex logic (flavors of ALU and FSM).

At the completion of the course, students are able to understand and implement Verilog modeling of basic digital logic. Ultimately, students write and simulate approximately 3000 lines of Verilog code. The synthesis and simulation of the test examples is done using freely downloadable tools with instructor guidance.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Describe a solution to complex logic design problems and implement a test solution using Verilog

Discuss how to implement a hardware solution through software

Explain how to implement and test complex combinational logic, sequential logic, arithmetic circuit, memory, DSP and finite state machine

Identify, debug and find a solution to an existing hardware problem

Skills Needed: Knowledge of basic logic design and familiarity with a high-level programming language (e.g., C) and use of a text editor.

Digital Marketing Science Certificate Course

8.0 CEU's

You will fast-track your career in this comprehensive Digital Marketing Science Certificate Course, which provides practical training and technical certifications that you can apply on the job. From audience targeting to lead generation and everything in between—this accelerated certificate course begins with an overview of search engine optimization, auditing a real business, using personas and messaging strategy. You'll learn more about the industry with practical assignments on paid search, paid social, analytics, and multichannel campaigns.

By the end of the course, you will be able to apply your skills and submit a plan in the form of a playbook to solve a business challenge for a real brand. This final project will be shared, and you will receive feedback from industry experts and peers.

Learning Outcomes

Web Analytics

Search Engine Optimization

Search Engine Marketing

Social Media Marketing

Email Marketing

Reputation Management

Digital Marketing Strategy

Industry-Recognized Certifications and Qualifications

Google Ads Search Certification

The Google Analytics Individual Qualification

HubSpot Email Marketing Certification

Taught by industry experts, this course is supplemented with weekly live-online interactive group sessions led by mentors with subject matter expertise. There are no prerequisites.

This course, provided in partnership with GreenFig.

Docker Containers In-Depth

1.8 CEU's

Docker containers are the leading open-source Linux and Windows OS-level virtualization packages for creating and deploying software applications. Recently, the industry that relies on major container orchestration systems such as Kubernetes, Mesos, and Swarm has dramatically shifted to using Docker containers in public clouds such as Amazon Web Services and in on-premise data centers using bare-metal computers. Having the skill to deploy, secure, and manage Docker containers is a very desirable skill among local employers. This six-week course teaches the concepts, operations, and programming techniques used by IT professionals and application developers to set up, configure, and deploy applications via Docker containers. This course is for current and aspiring IT operators, DevOps professionals and software developers—especially those in microservices development

After a brief overview of containers and the history of Unix/Linux isolation and resource quota techniques, we will address Docker components, such as the client (docker), the server (dockerd), containers (processes & union file system), and images, plus tools used to create and manage a Docker container, like Compose and a registry.

We will then move on to the aspects of creating and deploying a complex software application using containers, networking, and persistent storage. We will get to create and manage OS name spaces, resource quotas—such as CPU, I/O, memory, and network bandwidth. Security, including scanning tools and hardening, will be covered and demonstrated. Advanced features, such as containers in public clouds—AWS ECS and Fargate—as well as CI/CD—Jenkins or Spinnaker—and Kubernetes orchestration will be introduced.

Learning Outcomes

At the conclusion of the course, you should be able to

Discuss the fundamentals of containers and Linux isolation

Summarize the various components of Docker containers

Demonstrate how to manage Docker containers via the command API

Explain the basics of Docker networking, storage and security

Identify the format of Docker compose manifests

Create and manage a modestly complex Docker containers application

Document Preparation: Protocols, Reports, Summaries

1.5 Units

Clinical trial documentation must be clear, scientifically sound, conform to regulations and established standard operating procedures, and follow regulatory guidelines. Despite pressure to start the trial "yesterday," a clinical trial cannot begin without a study protocol in place. Many other

documents are needed before and during the trial, and the trial does not end until a final report has been submitted. Documentation of the trial often continues with articles in the biomedical literature. This course provides insight into the processes for preparing effective study protocols, reports, and summaries. Participants have opportunities to practice preparing documents and applying the rules governing clinical trial documentation. Professional Credit: CA BRN/LVN Credit--Provider #CEP13114.

Drug Safety and Adverse Events Reporting

1.5 Units

Regulators, the public, and the medical community are scrutinizing the safety profiles of pharmaceuticals more closely than ever. Thus acquiring, verifying and reporting quality safety data are crucial to obtaining and maintaining product approval. This course introduces fundamental concepts essential to drug safety and adverse event reporting and how to apply them to situations encountered during clinical trials and post-marketing reporting. You'll learn why safety reporting is crucial; the definitions of an adverse event and the key reporting issues of seriousness, expectedness, and relationship to the study drug. The course includes a brief overview of reporting requirements in the U.S. and abroad and the documents associated with these reports. The content is appropriate for CRAs, CRCs, drug safety associates, and regulatory affairs personnel. Professional Credit: CA BRN/LVN Credit--Provider #CEP13114.

Early Childhood Education Advanced Teacher Certificate Completion Fee

Once all of the certificate requirements have been met and your final grades are posted, please access your Student Portal to enroll in the "Certificate Completion Fee" to begin the review process. Please allow 4-6 weeks to receive your certificate.

Early Childhood Education Associate Teacher Certificate Completion Fee

Once all of the certificate requirements have been met and your final grades are posted, please access your Student Portal to enroll in the "Certificate Completion Fee" to begin the review process. Please allow 4-6 weeks to receive your certificate.

Early Childhood Education: Site Supervisor Certificate Completion Fee

Once all of the certificate requirements have been met and your final grades are posted, please access your Student Portal to enroll in the "Certificate Completion Fee" to begin the review process. Please allow 4-6 weeks to receive your certificate.

ECE 10: Supervision and Administration: Parents as Partners in Education

5.0 Units

This course will examine ways of creating an environment where parents and teachers work in partnership for the education of young children. Attitude, understanding and skills which lead to effective communication and cooperation between home and school will be shared and explored.

Learning Outcomes:

At the conclusion of the course, you should be able to

Describe the importance of family-teacher partnerships to improve educational outcomes for students

Discuss different types of communication with families, effective communication tools, and challenges to communication

Explain how the classroom environment and curriculum can reflect a family-centric approach

Identify key principles of home-school partnerships

ECE 11: Supervision and Administration of Early Childhood Centers, Part A

5.0 Units

This course focuses on the history of early childhood education, the laws governing early childhood centers in California, and the goals of early childhood education. You'll also discuss the administrator's job description, budgeting, personnel selection and standards, records and reports, and staff policies. The course discusses laws and regulations pertaining to the operation of an early childhood program and examines how to budget administrative responsibilities. You'll develop the skills necessary to create an early childhood environment which meets space, equipment, health and safety requirements, and evaluate your program quality using the Environmental Rating Scale. This course is a good fit for educators interested in obtaining the California Child Program Director Permit.

Learning Outcomes:

At the conclusion of the course, you should be able to

Identify the history of early childhood education

Identify the organization, function and relationship of the different types of programs for young children

Recognize laws and regulations pertaining to the operation of an early childhood program

Develop guidelines for selecting staff members for a program

Develop staff policies and procedures for an early childhood program

Plan early childhood environments which meet space, equipment, health and safety requirements

Examine budget and record keeping administrative responsibilities

Evaluate

Topics Include:

Framework for your work

Self-evaluation

Learning goals and action steps

Staff conflict resolution

Child care budgeting/approach assessment

Hiring (qualifications and job descriptions)

Licensing policies and procedures

Child care environment rating

Creating your program's vision

ECE 12: Supervision and Administration of Early Childhood Centers, Part B

5.0 Units

This course explores the challenges and issues related to the supervision and operation of preschool programs. Staff-administrator relationships, staff inservice education and working with parents are also covered.

Learning Outcomes:

At the conclusion of the course, you should be able to

Implement health and hygiene policies

Understand key issues related to the inclusion of special needs students

Establish anti-bias approaches to school administration

Apply interpersonal communication skills

Demonstrate staff supervision, evaluation, and termination strategies

Establish and maintain quality family-school relationships

Build Community Resources through identifying and supporting family needs

Develop market techniques and handling of the media

Apply techniques for accessing current legislative and published information essential to providing

quality child care and early education programs

ECE 13: Adult Supervision and Mentoring

5.0 Units

This course examines the process of building a staff organization through development of effective communication and interpersonal relationships. Topics include the criteria for selection and evaluation of personnel, involvement of staff in the planning and evaluation of programs, the administrative role in promoting professional growth, teaching effectiveness and developing sensitivity to individual needs.

Learning Outcomes:

At the conclusion of the course, you should be able to

Describe the roles of a supervisor, mentor, and coach in an ECE setting

Discuss expectations of a mentoring relationship

Explain how to make and communicate observations of teachers and the learning environments they create

Identify how to guide educators in facilitating professional development

ECE 1: Development in Early Childhood

4.0 Units

Participants explore human development from prenatal stages through middle childhood and study the interrelationships among social, emotional, physical and cognitive development, with a focus on the role of play in early childhood. Using observational techniques, the class identifies developmentally appropriate characteristics and activities.

Learning Outcomes:

At the conclusion of the course, you should be able to

Describe the influence of various social contexts on development including family, school,

childcare, the media, and culture

Discuss some views consistent with current knowledge and research in child development, based upon several current issues in child development

Observe, record, analyze and compare children's behavior and relate it to course materials on development

Identify the major milestones in child development from birth through adolescence in social, emotional, cognitive and physical development

ECE 2: Introduction to Teaching Young Children

3.0 Units

This course studies the philosophy, history and development of early childhood programs. You'll examine the teacher-child relationship and how existing programs meet the needs of preschool children and review programs to evaluate how they meet the criteria of a quality learning environment. You'll get a chance to see how ECE programs operate in the real world by attending mandatory field observations at sites designated by the instructor.

Learning Outcomes:

At the conclusion of the course, you should be able to

Describe the history of early childhood education

Discuss various guiding principles among early childhood educators

Know the differences among early childhood programs and how they are evaluated by checklists

Identify the differences among developmental stages of children

Topics include:

History of early childhood education

Types of programs

Defining the young child

Developmental and learning theories

Teaching: A professional commitment

Curriculum: Creating a context for learning and play

Issues and trends in early childhood education

ECE 3: Curriculum Development in Early Childhood Programs

4.0 Units

In this course, you'll examine basic child development theories in relation to design and implementation of curriculum for young children. Topics include the design of developmentally appropriate lesson plans and learning centers to fit the needs of specific age groups, the steps involved in curriculum development, material and equipment selection, planning group experiences, and basic guidance techniques for young children. The course emphasizes the value of play and learning environments and developmentally appropriate materials and activities.

Learning Outcomes:

At the conclusion of the course, you should be able to

Describe what the developmentally appropriate practices are according to NAEYC (National Association for the Education of Young Children)

Discuss various websites that could help an early childhood teacher with planning units of study

Explain why the 8 curriculum areas should be included in a quality early childhood program

Identify what the 8 curriculum areas are that should be included in lesson planning & curriculum

ECE 4: The Young Child in the Family and Community

4.0 Units

This course focuses on the dynamics between the young child and his or her family, school and community, including various cultural and social influences. Participants explore ways to develop communication skills between young children and peer groups, parents and teachers. Community resources and social services, including healthcare, welfare and counseling, are reviewed.

ECE 5: Positive Guidance and Discipline for the Young Child

3.0 Units

Participants in this course learn to identify children's behavior to determine whether it is normal, developmentally appropriate or problematic. Cooperative discipline is explored in the wider context of classroom management, working with staff and parents. Behaviors are examined to better

understand why children behave the way they do and to correct behaviors with a guidance and discipline strategy that is positive, respectful of both child and adult, and developmentally appropriate. Participants also learn to practice prevention of certain behaviors and guide children through the use of positive discipline. The focus is on how an adult can behave when a difficult situation arises and be as effective as possible in creating an atmosphere of safety that supports all children in reaching their fullest potential.

Learning Outcomes:

At the conclusion of the course, you should be able to

Describe the developmentally appropriate behaviors of young children

Discuss positively and respectfully guiding principles

Explain the theoretical foundation of prevention strategies

Identify the effective communication approach to collaborate with parents and other teachers

ECE 6: Culture and Diversity in the Early Childhood Classroom

3.0 Units

This course explores diversity, values, culture, racism and oppression from the educator's' viewpoint and the impacts these factors have on creating a positive multicultural classroom environment. You'll learn various styles of communicating with parents, and role-play scenarios to practice handling awkward situations. Course assignments provide an opportunity to develop multicultural lesson plans that can be used in an early childhood classroom.

Learning Outcomes:

At the conclusion of the course, you should be able to

Make a distinction between awareness and politics

Define learning styles

Define cultural diversity

Develop self-awareness surrounding our own attitudes about students in our classroom(s)

Create a distinction between prejudice, discrimination, and racism

Discuss racism and oppression from the educator's point of view

Understand, acknowledge, and plan for the needs of diverse learners

Develop multicultural lesson plans for students in the early childhood classroom

Recognize the qualities and benefits of a safe space that allows all students to thrive

Create a multicultural learning environment that meets the needs of all children

Understand the importance of parent involvement in early childhood development

Brainstorm effective ways to involve parents in their children's learning

Synthesize course information and plan for future implementation

Topics Include:

Diverse learners

Cultural diversity

Racism and oppression

Differentiated instruction

Multicultural lesson plans

Home-school partnerships

Confronting bias and overcoming cultural conflict

ECE 7: Practicum in Early Childhood Education

5.0 Units

This course provides early childhood education professionals with the opportunity to observe and evaluate children, applying theoretical and practical models from the field of early childhood education. Course activities include structured observation, analysis of the roles of adults, lesson planning, parent conferencing and reflective teaching.

Meets the California requirement of 3 semester units (equal to 5-quarter units) of supervised experience for teachers applying for a Children's Center Permit as described in the Child Development Permit Matrix see here: http://www.ctc.ca.gov/credentials/CREDS/child-dev-permits.htm

At the conclusion of the course, you should be able to: Plan and implement developmentally appropriate curriculum activities in the early childhood classroom

Locate and utilize professional resources

Understand and articulate the role of an early childhood educator

Demonstrate skills in appropriate guidance and disciplinary techniques with young children

Understand and implement skills in working with parents as partners in their children's learning process

Create appropriate indoor and outdoor learning environments for young children

Demonstrate appropriate skills in interactions with young children

Interact with other teachers in a professional manner, and demonstrate professionalism in all aspects of their teaching

Topics Include: Understanding and guiding behavior

Observing and assessing children

Curriculum development

ECE 7: Internship requirements: FAQ To obtain credit for this course, you need to be supervised by a mentor teacher at a school where you are teaching. The class meets only twice, once at the start and again at the end of the practicum. You are expected to complete your hours at a school and submit your assigned work on the last day of class and online. The Extension instructor is available for online guidance and support for both students and mentors.

PLEASE NOTE: Extension does not provide mentor teachers for the purpose of this practicum. You are responsible for finding your own mentor teacher.

Mentor teachers should be working in a licensed, preferably accredited, facility. Family child care is not permitted. It is acceptable to select a kindergarten teacher as a mentor.

Mentor teachers must have at least 5 years of experience working with children in the role of lead teacher or director. They should have a minimum of 24 units of training in early childhood education and meet the requirements for a master teacher permit. A site supervisor or director permit is desirable. The mentor teacher's credentials must be given to the Extension instructor at the first meeting.

ECE 8: Child Health, Safety and Nutrition

5.0 Units

This course is highly beneficial for anyone working in an early childhood educational setting. It introduces the theory, practices, and requirements for establishing and maintaining a safe and healthy learning environment. Topics include healthcare policies and procedures in the child-care setting, childhood nutrition and obesity, prevention of disease transmission and injuries, child abuse and neglect. You will also learn to provide a quick health check for children and plan healthy menus.

Note: Students are encouraged to obtain CPR certification by enrolling in ECE: CPR and First Aid (EDUC.812).

ECE 9: Language and Literacy for the Young Child

3.0 Units

This course covers the development of language in children and outlines experiences and techniques that enable children to further that development. You'll learn how to promote oral language abilities through the active use of books, poetry, dramatic play and group discussions. You'll gain insight into grammar, phonology and semantics; common speech problems, and language arts curricula that can help foster literacy in the classroom. The course also reviews the reading process along with various reading theories and issues.

Learning Outcomes:

At the conclusion of the course, you should be able to

Identify major factors that influence language development.

Understand the Maturation (Normative), Predetermined/Innatist, Cognitive, and Constructivist Theories of language

Define literacy, grammar, phonology, and semantics

Understand the role adults play in children's language development

Identify common speech problems

Understand differences in children's language

Understand the importance of early literacy

Describe ways that teachers can promote literacy growth

Incorporate Language Arts Curricula into daily instruction in order to support students

Design a classroom environment that supports literacy for children

Discuss multicultural book use

Describe how story-telling can improve children's language development

Understand how poetry and dramatic play can help improve children's literacy

Understand the correlation of reading and writing

Analyze a parent's role in helping children's literacy

ECE: Brain Development in Early Childhood

3.0 Units

How does the human brain develop during the first years of life? How can a child learn two or more languages at the same time? How does stress slow brain growth? This course answers those questions, providing parents or teachers of infants, toddlers or preschoolers with the latest research in brain development, demonstrating how this information can enhance parenting and teaching practices. This course will help you appreciate a child's unique qualities and your own strengths, as you work toward long-term success in parenting or teaching.

Learning Outcomes:

At the conclusion of the course, you should be able to

Identify brain development in children

Outline experiences and techniques that enable children to further their development

Identify different areas of the brain and how some of these areas are crucial at certain times in a child's development and need to be stimulated

Present topic of choice regarding brain research in children

ECE: Creative Arts for the Young Child (Preschool Through Grade 3)

3.0 Units

You know intuitively that art activities engage children of all ages. But how can you make the most of your teaching with art? How can you---even without formal training---organize stellar lessons that leave the kids asking for more? In this fundamentals course, participants start with a review of art expression at each stage of early childhood development, then move on to understanding ways to foster creativity and the creative process. Next, participants work hands-on with basic art processes, such as, painting, drawing, and creating designs. Through mini-lectures, discussions, videos, and readings, participants prepare age-appropriate lessons that build visual and spatial awareness and relate art to other key curricula---science, mathematics, language arts, and social studies. Participants leave the course with an individualized portfolio, complete with lesson plans and objectives. Course activities include ample instructor modeling.

Learning Outcomes:

At the conclusion of the course, you should be able to

Select and develop age-appropriate, process-oriented art experiences for young children and share them with the class and instructor

Create a resource portfolio based on knowledge of media and resources in the field of creative art

Observe young children and assess the developmental level of children's art expression and skills

Demonstrate through assignments and group discussion a knowledge of and appreciation for the role of creative art expression in the emotional, social, physical and cognitive growth of the child

Demonstrate judgment and decision-making in selection of art activities and materials for young children

Demonstrate integration of theory and practice by oral presentation of activities and written assignments

Demonstrate an appreciation for the role of creative expression in the individual through hands-on classroom experience

ECE: Infant/Toddler Growth and Development

3.0 Units

State licensing requires staff who work in infant and toddler programs to complete a three-unit semester course in Infant/Toddler Care and Development. This course satisfies the infant/toddler development portion of the requirement. The UCSC Extension course "Principles of Infant/Toddler Caregiving" fulfills the remainder of the state licensing requirement.

This course is designed for those who work or plan to work in child-care programs for children up to three years of age. The focus is on understanding growth and development and recognizing the range of individual differences within developmental norms. Participants engage in a variety of activities to promote theory learning and observation skills. Topics include gross and fine motor skills, perception, emotions and feelings, social skills, cognition and language.

Learning Outcomes:

At the conclusion of the course, you should be able to

Develop an understanding of the interactions among familial, cultural, social and physical environments that influence growth and development of infants and toddlers

Demonstrate knowledge of an infant's physical, perceptual, sensory motor, socioemotional, and cognitive growth and development

Demonstrate understanding of theories and research of infant education and development

Recognize, analyze, and discuss quality environments and care for infants through the identification and interpretation of State regulations and California Department of Education's Infant/Toddler - Learning and Development Program Guidelines

Identify and assess developmental expectations for infant learning and construct appropriate educational activities and materials

Identify requirements, regulations and program components and types of programs in infant care

Construct a philosophy and design a program for infant care and education

ECE: Principles of Infant/Toddler Caregiving

3.0 Units

This course satisfies part of the State Licensing requirement for the application of infant/toddler caregiving principles. The course "Infant/Toddler Growth and Development" fulfills the remainder of the requirement. This course is designed for those who work with children up to three years of age. The course focuses on understanding the principles of high-quality caregiving. Topics include understanding the adult role in the development and implementation of curriculum for infants and toddlers, and essential curricula components such as physical setting, social environment and play.

Learning Outcomes:

At the conclusion of the course, you should be able to

Describe milestones of children ages 0, 1, 2 and the monthly development that they go through

Discuss many different theories that have been given by child development theorists of the past

Explain the differences between toddlers/infants as compared to older children in preschool and beyond

Identify strategies that are best to use with children ages 0-2 years old

Edge Artificial Intelligence Development Capstone

2.0 CEU's

AI students in this capstone course will acquire practical experience through building and applying artificial intelligence for edge applications. You will be guided to design, develop, and deploy an enterprise use case for delivering edge intelligence using a NVIDIA Jetson Nano development system (or something similar). With access to an AI systems lab conveniently located near our Silicon Valley campus, you'll have the opportunity to use leading edge AI computing stack hardware. This is the course where you put your knowledge about the business of AI technology together to show what you've learned in this specialization. **Takeaways**

Understanding of software and hardware trade-offs that affect utilizing machine learning for edge applications

Development of intelligent edge device application utilizing machine learning techniques

Skills Needed

Solid knowledge of computer hardware and software, and machine learning techniques

Practical knowledge of programming using Python or C/C++ as well as of implementation of machine learning applications.

Educational Assessments I

3.0 Units

This course introduces the assessment tools and procedures frequently used in educational therapy settings. In addition to classroom activities, you'll gain field experience using specific assessment instruments. You'll have access to a limited number of assessment instruments and will be assisted in your fieldwork placement. Testing is limited to educational assessment tools, which are widely used by educational therapists and do not require authorization to administer (i.e., credentialing as a school psychologist or licensing as a clinical or educational psychologist). The course offers insight into how to administer tests used by educational therapists.

Learning Outcomes:

At the conclusion of the course, you should be able to

Explain the purposes of formal and informal assessment

Read, understand, and summarize educational testing reports

Administer a standardized assessment correctly

Recognize common tests of phonological awareness, visual motor integration, reading, writing, listening, and math

Use test data to plan remediation in one academic area

Topics Include: Understanding why educational therapists give assessments and conduct interviews

How to identify which assessments are appropriate for educational therapists to administer

How to review psycho-educational reports and other allied professional assessments in order to develop an effective treatment plan

Educational Assessments II

3.0 Units

In this course, participants are introduced to cognitive-educational report writing and the interpretation of findings from scores, interviews, and checklists. Discussion is limited to educational assessment tools which are widely used by educational therapists and do not require authorization to administer (i.e., credentialing as a school psychologist or licensing as a clinical or educational psychologist). Assessment batteries administered in the previous assessment course are used to generate the formal report. Participants also learn how to interpret test results, reports and findings from other allied professionals.

Learning Outcomes:

At the conclusion of the course, you should be able to

Give 3 or more standardized assessment tools

Interview student and family and conduct a record review to obtain a developmental history

Record test results and interpret them in writing

Summarize diagnostic information into a learning profile and recommendations

Educational Therapy Certificate Completion Fee

Once all of the certificate requirements have been met and your final grades are posted, please access your Student Portal to enroll in the "Certificate Completion Fee" to begin the review process. Please allow 4-6 weeks to receive your certificate.

Educational Therapy Practicum

5.0 Units

This final course in the Educational Therapy Certificate Program provides an opportunity for the intern to practice all aspects of educational therapy under the supervision of an experienced professional in the field. To arrange your internship, contact UCSC Extension for information.

Educational Therapy: Structured Literacy I

3.0 Units

This course is part I of a two-course series, Structured Literacy I and II. Spreading the content over two courses offers us the luxury of focusing more in depth, first on the teaching of literacy and then on teaching literacy to students with learning difficulties. Both courses are required for the Certificate in Educational Therapy, and are more closely aligned to the requirements of the Association of Educational Therapy, as well as providing a more thorough mastery of the skills and knowledge base necessary to adequately teach all of the students who will come to you in your practice.

Structured Literacy I is an introduction to the theories, issues, strategies and materials related to assessment and instruction of students with reading difficulties. The course emphasizes specific instruction methods and the selection and development of materials that match the diagnosed need of the individual.

Learning Outcomes:

At the conclusion of the course, you should be able to

Structured Literacy Define the components of structured literacy

Describe their importance and the red flags of their breakdowns

Apply the current science of reading to assess the quality of reading and writing programs

Create and implement effective remediation programs based on best practices in structured literacy instruction

Speech to Print Compare and contrast speech-to-print and print-to-speech approaches to literacy instruction

Evaluate quality programs following each approach

Describe the bi-directional influence of spelling on reading and vice versa

Apply current science on best practices to design an effective spelling intervention

Comprehension Explain Scarborough's reading rope and its implications for comprehension

Compare and contrast the effects of decoding and oral language proficiency on reading comprehension

Describe risk factors and red flags for weaknesses in oral language

Create an effective remediation program to address the individual needs of each student

Assessment Describe and justify the components of a quality assessment for literacy disabilities

List and describe both informal and formal literacy assessments

Describe techniques to create an accurate differential diagnosis for each individual student

Apply both informal and formal literacy assessments to create an accurate student profile

Create a comprehensive remediation program based on assessment data

Note(s): Formerly titled "Educational Therapy: Reading I"

Educational Therapy: Structured Literacy II

3.0 Units

This course is part II of a two-course series, Structured Literacy I and II. Spreading the content over two courses offers us the luxury of focusing more in depth, first on the teaching of literacy and then on teaching literacy to students with learning difficulties. Both courses are required for the Certificate in Educational Therapy, and are more closely aligned to the requirements of the Association of Educational Therapy, as well as providing a more thorough mastery of the skills and knowledge base necessary to adequately teach all of the students who will come to you in your practice.

Structured Literacy II builds upon Structured Literacy I foundation to explore how to teach, remediate and support students with learning difficulties, whether due to dyslexia, speech and language disability, ADHD, ASD, a mismatch between home and school culture, learning English as a second language, or a number of other challenges. The course emphasizes neurobiological and neurocognitive underpinnings of literacy, the science of reading and structured literacy, best practices of instruction, using informal and formal assessments to guide instruction, and the development of materials and skills to teach literacy to a broad range of students.

Learning Outcomes:

At the end of the course, students should be able to

Describe the main components necessary for mastery of literacy

Define the components of structured literacy

Explain and apply the general tenets of adapting instruction to meet the varying needs of individual learners

Analyze the complex interplay of overlapping challenges and create a multi-leveled, multi-faceted approach to best support each student

Apply both informal and formal literacy assessments to create an accurate student profile

Topics Include: The who, what, when and why of literacy instruction

Structured Literacy: what it is and why it is even more important for students with disabilities

Making differential diagnoses to align instructional practices with the specific needs of individual students

How socio-economic, cultural and a wide-range of identity issues affects literacy acquisition and instruction; and their interconnections with identification and treatment of language-based learning disabilities

Assessments for literacy difficulties and dyslexia

Effective Employee Relations

1.5 Units

This course presents legal and practical methods for handling employee relations issues. Special emphasis is given to the 80 percent of job terminations that are on-the-job behavior-related.

Learning Outcomes

At the conclusion of the course, you should be able to:

Understand how to add value and build credibility as an employee relations partner

Understand employee motivation and how it impacts ER

Drive setting aligned expectations with managers

Support managers on providing feedback to employees

Deal with employee complaints

Handle difficult conversations with employees

Drive employee communications at all levels

Topics Include:

Employee communications

Handling employee complaints, resolving employee conflicts and harassment

Coaching managers through employee issues

Performance management

Voluntary and involuntary terminations

Impact of mergers and acquisitions

Professional Credit:

HRCI®---PHR®, SPHR® and GPHR® general recertification credit: 16.5 hours.

Effective February 22, 2020, this course is valid for 16.5 PDCs for the SHRM-CP® or SHRM-SCP®.

Effective Negotiations: Principles, Strategies, and Techniques

1.5 Units

Negotiation is an integral part of our daily life. Whether you are seeking project resources, deciding on a new hire's salary, or inking a high-stakes deal for your company, your success depends on your skills as a negotiator.

In this foundational course, you will gain insight into the psyche of an effective negotiator and learn to steer clear of the most common pitfalls in deal-making. You'll practice each stage of a business negotiation, from initial planning to the final handshake and memorandum of agreement. We'll discuss 10 negotiation principles, including how to use the four basic forces in every business negotiation: power, information, timing, and approach. The Negotiation Matrix, developed by Roy Lewicki and Alexander Hiam, is used to shift from ineffective negotiating strategies and tactics to more cooperative and mutually beneficial approaches. Through group exercises, you will learn how to execute proven tactics, refine your personal negotiating style, and improve your ability to make a deal successfully and ethically in any situation. Along the way, you will gain new appreciation for how negotiating skills can help you overcome a wide range of challenges—at work and beyond.

This course, which is designed for anyone who wants to enhance negotiation skills and work more productively with customers, colleagues, partners, and vendors. No prior training in negotiation is required.

Learning Outcomes

At the conclusion of the course, you should be able to:

Enjoy optimal results in both formal and informal negotiations.

Apply strategic thinking to your negotiations.

Build confidence in your bargaining power and abilities.

Improve negotiations by managing your emotions and influencing others.

Build positive, productive relationships with all parties at the table.

Create value and "enlarge the pie" to produce win-win outcomes.

Professional Credit

The Project Management Institute (PMI)®--PMP® 15 Professional Development Units.

Effective Performance Management

2.0 Units

This course provides an overview of performance management, what it is, its benefits, and how it is applied in most organizations. You will learn how to develop effective performance management systems which involve goal setting, coaching and feedback, motivation, measuring performance against goals, performance appraisals, and employee development. In addition, you will gain an understanding of how employee coaching and leadership development tie in closely with succession planning, by developing high potential employees and identifying successors for senior level positions within an organization. We will also watch and defend a "mock performance appraisal review," listen to two guest speakers discuss new best practices in performance management, and review and implement new and experienced manager training.

Learning Outcomes

At the conclusion of the course, you should be able to:

Learn what Performance Management means, how it is used correctly and how it can be used incorrectly.

Understand how Performance Management is about managing employee behavior in performing the requirements of the job.

See how Performance Management is key to getting organizational alignment and successful results. What about positive feedback?

Be able to develop and utilize a PM process and a Performance Appraisal System.

Gain managerial tips to on how to effectively implement Performance Management in an organization.li> Understand how the Performance Management process dovetails into Leadership Development coupled with Succession Planning.

Learn about new manager training and development plans

Professional Credit:

HRCI®---PHR®, SPHR® and GPHR® general recertification credit: 19.25 hours.

Effective February 22, 2020, this course is valid for 19.25 PDCs for the SHRM-CP® or SHRM-SCP®.

Effective Procurement Strategies

3.0 Units

This new procurement strategy course is aimed at helping supply chain professionals as well as people new to the field, business leaders, and entrepreneurs optimize their effectiveness in sourcing, contract development, risk assessment, negotiation, and the rapidly changing technologies in the industry. When you integrate best procurement practices, you develop processes, strategy, and structure for an effective supplier and contract manufacturing supply base. Learn to maximize benefits for your organization in today's competitive landscape.

It is highly recommended that students take "Evolving Role of Supply Chain Manager" as the first course prior to taking this course.

Learning Objectives Explain the various methods of procurement

Determine value and its application to product and service selection

Identify leading trends and technology used in procurement

Topics Covered Procure goods and service, and succeed in a competitive bidding environment

Source effectively and maximize contractor engagement and product value

Build specification and scope of work to maximize value and reduce cost

Approach risk and reduce it

Develop and manage effective contracts

Negotiate and collaborate with internal and external partners

Problem solve as a procurement leader

Capitalize on IT licensing and new technologies

Integrate best practices for value and cost reduction

Electronic Data Capture for Clinical Trials

1.0 Units

A major trend among life science organizations has been the recent shift from manual, paper-based clinical data collection processes to the predominant use of electronic systems that expedite the availability of accurate clinical trial data. This course examines some of the key issues surrounding the industry's adoption of Electronic Data Capture (EDC) and gives students the opportunity to use EDC software on classroom computers during simulated clinical trials. The instructor illustrates the major differences between EDC software and paper-based trials, and systematically examines the costs, risks, related process changes and other business and regulatory implications of this shift. A significant portion of classroom time is devoted to hands-on EDC activities using actual commercial EDC systems from industry-leading vendors. Students will take on the roles of study coordinators, investigators, study monitors, data managers, and other sponsor personnel, using those commercial EDC systems to explore key EDC concepts and tasks performed during clinical trial startup, conduct, and closeout.

The course benefits clinical site personnel (primarily study coordinators and investigators) as well as bioscience industry professionals having roles in data management, study monitoring, clinical management, and others involved in the evaluation, design, and implementation of an EDC system.

Professional Credit: CA BRN/LVN Credit--Provider #CEP13114.

Embedded Design with Xilinx FPGAs

3.0 Units

This hands-on course will introduce you to the world of embedded microprocessor design using field programmable gate arrays (FPGAs). Combining the FPGA fabric with the popular ARM 9 processor cores, it opens up many possible applications with integrated custom peripherals and significant cost/time advantages in design. The course uses the Xilinx Zynq product family including two soft core processors, Picoblaze 6 and Microblaze MCS, and Virtex 7 fabric. The course begins with an architectural overview of the FPGA family and follows with an in-depth look at the ARM 9 cores. Along the way, you will use the Vivado Design Suite and software development kit (SDK) to develop your code, as well as the cross assembler. The SDK supports both C and C++ compilers with debug facilities. We will use real-world design examples, as well as former students' projects, to share the creative ideas that this design framework can offer. You will also learn practical approaches to debugging and simply 'bringing the system up'. A project report is required at the end of the course, with an optional student presentation during the final class for extra credit.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Describe the Vivado/Xilinx SDK design/programming environments

Discuss capabilities and limits of FPGA SoC embedded designs

Explain the detailed steps to creating and building a successful embedded SoC system

Identify FPGA speed limits and embedded processor performance limits

Notes: Students are required to purchase a Zynq-based board for their project (approximately $100, not included in the tuition). Detailed board information and instruction will be provided on the first night of class.

Skills needed: Understanding and experience with basic FPGA design. C or C++ programming experience is required.

Embedded Firmware Essentials

2.0 Units

All embedded systems require firmware to enable their features. In addition to C programming, firmware engineers must understand system and CPU architecture as well as the IO and memory interface; master the techniques to manage limited memory and OS processes, and code programs that are suitable for hardware bring-up and application development. This course provides practical in-depth knowledge and coding exercises for firmware development. The course reviews the embedded system architecture and hardware configurations, including the ARM Cortex-M instruction set. You will be introduced to using C codes to enable or disable hardware features, and gain hands-on experience with clock, timing, delays, and latency when working with different SoC, memory and IO interfaces. You will also learn to write efficient ROM code with limited memory and timing budget.

Most firmware development in industry is done on Linux systems. You should have solid C programming skills and be ready to do all class projects with GNU Tools in a Linux environment. You'll gain experience through a board project. The course will prepare you to take on additional embedded software courses for a wide range of product interests.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Understand key fundamental concepts of embedded firmware programming

Set up and use an embedded firmware development environment

Design firmware applications that take advantage of the many I2C and SPI sensors available

Interface hardware to firmware running in a micro-controller

Notes: Students are required to bring a laptop with Linux installed for in-class exercises. Options include VMware, VirtualBox, LiveCD, disk partition or separate drive. Students are also required to purchase a small board, breadboard, resistors, LED, and wires (approx. $70 to $120, not included in the tuition) to do class projects on their Linux laptops. Detailed board information and instruction will be provided on the first night of class.

Embedded Linux Design and Programming

3.0 Units

This course covers the fundamentals of building and installing a custom embedded Linux for an ARM processor platform, and provides hands-on experience for creating cross-platform environments using the GNU tools. Basic concepts for designing, testing, and customizing embedded Linux will be covered, including how the Linux scheduler is implemented, and how to write Linux kernel modules and remotely debug embedded Linux applications. **Learning Outcomes:**

At the conclusion of the course, you should be able to:

Explain the basics of designing embedded Linux

Master the requirements to setup a Linux cross development environment

Use GNU tool chain to compile Linux Kernel and applications code

Develop and download applications to run on an embedded Linux target system

Describe the steps to write, compile and load/unload Linux Kernel modules

Summarize the Linux File System and initramfs (Initial RAM File System)

Topics include:

An overview of embedded and real-time systems

Creating a cross-compiler

Linux device tree usage

Building and configuring a custom Linux kernel

Building and debugging Linux application source code using a GDB debugger

Writing kernel modules and user applications for embedded Linux using C language

Linux sysfs interface for GPIO

The basics of POSIX threads and the RTAI (real-time application interface) environment

Note(s): To do projects, students are expected to have access to Debian Linux on their computers. Options include Virtual Box, LiveCD, disk partition or separate drive. Instructor will not cover the Linux installation topic in class. For students needing help with Linux, "Introduction to Linux" is recommended. Students should come prepared with knowledge of the suggested prerequisites.

This course requires students to purchase a board (approx. $50, not included in the tuition) to complete the assignments. Students may either use Raspberry PI 2 Model B or Raspberry PI 3 Model B (details to be discussed in class). Students are expected to use their own Linux-based computers to do the programming project.

Skills Needed: Working knowledge of C programming language and UNIX/Linux operating-system internals. Advanced C programming recommended.

Embedded System Hardware Architectures, Introduction

3.0 Units

Beginning technical professionals who want to learn the big picture of embedded systems will get a solid grounding in key concepts of embedded systems hardware design, one of the particularly hot areas for U.S. engineers today. Embedded systems are computer systems designed to perform one or more dedicated functions. They are found in a wide range of electronic devices, including PDAs, consumer electronics, networking equipment, industrial controllers, and military electronics. Gaining an inside look at some of the most common embedded systems and the functional blocks within those systems, students in this course examine hardware components and their interfaces as well as important considerations with regard to procurement and design. They learn embedded systems design considerations and several approaches to system building common in the industry. Other key concepts in embedded hardware design include memories used in embedded systems and their interfaces, basic concepts in microprocessors, microcontrollers, digital signal processors (DSP), and the typical buses used at the system level.

After completing the course, you will see how the key concepts in embedded hardware design fit together, including the interaction of these hardware components as well as important considerations with regard to procurement and design.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Describe how microprocessors, memory subsystems and other hardware components interact

Discuss key design considerations

Explain key concepts in hardware design

Identify bottlenecks in choice of hardware in order to make more effective decisions

Topics Include:

Functional blocks and tear-down analysis

Hardware design considerations

Design methodology (ASIC, FPGA, COTS)

Memory subsystem and hierarchy, types (SRAM, PSRAM, DRAM, Non-volatile memories)

Microprocessors, microcontrollers

Inter-IC communications overview (SPI, I2C, Parallel Bus)

Skills Needed: Some familiarity with the hardware components of a computer system is required.

Embedded Systems Certificate Completion Fee

Once all of the certificate requirements have been met and your final grades are posted, please access your Student Portal to enroll in the "Certificate Completion Fee" to begin the review process. Please allow 4-6 weeks to receive your certificate.

Employment Benefits and Retirement Planning in Personal Financial Planning

3.5 Units

Planning for a successful retirement calls for a thorough evaluation of wealth, goals, and resources. In this overview course you gain theoretical insights and practical skills for managing the retirement planning process, an important component of personal financial planning. Learn how to determine the adequacy of your clients' retirement resources and income.

We will also discuss various employee benefit and government programs that provide retirement security. Topics include tax deferred retirement plans, pension, profit sharing, 401(k), 403(b), 457, SEP, IRA, and other tax qualified plans as well as nonqualified deferred compensation, and social security. Students are introduced to the fiduciary requirements of these plans and the taxation of benefits received as well as evaluation and selection from among the various plans covered.

Learning Outcomes

At the conclusion of the course, you should be able to:

Identify and evaluate the assumptions used in retirement needs including, age, budget, goal priority, longevity, investment rates of return, market volatility and inflation.

Explain the basics of Social Security and advise clients about their benefits, taxation of benefits, Social Security maximization.

Describe Medicare and Medicaid Programs; funding and structure.

Distinguish between qualified, government, non-qualified, and private tax advantaged retirement plans.

Understand the tax implications of qualified plans and explain the provisions to employers and employees.

Explain the fiduciary responsibilities of employers with respect to ERISA.

Differentiate between IRAs, ROTH IRAs, SEP, and SIMPLE plans and provide recommendations.

Understand regulatory considerations provided by ERISA, the PBGC, and DOL.

Identify the key factors affecting plan selection for businesses.

Explain retirement plan distribution rules and taxation.

Provide retirement income and distribution strategies to clients.

Explain when business succession planning is needed and describe buy-sell agreements and how they are implemented.

English As a Second Language Through Music and Movement

2.0 Units

Music is a part of all cultures and, for many, is a very important part of our lives. For this reason, music is an exceptional tool for teaching ESL. Music and movement activities in the classroom can offer a creative and beneficial break from the normal routine. They can help your students develop the primary language skills of listening, speaking, reading and writing. A myriad of researchers have documented the fact that music provides enjoyment and assists in the development of language skills. This course will help your students sing their way to fluent English! The course provides the tools that teachers need to easily foster the acquisition of ESL through song lyrics and student movement. Students develop practical lesson plans with activities that can be used immediately in the classroom.

Estate Planning

3.5 Units

This study of estate planning is designed to equip financial planners to identify and solve estate problems from the financial planning perspective (without practicing law). The course covers a wide range of topics and issues, including tax objectives, wills and living trusts, the unlimited marital deduction, saving the "second tax," holding title to property, lifetime gifts and trusts, life insurance and annuities, business interests, post-death problems and analysis of recent tax changes as they apply to estate planning.

Learning Outcomes

At the conclusion of the course, you should be able to:

Describe in general terms what happens to a person's estate after that person dies or becomes incapacitated, including the process it goes through to get to the heirs and how much that costs;

Discuss specifics of an estate plan with industry professionals, such as Attorneys, Accountants, Financial Advisors, Insurance Brokers, and Financial Product Salespeople;

Explain to clients, friends, and family what his or her estate planning issue is and who to talk to in order to get the issue resolved;

Identify standard documents and financial products used in estate planning, including trusts, wills, powers of attorney, deeds, contracts, assignments, policies, account statements, and debt instruments.

European Medical Device Regulation: Clinical Evaluation and Post-Market Surveillance

3.0 Units

Regulations for medical devices in the European Union are going through the most comprehensive revision since they were created in the 1990s. These revisions are driven in part by technological advancement. They are also aimed at ensuring safety and effectiveness of medical devices in response to several high-profile product scandals in recent years. Key changes have resulted in clinical evidence requirements, pre-market review of the technical file by notified body, post-market surveillance and vigilance, transparency and traceability through Unique device identification (UDI) and strengthening of the oversight of the medical devices by the notified body.

As the EU transitions to this new standard of regulations, medical device companies need to prepare to be in alignment with new standards. Not only do new device designs need to be in compliance with new standards, but all existing products and technologies must be recertified.

Students in *European Medical Device Regulation* will learn the details of the new regulations, and how to serve their organizations' needs for highly qualified regulatory affairs, clinical affairs, and quality assurance professionals.

At the conclusion of the course, you should be able to:

Learn medical device regulations definitions and requirements, including how to implement medical device regulations program for existing and new products, and the impact of quality management systems (QMS) due to medical device regulations (MDR).

Understand scope of changes from current medical device directive (MDD) to MDR.

Know MDR classification and conformity assessment.

Implement clinical evaluation plan and report.

Identify economic operations in your supply chain.

Recognize unique device identification (UDI), the European database on medical devices (EUDAMED), and information technology requirements.

Deploy post-market surveillance, report serious incidents, and field corrective actions.

Employ smart strategies to reduce the overall cost of implementing the medical device regulations.

Avoid ISO audit and EU competent authority inspection observations by following a sound regulatory path.

Prerequisite Skills:

MEDD.X407 - Quality Systems for Medical Devices FDA QSR and ISO 13485 (recommended)
REGL.X404 - Regulation of Medical Devices and Diagnostics (recommended)

Evolving Role of Supply Chain Management

1.5 Units

Supply chain management professionals who understand the latest best practices in this evolving field are in high demand. Students in this course take a look back to when purchasing was simply about buying requested materials and goods. They study the industry's evolution to include other areas of high impact such as, transportation, warehousing, and supplier management. Today's professionals have a much broader impact on an organization, particularly its bottom line, when they learn how to manage product planning, supplier development, and system implementation. The evolution of this field has made it one of the critical components of any successful company.

Learning Objectives Understand the role supply chain management plays in an organization

Recognize potential impacts to an organization's bottom line

Compare and contrast skills needed in the future

Topics covered Supply chain management defined

The purchasing multiplier

Product planning and development

Key skills for supply chain professionals

Trends in supply chain management

Experimental Methods in Molecular Biology

3.0 Units

This course will give students a theoretical and practical introduction into important methods in molecular biology. This is a lecture-based course that provides a theoretical overview of the key molecular biology techniques used in basic life science research and by the biotechnology and biopharmaceutical industry for the discovery of novel therapeutics. Students will understand how to work with molecular biological laboratory equipment and identify biological solutions relevant for molecular biology research. Laboratory safety aspects will also be a focus. Along with the practical aspects of the course, there will also be a particular emphasis on the planning, presentation, and critical evaluation of the results in the form of a laboratory report or oral presentation. You'll also learn about high-throughput sequencing and microarray expression analysis, methods that generate massive amounts of biological data. The instructor discusses the types of data these techniques generate, the relevance to bioinformatics, and their uses in the diagnosis and treatment of human disease.

Topics include:

Gene cloning, manipulation and sequencing

PCR

RNA interference

Gene expression analysis

Protein expression, engineering, and structure determination

Fundamentals of experimental design

Extreme-Agile Project Management

1.5 Units

Extreme Project Management (EPM) uses an agile development model to effectively address projects with short increment delivery schedules, high uncertainty, rapidly changing requirements, and high visibility. Participants examine the principles, values, skills, tools and practices of EPM, while exploring both the methodological and interpersonal skills needed to succeed under EPM conditions. Models covered include the Flexible Project Model, Adaptive Project Framework, and Scrum. The differences between traditional and extreme projects are highlighted throughout. Participants develop the quantum mindset of extreme project reality, while expanding and focusing their leadership skills for EPM environments, gaining insight into effective stakeholder management, and acquiring the ability to exploit the extreme project model to rapidly deliver value to the organization.

Learning Outcomes

At the conclusion of the course, you should be able to

Describe the Extreme Agile Programming Framework

Identify Leadership Skills for an Extreme World

Discuss the Flexible Project Model

Explain the Extreme Agile Project Environment

Professional Credit

The Project Management Institute (PMI)®--PMP® 15 Professional Development Units.

Facilitation Skills

2.0 Units

This course focuses on how facilitation skills are applied to create and support learning activity designed to improve individual, group, and organizational performance. Participants also learn how these skills can be applied to other organizational needs related to training: effective meetings, team-building efforts, and individual training and development programs. This experiential course gives participants an opportunity to practice facilitation skills and receive feedback on how to improve their performance.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Identify facilitation strengths and opportunities for development through experience, feedback, observation and reflection

Identify and understand the facilitator's role and application in group settings

Explain the difference between process and content as it relates to facilitation

Understand and experience elements of the group development process

Build a facilitation tool kit for use in the workplace

Refine and practice group observation skills to better manage group processes

Identify and observe the roles of group members for functional and nonfunctional behaviors

Topics Include:

The values of facilitation

Building and maintaining a learning environment

Group development skills

Group observation skills

Experimental techniques for interacting with groups

Recording theory and practice

Examination of key processes necessary in successfully leading learning activities (such as needs assessment, priorities and goals, conflict resolution, decision making, problem solving, and communication)

Professional Credit:

HRCI®---PHR®, SPHR® and GPHR® general recertification credit: 19.25 hours.

Effective February 22, 2020, this course is valid for 19.25 PDCs for the SHRM-CP® or SHRM-SCP®.

Final Project: Preparing Your Job Search

1.5 Units

This final course in the Technical Writing and Communication certificate program prepares students to secure employment as technical communicators. Each student develops an industry-appropriate portfolio and resume that are tailored to the job market and the type of job desired. Students also learn how to make the most of social networks such as LinkedIn and prepare for interviews.

Topics include:

Identifying the types of jobs the student wishes to pursue Defining an appropriate job-search approach Developing networking skills Developing a resume to support your job search strategy Crafting cover letters targeted toward specific job postings Creating a professional portfolio and web presence Preparing for interviews Tracking your networking and job search progress

Prior to enrolling in this class, students must contact the department for approval. E-mail ExtensionProgram@ucsc.edu or call (408) 861-3860.

Finance for the Business Professional

1.0 Units

Business professionals and students interested in learning financial accounting skills get hands-on experience in this course analyzing and evaluating the information behind financial statements and relevant data. Master basic business accounting concepts and processes, financial statements, budgets, and financial ratios. Get the financial literacy you need to succeed in the business world.

Learning Outcomes

At the conclusion of the course, you should be able to:

Discuss the importance of financial statements for a company

Explain underlying business activities' effects on financial statements

Describe a budget and its importance to a company

Identify the importance of the Sarbanes-Oxley Act in relation to a company's operations

Determine the overall strength of a company using various financial tools

Finance I, Fundamentals

3.0 Units

This course addresses financial management, including fundamental principles, planning and evaluation, and appropriate financial tools. Through lecture, readings, group discussion, and a group project, this course covers the concepts and tools of the financial marketplace.

This course is designed for managers and team members from corporations, nonprofit organizations, municipalities, and those self-employed who are increasingly required to address the organization's goals for financial planning, working capital, capital budgeting and return on investment for goal alignment with corporate planning to meet stockholder goal of wealth maximization.

Learning Outcomes

At the conclusion of the course, you should be able to:

Describe what financial management is

Analyze and interpret the most basic of financial statements to develop courses of action

Assess how revenue, profitability, break-even, and time value of money all influence financial decision making

Topics Include

Key financial ratios for business analysis

Financial statement analysis

Funding, financial forecasting and risk analysis

Cost of capital, time value of money

Capital budgeting and investment risk

Valuing stocks, bonds and preferred stocks

Capital budgeting systems

Working capital and cash management

Skills Needed: A foundation in basic financial accounting knowledge is recommended.

First and Second Language Development

3.0 Units

The fields of linguistics and cognitive psychology have rendered theoretical models of first- and second-language learning and acquisition. Participants in this course examine how these theories apply in TESOL and bilingual education. Participants also examine the critical factors affecting language development. Among those covered are psychological factors such as motivation and communication strategies, sociocultural factors such as dialects and language policy, and pedagogical factors such as formal and informal learning. Participants draw upon their own language learning and teaching experience for examples that relate theory to practice.

Foundational Legal Issues of Emerging Growth Companies

1.4 CEU's

This course, for entrepreneurs who intend to form, grow, and scale a startup, provides an introduction to the core legal issues that VC-funded emerging growth companies encounter.

Each week we will tackle a key legal area in business development, moving from entity selection and initial capitalization, intellectual property, and common tax and employment issues, to seed financings, venture capital financings, and exits.

You will develop a practical legal knowledge to grow your company in seven weeks. By the end of this course, you will understand foundational principles of corporate, employment, securities, tax, and intellectual property law. You will also see how a cap table works and why it is mission critical to model cap tables before any round.

Topics

Business entities and the common corporate structure for venture-backed companies

How to secure intellectual property

Wage, hour, equity compensation, and tax issues

Seed financing

Venture capital financing

Mergers, acquisitions, and other exits

Foundations in Medical Devices: Developing Premarket U.S. Regulatory Strategies and Working in a Regulated Environment

2.0 Units

New to the industry? Or maybe you need a basic understanding of the U.S. FD&C Act and U.S. FDA regulations? Maybe you have a medical device that you'd like to commercialize in the U.S.? Maybe you just want some practical regulatory advice for working in the industry or how to do remote work? This online synchronous-lecture course will give you the medical device industry basics all from the comfort of your home. The course will answer your questions such as: how to work in a regulated environment, what are the roles available to you, and what are the differences between regulatory affairs, quality assurance, quality control, compliance, and quality engineering. This course will also help you create or be a part of producing a regulatory strategy for your medical device, IVD, stand-alone software, or combination product. Live discussions, class group games, etc. will be used to help you in navigating through the US FDA regulations including California's FDB requirements. You'll learn about the various US FDA device classifications, including the various regulatory pathways 510(k), De Novo, PMA, and HDE. You'll also learn about the different programs such as Q-submissions, Investigational Device Exemptions (IDE), Breakthrough Designation, Pilot Programs, and more. Including the medical device program enacted by FDA during emergency situations such as the COVID-19 pandemic: Emergency Use Authorization (EUA).

Learning Outcomes:

At the end of the course, students should be able to

Discuss FDA's jurisdiction and the reason for food, drug, and cosmetic laws

Define the various regulatory pathways available for the various biopharmaceutical products

Understand individual roles/responsibilities in regulatory affairs

Understand the basic technical data elements required in biopharmaceutical product development

REGL.x410 replaced REGL.x404 Regulation of Medical Devices and Diagnostics. If you have declared candidacy using the former requirements, you will not need to take REGL.x410. If you are interested in declaring candidacy using the new requirements, please contact student services. Student services will guide you on the steps needed to request REGL.x404 earned credits to count towards the updated program requirements.

Foundations in U.S. FDA Regulations of Drugs & Biologics and Regulatory Submissions

2.0 Units

New to the industry? Or maybe you need a basic understanding of the U.S. FD&C Act and U.S. FDA regulations related to biopharmaceutical product development and approval? Are you seeking a career in regulatory affairs? Maybe you just want some practical regulatory advice for working in the industry? This course will give you basic information on the regulatory environment in the biopharmaceutics industry and answer your questions: how to work in a regulated environment, what are the roles available to you, and what are the key foundational aspects of regulatory affairs. This course will also help you gain an understanding of the basics of the biopharmaceutical development process. Live discussions, class group exercises, etc. will be used to help you in navigating through the basics US FDA regulations related to biopharmaceutics development and approval. You will learn about the differences between the various types of human therapeutics, including the various regulatory development options utilized in the industry.

Learning Outcomes:

At the end of the course, students should be able to

Discuss FDA's jurisdiction and the reason for food, drug, and cosmetic laws

Define the various regulatory pathways available for biopharmaceutical products

Understand individual roles/responsibilities and how the biopharmaceutical industry works in general

Foundations of Disciplined Agile for Project Managers

1.5 Units

In this overview introductory course, students will review and assess values and principles from the Disciplined Agile (DA) framework— a method project managers use when working in large enterprise organizations that wish to transform to agile.

Although complex, this framework allows organizations to select their way of working (WOW) and apply the best approach based on context. The DA toolkit supplies straightforward guidance to help you, your team, and your enterprise increase effectiveness. Apply and evolve your way of working (WOW) in a context-sensitive manner with this people-first, learning-oriented hybrid agile approach.

Learning Outcomes

At the conclusion of the course, you should be able to:

Know the scope and be able to use the basic elements of DA.

Learn how to create your WOW using DA.

Organize the flow of work within a team and across teams using DA.

See how teams can work differently yet still be governed consistently using DA

Engage in a guided exercise to demonstrate how to use DA, selecting a specific WOW that best fits your organization.

Note: This course is an introductory course, not a certification course.

Foundations of IoT

3.0 CEU's

In this course, designed for nontechnical people, you will take a tour of the entire IoT ecosystem—from hardware and software to networking and cloud service providers. Foundations of IoT is for people who want to rapidly understand the IoT building blocks and what to expect in an IoT career.

We introduce you to the emerging world of the Internet of Things (IoT)—where billions of internet-connected devices share data. IoT fundamentally involves sensing, analyzing, and taking actions. IoT services often require large numbers and types of sensors. We will start with hardware elements, progress through software and networking, and finally see how to make everything work through cloud service providers, such as Google, Microsoft Azure, or Amazon Web Services. Foundations of IoT explains how all of this works. You will explore key concepts, demonstrate real-life examples, and get to try each example for yourself. No technical background is assumed

Topics

What is IoT? What does it mean for me?

SoC's (System on a Chip) Sensors & Actuators

IoT Networking

IoT Hardware

Introduction to Python Programming

Data, Statistics & Analytics

Database Management

Cloud Services

IoT Security

Foundations of IoT Format

This course is offered in a hybrid format. There are live-online meetings twice weekly with the instructor, short, video-based lessons, and case-based homework assignments. While some content within the course can be studied at your own pace, you are encouraged to attend a live-online class twice a week or view recorded videos. You can study entirely at your own pace Although basic familiarity with coding is helpful, Foundations of IoT requires no prior technical background.

Note(s): This course is project based and requires the purchase of several sensors and IoT hardware platforms (about $150, not included in the tuition). Detailed information will be provided at

the first class.

Synchronous online meeting days/time: Tuesdays & Thursdays 5:30 p.m - 6:30 p.m

FPGA Application in Autonomous Driving Systems, Introduction

3.0 Units

The Silicon Valley-led shift from conventional, fully human-driven vehicles to autonomous driving (AD) systems empowered by artificial intelligence has created a huge demand for engineers and researchers who know these emerging technologies. In this course, which is open to students with a basic knowledge of programming and digital logic, we will explore the fundamentals of AD systems—machine learning, computer vision, and hardware implementation on a field programmable gate array (FPGA). We will cover critical concepts such as object, vehicle, and lane detection, as well as traffic sign classification, AI, and deep learning algorithms. You will study practical systematic design of typical FPGA applications in AD systems using a hardware description language, such as VHDL or Verilog before moving to testbench development, simulation for bit-true design verification, and complete system design synthesis.

The course designed to strengthen theoretical understanding and provide hands-on experience with hardware. By the end of the course, you will have hands-on experience with FPGA design and be able to design, test, and implement a complete digital system on an FPGA device including interfacing to external devices.

Learning Objectives

Define, develop, and model image processing and machine learning basic algorithms

Understand and differentiate computation platforms for AD

Develop basic RTL designs for FPGA

Develop image processing algorithms on FPGA

Implement, verify, and simulate a working design on FPGA for AD applications

Skills Needed: Some programming knowledge (Python, MATLAB, VHDL, Verilog, SystemVerilog) and digital system design experience is preferred, but not required.

Fundamentals of English Grammar for ESL Teachers

2.0 Units

This course familiarizes prospective ESL teachers with those aspects of English grammar that are crucial for their students, who bring special grammatical challenges to the learning process. An ESL teacher can become truly effective only if he or she is able to identify, objectify and then clarify those challenging aspects of English grammar. The main objective of the course is to explore these points.

Gene Expression and Pathways

2.0 Units

Knowledge of how gene expression is regulated is essential to understanding cellular structure and function, both in normal cells and in the disease state. This course provides a solid foundation in the molecular concepts and cutting-edge technologies that are central to the study of gene expression pathways in simple cells (prokaryotes) and complex multicellular organisms. Topics include:

Basics of gene structure and gene regulatory elements- both cis and trans

Transcriptional control of gene expression in prokaryotes and eukaryotes

Post-transcriptional and translational control of gene activity

Molecular techniques for studying gene expression

We will discuss abnormalities in gene expression pathways and how they relate to human diseases, including viral, immune and metabolic diseases, as well as cancer. We will also discuss the latest methods used to manipulate, monitor and analyze gene expression levels in cells and whole organisms, and the relevance of these techniques to research, drug discovery and diagnostic medicine.

Gene Therapy: Hacking the Genome

1.5 Units

With double-digit annual growth in the global gene therapy market, people with the skills to treat or prevent disease through experimental gene techniques have never been in higher demand. This course brings you closer to the exciting discoveries in genetics by providing a foundational survey of the existing technology for gene editing and helps you understand the tools of discovery.

Topics

Gene therapy landscape overview

Uses of viruses in gene therapy

RNAi

Car-T gene therapy

CRISPR gene therapy

This class offers a detailed analysis of the biology underlying each technology and analyze the advantages, disadvantages, and limitations of each.

Prerequisite Courses: There are no prerequisite courses for this class.

Prerequisite Skills: There are no prerequisite skills needed for this course, but prior molecular biology coursework or background is strongly recommended.

Genomics and Next Generation DNA Sequencing: Methods and Applications

3.0 Units

Next Generation DNA Sequencing (NGS) has made it possible to sequence a human genome at an incredibly low cost, vastly expanding the potential applications of genomics in cancer diagnostics, pathogen identification, forensic human identification and genetic disease diagnosis. This course begins with the basics of this revolutionary process and then delves into specific applications of NGS in research and clinical settings. The course covers the primary methods used for highly parallel sequencing. You will develop the knowledge needed to perform analyses from sample prep to generating the final data. Skills needed: Completion of "Bioinformatics Tools, Databases and Methods or Experimental Methods in Molecular Biology" is recommended.

Global Diversity: A Toolkit for Cross-Cultural Communication

1.6 CEU's

In this course, we take all that you know about business, communication, and diversity and examine it through an internationalized lens.

Students will explore key cultural components, such as country-specific histories and current cultural impact, migration, language, ethics, gender roles, customs and perceptions. We will analyze stereotypes and customs, socioeconomic and political factors that have an impact on how we perceive others as well as how others may perceive us.

Once you have experienced the perspectives of other cultures, the biases and the cultural intelligence of ourselves and others, you will be in a stronger position to evaluate business and personal decisions that integrate a truly global perspective. You will be able to apply your practical experience and improve communication in the workplace and have new skills to engage as a global citizen.

This is a perfect course for people interested in international roles and international teams as well as managers looking to improve communication and facilitation skills across diverse teams.

Learning Outcomes Discover how they demonstrate and influence biases and stereotypes impacting the workplace.

Be better prepared to communicate cross-culturally in diverse or international contexts.

Understand international and global systems influencing how individuals, organizations and nations interact socio-economically and politically.

Discover how we demonstrate and influence biases and stereotypes.

Improve cross-cultural communication in an internalized workplace.

Identify how international and global systems influence socio-economical and political interactions between individuals, organizations and nations.

Global Medical Device Submissions and Strategy

1.5 Units

The global nature of the medical device industry presents both opportunities and challenges for medical device companies and regulatory affairs professionals who must navigate a diverse regulatory terrain. Through interactive lectures and facilitated group projects, students gain a practical understanding of international medical device requirements and regulations for major and emerging markets around the world, with emphasis on the US, EU, Canada, Japan, China and Brazil. A comparative approach highlights regulatory and process similarities and differences between countries and underscores the impact they have on global regulatory and business strategies. This course will benefit regulatory affairs professionals who need to help their organizations understand the barriers to entry into the global medical device market.

Learning Outcomes:

At the end of the course, students should be able to

Describe what a medical device regulatory strategy is and its elements

Discuss the various regulatory submission types, their contents, and format

Explain why a strategy is important and how it drives the business

Identify common pitfalls of submissions and strategies

Good Clinical Practices

3.0 Units

Clinical research is governed by a set of broad regulatory requirements, industry standards and recommendations. Interpreting and implementing these "best practice" standards presents a challenge for all the stakeholders involved in human research. This course explores the framework and principles of Good Clinical Practice (GCP) as it relates to the roles and responsibilities of various stakeholders like the FDA, Investigator, Sponsor, IRB and the study subject. Through lectures, homework, quizzes and the final exam, you will gain knowledge of regulations (federal, state and local) and learn to apply the principles of GCP. Professional Credit: CA BRN/LVN Credit--Provider #CEP13114.

Good Manufacturing Practices

3.0 Units

Familiarity with the Good Manufacturing Practices (GMP) regulations is necessary for employees engaged in the manufacture, regulation, quality assurance, and control of drugs and biologics. Through lectures, discussions, and case studies, you'll gain an understanding of the FDA GMP and Good Laboratory Practice (GLP) regulations. While primarily aimed at the manufacturing, quality control, and quality assurance worker, the course is also useful for regulatory affairs and clinical research professionals, as well as anyone who wants to understand which regulatory controls apply to the manufacture of drugs and biopharmaceuticals for human use.

Professional Credit: CA BRN/LVN Credit--Provider #CEP13114.

Go Programming, Fundamentals

3.0 Units

Go language (golang), often considered the "C for the 21st century," is an open source programming language developed by Google to help build simple and advanced-level software systems. The core strength of golang is its concurrency mechanisms that make it simpler to write reliable software and to exploit multi-core architectures. The golang is a C-like compiled language that offers portability, speed, and modularity, as well as compatibility with C language. The golang compiler can produce an executable binary for many different CPU and GPU architectures without rewriting the application source code and has a built-in garbage collection mechanism. Participants in this class learn to write faster and modular code, for real-world, cloud-based and general purpose applications.

Class assignments and exercises will prepare students to write real world applications that involve web servers, database interaction, and embedded applications.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Write faster and modular code, for real-world, cloud-based and general purpose applications

Understand and use the basic programming constructs of GO language

Manipulate various GO language data types, such as arrays, strings, and pointers

Write GO language code using principles of concurrency programming

Understand how to write web servers for cloud-based applications

Manage memory apropriately, including proper allocation/deallocation procedures

Topics include:

Code compilation

Program structure

Basic data types

Control structures

Composite types

Functions and methods

Interfaces encapsulation

Using packages to reuse code

Goroutines and channels

Concurrency

How to use build in test tools

Skills Needed: Students should have C programming skills. Advanced C is recommended.

Grammar and Style for Technical Communicators

3.0 Units

This class provides students an intensive review of modern English grammar, sentence errors, style, punctuation and how these concepts apply to current practices in technical writing. We will study the parts of speech; common sentence-level errors, such as fragments, comma splices, and misplaced modifiers; and style issues, such as parallelism, passive voice, and wordiness; and punctuation, such as commas, colons, and semicolons.

Please note - this is not an introductory course in grammar. In order to be successful, you should have English proficiency (TOEFL 550 or 80 IBT, IELTS 6.5) as stated in the admissions requirements for UCSC Extension International Programs. This course is rigorously graded for certificate students, so those studying for self-improvement might find it unsuitable.

For Online Sections of this course: Online courses are largely self-study with instructor support through threaded discussion groups, email and sometimes scheduled online chats. Some instructors may allow students to pace themselves following the published syllabus, enabling them to accelerate through the material and finish early. However, all students must complete and submit all assignments by the schedule end date. Grades are issued for the entire class approximately two weeks after the scheduled end date.

Hazardous Waste Handling and Awareness Training

0.7 CEU's

Businesses that store or use hazardous materials must provide annual training for all employees in the safe and proper handling of hazardous waste under Title 22, Section 66265.16, California Code of Regulations. This specific training program was designed to meet the personnel training in hazardous waste management requirement in the California Code of Regulations. Topics include:

Federal and state regulatory structure

Steps for identifying a hazardous waste

Documentation, manifesting and labeling

On-site handling requirements for hazardous wastes

Contingency planning, emergency response, and spill reporting and recording procedures

Liabilities for improperly handling hazardous waste

Professional Credit: CSPs can claim COC points 0.6

Healthcare Equity: Improving Access

1.5 Units

This course aims to engage participants through topics about history, current ethical climates, culture and the future of diversity, societal equity and inclusion in the healthcare sector. DEI in healthcare systems & regulations, institutions and equity ethics are covered. The course includes topics related to both physical and mental care in the U.S and abroad including internationalized content such as the World Health Organization, global diversity in STEM, artificial intelligence technologies, and global clinical trials.

Learning Outcomes:

At the end of the course, students should be able to

Demonstrate improved self and societal awareness about access, biases and disparities in healthcare and life sciences related to DEI.

Apply gained skills and perspectives to be better leaders, collaborators and providers.

High Efficiency Switch-mode Power Supply, Design Overview

3.0 Units

The power supply is a critical component in any system and has a major impact on overall reliability. System designers need to understand the designs and requirements of their power supplies to meet the evolving needs of the system, and to satisfy regulatory requirements for energy efficiency and standby power. This course covers both analog and digital switch-mode power supplies. This course starts by introducing the fundamental concepts of a real switch-mode power supply and its functions, operations and interactions. Discussions will cover the various topologies as they relate to power supply operation, design, component selection, and rating for a particular application. The course focuses on the most popular topology: the Flyback converter. The case study includes the clamp, snubber networks, transformer, and EMI filter. You will learn the design considerations for EMI, thermal management, and product safety with detailed discussions of PCB design. Lastly, the course discusses the challenges of power supply development in the face of evolving system requirements and regulations. You'll learn how to meet requirements of high efficiency, high power density, digital control and reporting, and stringent ultra-low no-load standby power. The course has expanded practical discussions of digital implementations of a real switch-mode power supply with added features, enhanced performance, and programmability.

You'll gain practical power supply design knowledge and skills relevant to your hardware engineering environment and be able to satisfy actual market and regulatory requirements with practical component implementations. The course features live demonstrations and waveform observations of power supply behaviors using state-of-the-art solutions.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Understand the design and practical implementation of a high efficiency switch-mode power supply

Describe the evaluation approach and process in validating power supply designs

Topics Include:

Fundamentals of power supply

Types of power converters and their operation

Power factor corrections

Understanding system power architecture

Modern design techniques for high density and high efficiency switch mode power supplies

Reducing ultra-low/no-load standby power and improving low load efficiency

Using digital technology to enable programmability and reporting/communications with the system

Using digital technology to enable full digital control

Environmental and safety standards applicable to power supplies

Practical design of a switch mode power supply with hands on testing

Skills Needed: Knowledge of electronics and basic understanding of an electrical system design with power supply.

HTML5 Advanced and Javascript APIs

3.0 Units

An increasing number of companies are using HTML5 to develop web and mobile applications. This course will acquaint you with the new standard of HTML. Through a combination of hands-on exercises and lectures, you will explore the evolution of HTML, XHTML and HTML5, and learn about the many new features available in HTML5. The course de-mystifies HTML5 and all of its long-awaited and powerful features. You will gain experience with redefined web forms, new extended audio and video controls, new page structures and syntax. You will learn and practice "meaningful markup", new canvas drawing methods, drag and drop, data storage methods, new JavaScript and CSS3 implementations, as well as geolocation and mobile application frameworks.

The course includes a series of in-class exercises and lessons with homework. By the end of the course you will be able to build cutting edge web content, support multiple viewers and browsers, and determine what the best applications are for your web and mobile projects.

Topics include:

History of HTML

What is HTML5?

New structure and syntax

Managing browser history

Web forms revisited

The new canvas - graphics and animation

Drag & drop

Audio and video

Local storage & offline applications

Multiple screen support

Geolocation

Mobile application fundamentals

Skills Needed: "HTML5 Fundamentals" and "Designing with Cascading Style Sheets: Fundamentals" are required. "Introduction to Web Programming: JavaScript and PHP" and "Designing with Cascading Style Sheets: Advanced" or equivalent experience is recommended.

HTML5 Fundamentals

2.0 Units

In this hands-on course, students learn to create Web pages using HTML (HyperText Markup Language), the foundation for all Web sites. The course covers the fundamental concepts of hand-coding a Web page using HTML. It discusses all the major topics of coding and validating HTML, including techniques for meeting current standards and practices set aside by the World Wide Web Consortium (W3C). The course also addresses basic coding practices to meet accessibility mandates as set by the American Disability Act (ADA) Section 508 and the Web Content Accessibility Guidelines (WCAG 2.2 AA). In addition, this course covers techniques for coding to improve search engine optimization (SEO). Students will learn how to correctly format text, insert optimized images, link to other Web pages and sites, and create forms and data tables that all meet accessibility guidelines. The instructor will address the latest version of HTML, how it builds upon HTML 4.01 and XHTML, including new elements that have been introduced and are supported by current browsers. Throughout the course, the code will be taught and written to reflect today's standards.

The course is for students who have not previously coded Web pages, or those who would like to review and update their HTML coding skills to meet current practices and standards.

Topics include:

What is HTML? A brief history

Tools and techniques to write and validate HTML

Optimizing your pages for search engines (SEO)

Best coding practices for accessibility

Importance of good title and meta tags

Block level and inline level elements

Phrase elements and character entities

Ordered, unordered, definition and nested lists.

Incorporating optimized, accessible images into your web page

Creating links including: Absolute, relative, e-mail and anchor hyperlinks

Image mapping

Data tables

Creating functional iframes

Coding a form for surveys including radio buttons, checkboxes and comment fields

Validate HTML to meet current standards

New elements of HTML

Skills Needed: Ability to use Web browsers, navigate Web pages, download files, create folders, and save files (file management/organization) either on Mac or Windows environment. The course recommends using Notepad++ on Windows or BBEdit on the Mac, which are free.

Human Factors and Usability in Medical Device Development

2.0 Units

Understanding and applying human factors is essential to ensuring product usability and user satisfaction. More importantly, consideration of human factors during the design and development of medical devices helps to ensure patient safety by minimizing the risks introduced by user error. This course begins with the fundamental principles of human factors and builds on that foundation each week to cover core concepts and demonstrate how human factors fit into the larger context of medical device software and hardware development. Lessons address the integration of human factors and usability into the product development lifecycle, regulatory considerations, including applicable FDA guidance and standards (ANSI/IEC), and human factors methods. The course is beneficial for professionals who already have a basic understanding of risk management and quality systems, as well as a broad range of technical professionals, including those with no prior medical device experience.

Human Factors for Technical Communicators

2.0 Units

Human factors, the art and science of designing for people, is a fundamental building block for anyone developing content and products---especially interactive, online content. Through lecture, individual and collaborative exercises, discussion, and demonstrations, this course provides a basic grounding in the psychology of users and how they access, learn, and remember information, including: How people sense and perceive the world around them

The capabilities and limitations of human memory

The impact of colors, shapes, and patterns

Various learning styles

Approaches and obstacles to solving problems and making decisions

The course also describes how these factors impact the information-architecture and design tasks of technical communicators.

The course is designed so you will learn to think critically about your audience of users and how design should reflect key cognitive processes, including:

Understand the importance of human factors to information and product design

List the primary human factors that affect information and product design

Describe how each factor might suggest or constrain a design

Evaluate interactive products and describe defects in terms of human-factors violations

The course project provides an opportunity for you to learn key stakeholder communication skills critical to building credibility, content leadership skills; and defending design decisions or presenting a business case for funding.

Human Physiology in Health and Disease

3.0 Units

This course introduces the fundamental principles of human physiology in health and disease, and provides insight into emerging and established therapies used to treat a range of disease processes. Designed for individuals who lack formal medical training, the course introduces the hierarchical organization of the body, from cells to coordinated organ systems, and continues with a discussion of the key integrative/homeostatic control mechanisms. With these topics as a foundation, the instructor progresses through the functions of major systems, including renal, cardiovascular, respiratory, neuromuscular, digestive, endocrine and reproductive. This course benefits clinical research, biopharmaceutical, and engineering professionals who need a basic understanding of the physiological processes and therapeutic approaches that underlie the biomedical projects or clinical trials on which they work.

Human Resource Management

1.5 Units

Human resource management is a rapidly evolving profession. This seminar provides an exploration of modern HR and the role it plays in an organization. Designed for those who are new to the field, the course covers HR basics through lectures, class discussions and a team exercise. You will learn the fundamentals of HR functions and specialties, including workforce planning, compensation and benefits, training, talent acquisition, employee relations, and the latest theories in human resources.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Identify the key concepts, theories and processes of HR within a business environment

Describe the basic components of HR fundamentals

Identify the forces that contribute to the successful management of each area of HR covered in the course

Distinguish between advantages and disadvantages of various approaches to HRM in a business environment

Understand the value and importance of aligning HR strategies to business outcomes

Topics include:

Organizational development

Staffing

Company culture

Recruitment

Reductions in force

Conflict resolution

Laws and regulations

Professional Credit:

HRCI®---PHR®, SPHR® and GPHR® general recertification credit: 16.5 hours.

Effective February 22, 2020, this course is valid for 16.5 PDCs for the SHRM-CP® or SHRM-SCP®.

Human Resource Management Certificate Completion Fee

Once all of the certificate requirements have been met and your final grades are posted, please access your Student Portal to enroll in the "Certificate Completion Fee" to begin the review process. Please allow 4-6 weeks to receive your certificate.

Human Resources Business Partner (HRBP) Excellence

1.0 Units

The 3-session Human Resources Business Partner (HRBP) Excellence course provides a comprehensive personal and professional development experience for the student who is either currently an HR Business Partner or aspiring to develop the skill set to grow into this role. Course participants will have the opportunity to take a "deep dive" into the craft of HR business partnering, explore the competencies required to become effective, and plan to reach heights of excellence in their current or future HRBP role. The HRBP Circle of Excellence Framework combined with the HR Functional Competency Dimensions will provide stimulating and robust content and insights for the student; all of which can be practically utilized on the job. As part of the program, every participant will have the opportunity to construct their individualized "action-oriented" development plan with respect to the knowledge, skills and abilities as detailed in the HRBP Excellence Framework.

The course will begin with a self-assessment based on the HRBP Excellence framework. Following this, targeted personal goals for development will be identified. An authentic HRBP case study will be analyzed by teams of students; including an interactive discussion and culminating in a presentation of their findings and recommendations out to the whole class. In addition, students will work in these same teams (using a study group approach) on a final project to be presented out to the whole group in Session 3. The final project will entail identifying real-life HRBP issues and challenges, selecting the most compelling scenario and then conducting a comprehensive analysis, applying the HRBP Circle of Excellence framework and functional competencies to the selected scenario (s). This project will be graded.

Learning Outcomes

At the conclusion of the course, you should be able to:

Assess participant's current operating HRBP skillset, including both their individual strengths and areas for improvement/development.

Discuss and gain an understanding of the skills and abilities required for demonstrating excellence in three core areas of focus: Develops Ideas, Advises/Influences and Promotes.

Explain what it means to have an "action-oriented approach" to develop the three core areas on a "deeper" more sophisticated level.

Identify the challenges and issues faced by the HRBP and be able to make solid and sound recommendations for action utilizing the HRBP Circle of Excellence framework.

Assess levels of functional competencies required to be effective in the HRBP role.

Apply a critical analysis approach towards the HRBP Circle of Excellence framework.

Professional Credit:

HRCI®---PHR®, SPHR® and GPHR® general recertification credit: 9.5 hours.

Effective February 22, 2020, this course is valid for 9.5 PDCs for the SHRM-CP® or SHRM-SCP®.

Immunology, Principles

3.0 Units

Immunology involves a complex network of interacting molecules and cells that function to recognize and respond to foreign agents. It also has wide-ranging implications for the pharmaceutical, healthcare and biotechnology industries. This course provides the fundamental principles of immunology, along with recent developments and their implications for drug discovery and development, as well as disease treatment. Topics include:

Innate, humoral and cell-mediated immunity

The clonal selection of lymphocytes

Antigens, antibodies and their interactions

Antibody gene rearrangement

Lymphocyte development

Aspects of clinical immunology such as inflammation

The immune response to bacterial, viral, fungal and parasitic diseases

Vaccines

AIDS and other immunodeficiencies

Autoimmune diseases

Allergies

Transplantation immunology

Cancer

The course highlights immunological techniques important in research and clinical laboratories. This course is intended for researchers in biotechnology or pharmaceutical companies, nurses, and others interested in gaining a background in the fundamentals of immunology. It has been specifically designed both for those who are new to immunology and for those who already have some understanding but wish to update their knowledge.

Professional Credit: CA BRN/LVN Credit--Provider #CEP13114.

Implementing Marketing and Sales Strategies

2.0 Units

In this introductory course students gain an integrated view of marketing and sales strategies by studying the concepts, framework, and techniques behind great strategic decisions. Learn how firms establish sustainable competitive advantages and develop customer strategies amid risk and uncertainty. You will see how to develop cohesive marketing and sales strategies to support revenue generation. Investigate key steps of the sale process, how buyers react at each stage, and

the marketing tools that have increased the sophistication, productivity, and pace of selling.

Learning Outcomes

At the conclusion of the course, you should be able to:

Describe corporate and business strategies

Develop sustained competitive advantages

Apply selling strategies to systematically convert prospects into customers

Maintain customer relationships to maximize long-term profitability

Income Taxation in Personal Financial Planning

3.5 Units

Designed for students intending to become financial planning professionals, this course focuses on the interrelationship between common income tax rules and planning techniques that are applicable to individuals.

Learning Outcomes

At the conclusion of the course, you should be able to:

Understand and explain fundamental tax law.

Complete a Form 1040.

Differentiate among sole proprietorships, partnerships, LLPs, LLCs, S-Corps and C-Corps.

Outline compliance rules for trusts and estates.

Explain Alternative Minimum Tax (AMT).

Identify tax reduction and management strategies.

Understand the tax consequences of property transactions.

Identify passive and at-risk activities and explain how taxation of these differs.

Provide recommendations to special circumstances such as supporting an adult parent or child, special needs, and divorce.

Advise about types of charitable gifts and charitable entities and calculate the maximum deduction allowed in a tax year.

Topics include:

Income

Deductions

Credits

Sales and exchanges

Real estate transactions

Compensation planning and stock options

Retirement plans

Business entities

Overall coordination with the individual's financial plan.

Information Architecture and Design Basics

1.5 Units

An introduction to the architecture and design of online information, this course focuses on information used in information-rich user interfaces (including multimedia, software products, and software interfaces within hardware products), product help, and websites. The course covers the process and techniques of information architecture (structure, organization, and navigation) and design (information typing and how those types are best presented). It also covers the technologies used to create the underlying infrastructure for presenting online information and the tools used for developing information using those technologies. In keeping with the theme of the course, all homework must be created using Web-based technologies and delivered electronically. Lectures, computer demonstrations, group discussion and exercises cover the past, present, and future of online information development; the process of developing online information; basic information architecture and design concepts; basic user interface and interaction design concepts; an introduction to Web-based technologies with an emphasis on HTML, and the benefits and constraints of those technologies related to online information development; and a demonstration of the tools most often mentioned in Bay Area job postings.

Prerequisite(s): "Developing Technical Information from Plan to Completion" or instructor's approval with equivalent course work or experience.

Instructional Design and Delivery, Introduction

1.0 Units

Careful planning is the first step in designing a strong instructional program, but a syllabus alone is not instruction until it's "delivered" to the students. The designer's first step consists of integrating expected outcomes with knowledge of adult learning theories, learning styles, and student needs. What should the students be able to do, say or think after instruction, at what level of proficiency, and under what conditions? How will the designer create opportunities for students to experience the content, practice the skills, and achieve competence? Most importantly, what will the students actually do as they engage in instructor-led sessions, self-paced sessions, or combinations of the two? Participants in this course will practice face-to-face delivery, focusing on effective

presentations and group facilitation skills (i.e., getting students engaged in active discussions). Participants will also practice delivery through remote channels, such as voice and video conferencing and Web-based meetings. Finally, participants will strive to find the most effective balance between instructor activity and student activity, matching these activities to the expected outcomes.

Instructional Design and Delivery, Practicum

2.0 Units

In this capstone course, participants synthesize and field-test the elements of solid instructional design and delivery. With the instructor as coach, participants field-test segments of at least one course or training program designed in the certificate core courses. Most participants will present before authentic audiences (e.g., a corporate or government group or a university or college class). The focus remains on learning objectives, student outcomes, instructor self-reflection, feedback loops, and principles of continuous improvement. Participants enrich their courses and programs while practicing professional habits. Course activities include a review of participant portfolios that demonstrate professional competencies to design and deliver instruction and/or training.

Instructional Design Certificate Completion Fee

Once all of the certificate requirements have been met and your final grades are posted, please access your Student Portal to enroll in the "Certificate Completion Fee" to begin the review process. Please allow 4-6 weeks to receive your certificate.

Instructional Needs Assessment and Evaluation

1.5 Units

Designed for an in-depth, systemic examination of instructional needs, this course builds the skills needed to plan and implement assessment and evaluation as they play out in corporate training and college and university settings. Best practices at the organization and program levels--although different in scope--share key characteristics: They promote high expectations; address problem-solving; align with objectives; determine methods and tools; respect diverse talents and learning styles; and improve the knowledge, skills, and performance of individuals, groups, and organizations. Other topics in the course include methods (e.g., performance-based, self-assessment, portfolios, teamwork, field work) and ways instructors can conduct self-assessments (e.g., teaching or training portfolios). Participants apply assessment and evaluation principles to their work or teaching setting and share results with the class.

Professional Credit:

HRCI®---PHR®, SPHR® and GPHR® general recertification credit: 13.75 hours.

Integrated Marketing Communication

3.0 Units

A proper integrated marketing communication plan is the best way to reach your appropriate target market with consistent, meaningful and credible messaging in a cost-effective and measurable way.

This course shows you how to develop an effective blend of public relations, advertising, internet marketing, direct marketing, personal selling, incentives and other marketing tools, so that they all convey a consistent message. Geared for students both on the client and agency side of marketing communications, you will learn from practical in-class team exercises, discussions, case studies and project presentations how to develop a plan and budget with a good return on investment.

Learning Outcomes

At the conclusion of the course, you should be able to:

Explain the manager's role in the marketing communication process

Determine marketing communication objectives versus general marketing objectives

Properly identify the key messages for your target markets

Know and use the criteria for developing creative materials

Evaluate and integrate all the various marketing communication tools available

Select the appropriate traditional and modern digital media channels

Develop integrated budgets using the "Task Method"

Develop and implement measurement and feedback processes.

Properly identify Target Markets using PSYCHOGRAPHICS.

Prerequisite Skills

It is generally expected that you have had some marketing experience or have taken the Principles of Marketing course.

Intellectual Property Law for Engineers

4.5 CEU's

All engineers should be particularly concerned with patent law. This constitutionally-based discipline has to do with the process by which an invention, and its creator, are protected by the law from infringement and unfair competition. The class will deal with patent applications, research and prosecution; the law of infringement, and computer applications of software (protected by copyright) and hardware (by patents). We will also state what other concepts are patented, as well as machines, processes, mixtures, manufacturing, compositions of materials and methods of doing business and research. Not only do we deal with utility patents, but with design and plant patents as well. Although we are mostly concerned with patent law, we also deal with copyright, trademark, trade dress, trade secrets and business methods. The engineer must be at least conversant with the other forms of intellectual property. In a relatively short time, we will give you a survey of the rights of creative and ingenious people and provide you with the information to protect yourself and your ideas in Intellectual Property matters. Coursework in Intellectual Property is equivalent to 45 clock hours of study.

Enrollment and Course Materials

Students are required to enroll directly through The Center for Legal Studies. You can learn more about curriculum details and enroll at Intellectual Property Law for Engineers , or by contacting CLS at (800) 522-7737 or info@legalstudies.com .

Refund Policy Students enrolling in the Center for Legal Studies programs and courses are accountable to the Center for Legal Studies refund policy and the associated fees. Learn more by visiting the Center for Legal Studies Course Policies.

Intermediate Accounting I

4.0 Units

This intermediate-level course is designed for participants specializing in accounting. Through lecture and exercises, it covers the theory and application of financial accounting and reporting. The course emphasizes financial statements, revenue recognition, current and long term assets on the balance sheet. There will be In-class discussions, assignments, and exams designed to reinforce these concepts.

Learning Outcomes

At the conclusion of the course, you should be able to:

Apply basic knowledge in the preparation and analysis of financial statements, balance sheet, income statement, statement of cash flow, etc.

Explain Financial Accounting Standards Board's (FASB) guidelines on revenue recognition, matching principles, time-value-of-money, etc.

Discuss each major asset categories, including Cash/Receivables, Inventories, Property, Plant & Equipment (PP&E;), and Investments.

Intermediate Accounting II

4.0 Units

This intermediate-level course covers the theory and application of accounting. Through lectures, readings and course exercises, this course covers investment accounting, bonds, pensions, leases and earnings per share.

Learning Outcomes

At the conclusion of the course, you should be able to:

Understand U.S. GAAP as it applies to Liabilities, Equity, EPS and the Cash Flow Statement

Further your ability to identify economic transactions and reporting alternatives

Have sufficient accounting theory and practice to self-study for the CPA or CMA examinations

International Business and the Global Economy

3.0 Units

This course will introduce students to international business environment within the global economy. The course will leverage the lessons learned from business economics and will introduce students to non-economic factors influencing an international business in the global economy. The

course will provide different international business scenarios through small case analysis. The course will draw business insights from various background such as ethics, culture, and political economy.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Describe the basis of the international economy..

Discuss topics such as political economy, international business and international monetary system.

Explain the benefits of open economy trade and finance.

Identify possible opportunities and threat to international trade and finance.

Interviewing for Success: Using Structured Interviewing Techniques

0.5 Units

Students in this course will improve their interviewing skills and evaluation techniques through discussion, lecture, role-playing and videotaping so they can make more effective candidate selection and hiring decisions.

While this course is focused on the needs of staffing professionals, managers, and supervisors, other employees and even students who are active in the job market will gain distinctive interviewing skills.

Discussion topics include how to prepare job descriptions; review resumés quickly and accurately; plan, control, evaluate, and document the interview; and use effective questioning techniques in the interview process. You will study specific skills for behavioral, technical, and executive interviews, conducted by telephone, in person, or via videoconference.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Conduct an effective, legally compliant, initial phone/video screen of selected candidates;

Apply a structured, flexible interviewing process, using four-phase, nine-step model presented in class;

Prepare and execute a resumé-based interviewing agenda to elicit decision-making information;

Use effective, job related behavioral, situational, self-assessment and open-ended interview questions;

Evaluate a candidate's behavioral evidence from interview against the job requirements; and

Identify non-compliance risks related to federal and California law and legal guidelines for interviewing

Professional Credit:

HRCI®---PHR®, SPHR® and GPHR® general recertification credit: 6.5 hours.

Effective February 22, 2020, this course is valid for 6.5 PDCs for the SHRM-CP® or SHRM-SCP®.

Introduction to Accounting I: Financial Accounting

4.0 Units

This course covers the fundamentals of financial accounting as well as the identification, measurement and reporting of the financial impacts of economic events on enterprises. Through lectures, readings and class exercises, the following topics are addressed: accrual account concepts; transaction analysis, recording and processing (journals and ledgers); preparation, understanding and analysis of financial statements (income statement, balance sheet and cash-flow statement); accounting for sales and cost of sales; inventory valuation; valuation and depreciation of operational assets; analyzing liabilities and stockholders equity transactions; and financial statement analysis. Learning Outcomes

At the conclusion of the course, you should be able to:

Discuss the importance of financial statements for a company

Discuss the accounting theories and processes behind business transactions

Prepare financial statements

Determine the overall strength of a company using various financial tools.

Introduction to Accounting II: Managerial Accounting

4.0 Units

This course covers managerial accounting and how to evaluate cost-accounting data in order to help management do its job effectively in the areas of planning, control, motivation, communication, evaluation of performance and decision making. Accordingly, topics include traditional and activity-based costing, standard costing, relevant costing, variable costing, cost-volume-profit analysis, short- and long-term budgeting, alternative decisions, performance measurement, responsibility accounting and transfer-pricing.

Learning Outcomes

At the conclusion of the course, you should be able to:

Speak accounteese

Understand the differences between managerial and financial accounting

Utilize the concepts learned in job related context.

Introduction to Machine Learning

3.0 Units

Machine learning (ML) is the foundation for many artificial intelligence (AI), and ML algorithms that underlie online shopping recommendations, credit card fraud detection, relevant social media content delivery, rideshare trip pricing, and traffic navigation. In this course you'll explore essential ML concepts, tools, and methodology, such as classical and modern algorithms that drive real-world applications such as search engines, image analysis, biometrics, industrial automation, and market segmentation. You'll work with practical data-driven applications and gain a practical background for creating new products and improving existing ones.

Starting with an introduction to the mathematics underlying ML, we'll leverage open source Python-based libraries, including Pandas, NumPy, and Sklearn. You'll improve your intuitive understanding of the underlying algorithms, such as regression, classification, and clustering, as well as related Python-based code samples. You'll work in a small team or by yourself on a project to present during the final week of class.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Identify and formulate ML problems

Understand and implement algorithms to solve ML problems

Explain the implementation, working, and practical benefit of many ML topics

Analyze the performance of given or implemented ML solutions on practical datasets

Topics include:

Defining ML using simple problems and intuitive solutions for supervised learning and Bayesian classifiers

Probability density

Linear classifiers—common straightforward classifiers with practical applications

Cross-validation in data-poor situations

Principal component analysis—correlation matrices, eigenvalues, and eigenvectors

Unsupervised Learning: Using accumulated buying histories from a customer database to evaluate the quality of clustering results

Neural networks and deep learning: Without using complex mathematics, learn how neural networks are trained (Tensorflow and Keras)

Natural language processing: How computer algorithms glean meaning and sentiment from written text and respond intelligently

Skills Needed

For best results in this class, the following topics are highly recommended, some of which are covered in the suggested prerequisite course (listed below):

Familiarity with Google Colaboratory and Jupyter Notebooks

Reasonably good programming/debugging skills beyond the basic or beginner level

Familiarity with Python programming, Numpy, and Pandas

Comfortable with basic knowledge of algebra, calculus, probability and statistics

Introduction to Online Teaching

2.0 Units

Technology has dramatically affected many aspects of our lives, including the areas of teaching and learning. Some teachers can be overwhelmed, while some students seem to take it in stride, and vice versa. In this survey course, you'll explore how online technologies have changed the way instructors and students interact and how that interplay may change in the future.

Introduction to Web Programming

2.0 CEU's

This course introduces the basic concepts and programming skills you need to create dynamic web pages, taking you beyond HTML and CSS into the world of JavaScript and PHP. Primarily used on the client side through the browser, JavaScript allows you to alter displayed document content with user interactions. PHP, a widely used open-source scripting language installed on web servers, is the language of WordPress, Drupal, and Joomla. The combination of JavaScript and PHP enables user friendly, secure form processing.

The instructor will provide examples of code and discuss basic programming syntaxes such as variables, data types, strings, expressions, and operators. We will analyze dynamic web pages that use JavaScript and PHP, discuss functions, events, decision-making and repetition for both languages. You'll learn to build forms and objects, take inputs, and reset forms. Using PHP for server-side scripting, you'll practice handling user input and processing form data creating an all-in-one form.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Describe appropriate uses for JavaScript and PHP

Identify elements of each language and their implementations on any website

Discuss, create, and debug semantically correct basic examples of dynamic web pages

Explain where and why to use each of these languages and how it fits in with other languages

Topics include:

Elements of dynamic websites

JavaScript basics

Variables, data types, expressions, operators, and strings

Working with functions, events, decision-making, and repetition

Form elements and objects, input fields, selection lists, submitting and resetting forms

Creating basic PHP scripts and building expressions

Handling user input, processing form data, creating an all-in-one form

Note: As an introductory course, we will not explore all features of JavaScript or PHP nor cover cookies or databases.

Skills Needed:

HTML and CSS coding experience are required.

If you have experience with object-oriented languages such as Java or C++, the pace of the course may be slow. You may consider "JavaScript and AJAX, Comprehensive" instead.

Introduction to Web Programming: JavaScript and Python Django

2.0 Units

A dynamic website goes beyond HTML and CSS; it typically involves JavaScript and Python Django. JavaScript is primarily used on the client-side through the browser to alter displayed document content with user interactions. Python Django (Hypertext Preprocessor) is an open-source scripting language installed on Web servers and is the language that Wordpress, Drupal and Joomla are written in. It is integrated with HTML, interfaces with databases and processes data based on user input. This course introduces the basic concepts and programming skills that you need to know to program dynamic Web pages. It does not cover all features of JavaScript or Python Django. The course showcases and analyzes demos of dynamic Web pages that use JavaScript and Python Django. It covers basic programming syntaxes such as variables, data types, strings, expressions and operators. You'll discuss functions, events, decision-making and repetition for both languages, and you'll learn to build forms and objects, take inputs and reset forms. When using Python Django for server-side scripting, you'll learn to handle user input and process form data, creating an all-in-one form.

The instructor will provide examples of code to facilitate learning. At the end of the course, you'll have a deeper understanding of the dynamic Web and be able to analyze and handle basic coding. You'll notice the difference between a static webpage and a more interactive and dynamic page that uses Python Django and JavaScript.

This is an introductory course. It does not cover cookies or databases.

Topics include:

Elements of dynamic websites

Introduction to JavaScript

Variables, data types, expressions, operators, and strings

Working with functions, events, decision-making, and repetition

Form elements and objects, input fields, selection lists, submitting and resetting forms

Creating basic Python Django scripts and building expressions

Handling user input, processing form data, creating an all-in-on form

Skills Needed: HTML and CSS coding experience are required. If you have experience with object-oriented languages such as Java or C++, the pace of the course may be slow. You may consider "JavaScript and AJAX, Comprehensive" (course IPDV.X405) instead.

Investments in Personal Financial Planning: Principles and Methods

4.0 Units

This course provides a comprehensive overview of investments through readings, case studies, problem-solving exercises and discussion. This balance of practical application and theory should be useful to both the practitioner and the investor. The course emphasizes the structure, regulation and operation of investment markets; understanding modern portfolio theory, asset allocation and risk control; detailed analysis of fixed income, equity and derivative investing; portfolio design and construction; fulfilling fiduciary responsibilities; and investment performance measurement and reporting.

Learning Outcomes

At the conclusion of the course, you should be able to:

Describe the types and functions of markets, investment strategies such as active and passive, mutual funds, ETFs, options, hedge funds, etc.

Discuss the advantages and disadvantages of mutual funds and ETFs, risk vs reward, various performance measuring techniques, various asset pricing models, and the general process of portfolio construction and how to analyze changes to a current portfolio. Participants will also learn the difference between suitability and best interest in recommendations and the difference between compliance and ethics.

Explain option pricing basics, the steps to creating a portfolio including risk assessment, optimum mix of risk and riskless assets, Technical vs. Fundamental analysis, the role of statistics in portfolio assessment, portfolio performance measuring techniques, taxation of various investment accounts, etc. Participants will also learn ways to explain investment concepts in ways that will make the concepts understandable to others.

Identify ways to reduce risk, enhance returns, or both. Participants will learn to identify ways to manage their own or client portfolios under differing market conditions.

IO Concepts and Protocols: PCI Express, Ethernet, and Fibre Channel

3.0 Units

Ever wondered what makes the IO system of a modern computer tick? Wanted to know more about PCI Express, Ethernet, and Fibre Channel, and how they all fit together? This course will help you understand the ins-and-outs of the IO technology. Traditional operating systems courses have treated IO superficially. This course focuses on IO technologies, and walks students through the

complexities of IO subsystems in modern computer and networking systems. After an introduction to the basic concepts of IO, we will look into deeper aspects regarding the most prevalent IO interconnect: PCI Express. We will study the need for PCI Express, its evolution from PCI/PCI-X, and the details of the protocol. We delve into address spaces and cover how devices are discovered and configured. We will then switch our attention to south side interconnects such as Ethernet and Fibre Channel. We will discuss their operation and, in the case of Fibre Channel, how targets are discovered and configured. Finally, we will tie everything together.

The course will comprise 10 lectures, homework assignments, and tests. By the end of the course, students would have a broad idea of how IO works in a modern computer system and be better prepared to learn about writing device drivers or troubleshooting IO problems. The course does not cover chip or board design aspect of the IO.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Describe how IO works in a modern computer system

Understand how a device driver communicates with the hardware it controls

Explain protocol specifics of PCI Express, Ethernet, and Fibre Channel

Topics Include:

Modern computer architecture in block diagram format

Flow of an IO request

IO concepts: MMIO, DMA, interrupts

Introduction to PCI Express, evolution from PCI, PCI-X

Address spaces: configuration, memory, IO

Device discovery

How MMIO, DMA, and interrupts work in PCI Express

Introduction to Ethernet: CSMA/CD, frame format, VLANs, aggregation

Introduction to Fibre Channel: topologies, N-port IDs/WWPNs, logical units, frame format, SCSI request mapping, target discovery and configuration, security, FCoE

Further topics to explore - lead in for future courses

Skills Needed: An introductory course or practical experience with operating systems internals, an introduction to computer architecture and organization, and systems programming experience.

IO Design Fundamentals

3.0 Units

This course is an introduction to IO interfacing from one platform to another at both chip and board levels. With today's chips running over 1GHz, inter-chip communicating is often a limiting factor of

the system. Examples of high-speed IO are HDMI, USB 3.0, and 100Base-T.There is no single solution and over the years numerous approaches have been taken, including lowering logic voltages, using differential signals and optical interfaces. The course reviews the various approaches that have been taken in the last two decades, and covers the advantages and disadvantages of TTL, CMOS, low-voltage CMOS, LVDS and optical, from the perspective of speed, power, cost, and complexity.

The course emphasizes fundamental concepts such as transmission line analysis, slew rate, termination, etc. It introduces the basic IO logic, timing analysis and package model, and covers bit error rate, bi-directional IO and decision feedback filters. It does not cover complete circuit designs of the latest IO schemes or board design. Because most solutions are silicon-based, ESD (electro static discharge) concepts and techniques will also be discussed. A circuit simulation tool will be offered to students for exercises but its instruction is not part of the course.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Describe the techniques used in high speed data communications interfacing at the chip and system board level

Utilize IO Design techniques and tools to analyze and approach various interface problems

Demonstrate impedance matching, termination techniques as well optical interfacing circuits and techniques

Discuss suitable approaches for 3GHz and beyond

Skills Needed: A basic course in circuit design and understanding of basic electromagnetic physics.

IoT Creator

1.6 CEU's

IoT Creator is a visual flow-based IoT system builder that eliminates the complexities of creating functional cloud-connected projects. IoT Creator combines the graphic development environment, drag and drop IoT function blocks, connectivity to cloud databases, APIs, and many other IoT resources with integrated data illustration and Graphical User Interface (GUI) to access and control systems from anywhere in the world.

In this course, students will gain an understanding of cloud-connected systems by focusing on the implementation of an Intelligent Lawn Sprinkler system. This system is a real life conduit and transposes to many other cloud connected IoT projects. The primary objective is to gain confidence in the fundamentals of cloud connected data acquisition, data transport and manipulation using the cloud connected sprinkler system as an example. This includes the hardware, software, programming process, wireless communications protocols, and actuation, as well as learning how to interface with cloud services such as weather forecasts and creating web-based graphical user interfaces. The students will gain hands-on experience with a real sense of accomplishment.

Throughout the project, the students will be introduced to IoT system concept planning, creation, and implementation of data flows. This course emphasizes the realization of the learned material in the creation of a usable cloud connected project. The course is self-paced with weekly debug sessions to overcome barriers of understanding and project implementation.

Students will be working with the same technology that's being installed in cutting-edge cloud connected systems around the globe right now. They will take away highly relevant job and entrepreneurial skills upon completion of this course.

Learning Objectives

Understand how an IoT system works from data acquisition to data processing and transportation to actuation

Learn the basics of APIs, JSON, SQLite, MQTT, and IoT Creator

Understand cloud connected components and actuators

Hands-on practical building of functioning and scale-able system

Exercise cloud-connected intelligent systems

Create a webpage to control your system through the cloud

Learn the basics of communications networks and how they work

Gain hands-on experience implementing an IoT system through a real life project

Format

This course is being offered in a hybrid format. Some content within the course is asynchronous, and can be taken at the students own pace. A student will also be expected to meet weekly deadlines and attend class (online) once per week.

Synchronous online meeting days/time: Thursdays 5:30-7:00 pm

IoT for Work, Life and Play

3.0 CEU's

Smart cities, buildings, living spaces, and the environment of our future will depend on advances in the way we light our world. In this course, you will gain an understanding of IoT devices by focusing on cloud connected intelligent lighting devices and systems. You will learn to imagine, create, and operate them through a hands-on project that lets you see your ILS designs in action.

The course includes an introduction to lighting physics and human optics, lighting devices including LEDs, and building LED-based circuits, as well as wireless communication. You will then learn the fundamentals of cloud-connected data acquisition, data transport and manipulation using intelligent lighting as an example. A study of hardware, software, programming process, wireless communications protocols, and lighting itself follows before you learn to interface with cloud services such as Amazon Web Services. The final project is to implement IoT system concept planning, creation, and implementation of data flows into a sensor-connected intelligent lighting system.

By working with the technology currently installed in cutting-edge intelligent lighting and smart city programs around the globe, students gain highly relevant job and entrepreneurial skills upon completion of this course.

Topics

Understand how an IoT system works from data acquisition to data processing and transportation to actuation

Learn the basics of light and color

Understand LED components and luminaires

Hands-on practical building of an LED breadboard

Exercise cloud-connected intelligent lighting systems

Create a web page to control your light through the cloud

Learn the basics of wireless networks and how they work

Study radio options for IoT systems

Hands-on experience implementing an IoT system through a Capstone project

How to work as a team on a large project

Format

This course is offered in a hybrid format. You are encouraged to attend live-online meetings twice weekly with the instructors, view short, video-based lessons, and complete weekly case-based homework assignments. Online class participation is part of your final grade.

Synchronous online meeting days/time: Tuesdays & Thursdays 7-8:00 pm

Prerequisites

While there will be some high-level programming, instructors will guide beginners through new technology and no experience is necessary.

Java Programming, Comprehensive

3.0 Units

Java is the premier development language for web servers, enterprise servers, network applications, embedded devices, appliances and wireless applications. This course, which covers Java 15, teaches students to apply object-oriented concepts, design and develop Java applications, and use Java libraries. You'll learn to write, maintain and debug applications, and make effective use of standard packages. You'll also learn key design concepts and implementation skills needed for professional Java programming.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Describe the core features and syntax of Java language

Develop Java applications that correctly apply the principles of object oriented design

Use Java class libraries

Apply generic, multi-threaded, network, database and GUI programming techniques using java

Understand functional programming using lambda expressions

Topics Include:

Object-Oriented concepts

* Defining classes and methods, constructors, access modifiers, inheritance, overriding, overloading, polymorphism, constructor chaining, super keyword, abstract classes, static fields and methods, final keyword, MVC design pattern Arrays and Strings

* Creating arrays, multidimensional arrays, strings, StringBuilder class, primitive wrapper classes Interfaces, Nested classes

* Creating interfaces, difference between interfaces and nested classes, predefined interfaces, nested interfaces, static nested classes, inner classes, anonymous classes, records, sealed classes and interfaces, pattern matching for instanceof Input/output programming

* Reading and writing text and binary files, random file access, serializations Exception handling

* Try and catch blocks, exception class, creating custom exception classes, multiple catch blocks, run-time exceptions, the finally block Multithreaded programming

* The Thread class, interface runnable, creating threads, interrupting threads, thread synchronization, problems with threads Collections framework

* Generics, interfaces set, map and list and their implementations, iterators, set operations, wildcards, comparable and comparator interfaces JDBC

* JDBC API with driver managers, result sets, cached row sets, prepared statements Functional programming

* Functional interfaces, lambda expressions, streams

Skills Needed: "Java Programming for Beginners" is recommended for those new to Java. Experience in a programming language such as C or C++ may also help with learning Java.

Java Programming for Beginners

2.0 Units

This course is an introduction to Java programming for those who are new to the field or need a refresher. The course covers how to apply key programming concepts and use Java programming environment for real world applications. This introductory foundation in Java programming will prepare students to start simpler programming projects for applications. The course begins with programming concepts and Eclipse IDE. The instructor introduces basic and intermediate Java syntax, and then methodically addresses abstraction, object-oriented paradigm, procedural programming, elementary data structures, and more. Other useful topics include graphics user interface, collections and generics. Students will gain a strong conceptual foundation in these areas while starting to write programs for real applications.

The course consists of lectures and discussion, with some lab work. Students are expected to complete assignments on their own computers. By the end of the course, students should be able to program in the Java language and will be exposed to many useful programming concepts.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Understand concepts of programming languages and their usage

Use intermediate Java syntax

Use variety of data types suitable to specific programming needs and data abstraction

Differentiate procedural programming from object oriented programming

Demonstrate the use of the various control flow features

Develop programming concepts to write non-trivial Java programs

Build solid foundation of Java programming and be ready to take up advanced courses

Topics include:

Introduction to programming, JDK and IDE

Data types, inputs/outputs

Strings, arrays, collection and generics

Java programming logic

Object-oriented programming

Graphic programming

Exception and file handling, debugging

Skills Needed: Students should have experience using logic. Some programming experience will be helpful. Ability to install and configure open-source software on own computers.

JavaScript and AJAX, Comprehensive

3.0 CEU's

JavaScript is primarily used on the client-side through the browser to alter displayed document content or create dynamic Web pages. Together with HTML5, it is becoming a "First Class Language" for cross-platform development, especially for mobile applications. This comprehensive course covers JavaScript as a programming language and includes introductions to open source frameworks and AJAX (Asynchronous JavaScript and XML). You will gain insight on useful Web architectures and build the foundation needed to harness this popular technology for the Web. The first few weeks of the course are devoted to getting up to speed with language syntax, data types, operators, and programming constructs such as if/else, switch statements and loops. You will learn

how to integrate JavaScript with HTML/CSS and write functions to handle user-initiated events such as mouse rollovers, clicking on a link, or submitting a form. The course emphasizes JavaScript's object-oriented capability.

Since every HTML element can be referenced as a JavaScript object, the second half of the course is devoted to creating and manipulating objects such as windows, forms, images, and links with an emphasis on the Document Object Model. You will learn how to walk the W3C DOM tree, manage nodes and use event listeners. After learning the language, you will be introduced to Bootstrap, an open source framework to facilitate application development.

The course also covers how AJAX introduces asynchronous calls using the JavaScript XMLHttpRequest object to handle communication between the browser and the server, and when to use it to enhance user experience. Upon completion of the course, you will be able to write unobtrusive JavaScript programs and use AJAX to create a communication layer.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Write unobtrusive JavaScript programs

Use functions from a JavaScript library

Use AJAX to create a communication layer

Topics include:

History and interactions with three layers of a Web page

Operators, data types, functions and variables in JavaScript

Working with objects and arrays, inheritance

Browser and Document Object Model

Forms and programming input devices, validation

Event handling and validation using Regex

Form scripting, interaction with CSS

Introduction to Bootstrap

Working with AJAX

Skills Needed: Familiarity with basic programming constructs (of a language such as C or Perl) and a working knowledge of HTML are required.

Java Threads

3.0 Units

In this internet-of-things era, where big data is in such high demand, concurrent programming using Java threads has become increasingly integral. The use of Java has become ubiquitous and it's growing exponentially. In this class, we will explore both the breadth and depth of java threads and

methodically navigate the intricacies of using them. The first few lectures will provide the "what" and "how" of threads and threads programming. While initial discussion will include refreshers for those who know the basics, seasoned thread developers will find ample new material in these lectures; the concurrency model in the most recent Java Development Kit (JDK) has been enhanced significantly.

In the following few lectures, students will dive into the concurrency model. You will study synchronizer objects, thread management API classes, concurrent data structures and atomic variables. These lectures will lay out the application of the concurrency model and warn against pitfalls of incorrect uses of these objects.

Advanced topics such as applications of the concurrency model will be covered in later lectures. You will learn how to develop your own thread-safe data-structures and be able to apply the knowledge in a comprehensive application that integrates all the material covered in the class.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Apply threads to large scale, big data, and machine learning application

Create thread-safe design patterns

Write thread-safe custom data structures

Use threads in making their GUI application more responsive

Jitter Essentials

1.5 Units

As the data rate of parallel and serial transmission increases, analysis and characterization of timing jitter are becoming critical to determine the system performance. The unit timing interval of the current system is shrinking and consequently the timing jitter is now occupying a larger portion of a system's overall timing budget. The effects of jitter, which in the past may have been safely ignored, must be managed today to advance system performance. It is therefore necessary to directly relate the jitter performance to system performance in terms of Bit Error Rate (BER). This course is designed for anyone working with jitter who wants to develop a strong foundation and to clearly understand it. Students will learn the definitions of various types of jitter (including phase noise), understand which type of jitter is important to their application and why, learn how to propagate jitter through a system, create jitter budgets, understand the various equipment for measuring jitter, and learn how to minimize jitter. Emphasis will be placed on developing a working knowledge of jitter, such as establishing a common language, understanding jitter beyond the definitions, gaining insight by making simplifying assumptions, and visualizing relationships between different types of jitter. This course teaches the fundamentals of jitter applied to a wide range of products, and is intended for anyone who works with jitter on a regular basis.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Understand basic jitter terminology

Identify the type(s) of jitter important to various applications

Visualize jitter in several ways, to reveal underlying source(s) of jitter

Describe how jitter propagates through a high-speed serial link, and how standards specify jitter to limit it

Select the right test equipment to measure jitter across various applications

JUnit Test Framework

1.5 Units

JUnit is one of the most popular open source testing frameworks for all types of Java software applications at the unit, integration, functional, and acceptance testing stages of the software life cycle. This course begins with the fundamentals of JUnit, including installation, setup and integration with Eclipse and Apache Ant, two of the major Integrated Development Environments (IDE) that support JUnit. Then the features of JUnit are covered, along with how different versions compare to each other, and how to customize JUnit and create automated tests. Students will learn the real-world uses of JUnit, including test strategies and the concept of Test Driven Development (TDD) also known as "test first, code later." Other advanced topics include testing presentation layer, server side, JPA and database access. By the end of this course, students will have learned to use JUnit to test Java applications in all life cycle stages and will be able to apply this framework to build automation testing.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Use JUnit to test Java applications in all stages of software life cycle

Build automation testing, and Test-Driven methodology (tests first and code later)

Test database and application server using junit, stub, and mock technology

Topics include:

JUnit fundamentals & setup

JUnit comparison

JUnit customization

JUnit test automation & build process

Test Driven Development (TDD)

Test strategies

Real-world use of JUnit

Skills Needed: The assignment requires coding in Java. The course will not repeat Java

programming instructions.

Kubernetes Container Orchestration Fundamentals

3.0 CEU's

Kubernetes is the leading open-source container orchestration system for automating application deployment, scaling and management. It works with a range of OS-level virtualization packages called software application containers. It was originally designed by Google and provides a platform for automating deployment, scaling, and operations of containers across clusters of hosts. Many public cloud services offer a Kubernetes-based platform or infrastructure as a service. Many vendors also provide their own branded Kubernetes distributions. This course focuses on the concepts, operations and programming techniques used by both IT professionals and application developers to setup, configure, and deploy applications via Kubernetes. The course will start with a brief overview of containers and Kubernetes. Discussions will address the Kubernetes architecture, such as the master and worker nodes, and their components like the API server, the scheduler, the etcd database, kubelet, etc., and tools used to create and manage a cluster, like kubectl, kubeadmin, Kops and Eksctl. It will then move on to the aspects of creating and deploying a Kubernetes application and its components; containers, pods, volumes, secrets, networking, services, and replica sets. Creating and managing name spaces, quotas, labels and RBAC permissions will be covered and the underlying HTTP REST API schema will be explained and demonstrated. New features, like the Helm package manager, will be introduced and how to programmatically interact with Kubernetes via the Go and Python clients will be covered.

Learning Outcomes

At the conclusion of the course, you should be able to:

Explain what is a container and how Kubernetes is used to orchestrate them

Describe the overall architecture and components of Kubernetes clusters, including the difference between master and worker nodes

Describe the core services on a Kubernetes master node, including their functions

Describe the various Kubernetes components of a distributed application such pods, replica sets, networking with services, user and pod security controls, name spaces, quotas and labels

Demonstrate deploying and managing a Kubernetes cluster using computer servers or virtual machines, either local or cloud based

Demonstrate deploying and managing a Kubernetes distributed application using the Kubernetes REST API, either via a command line interface or a software programming interface

Analyze a Kubernetes manifest and understand how it will deploy a distributed application with its various Kubernetes components

Build a modestly complex Kubernetes application using pods, replica sets, network access, security controls, name spaces, quotas and labels

Language Structure

3.0 Units

Knowledge of language structure and use, with emphasis on language universals and varieties, is fundamental to developing teaching expertise in TESOL and bilingual education. In this seminar,

participants review theories and research in linguistics and sociolinguistics related to teaching. Readings, lectures and activities focus on sound systems (phonology), word formation (morphology), grammar (syntax), word meanings (semantics), language in context, written and oral discourse, and language variation. The structure of selected languages and transcription of sounds will also be discussed.

Learning Outcomes:

At the conclusion of the course, you should be able to

Distinguish between phonology, morphology, syntax, and semantics

Analyze spoken language, text and discourse

Develop lesson plans that help ESL students achieve communicative language competence

Discuss language change and variation

Law and Human Resource Management

2.0 Units

This course outlines the laws and agencies that regulate employment relationships in California and on a federal level. These fundamental labor laws must be understood to prevent or, if necessary, defend against employment litigation and government audits.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Describe legal issues and laws that impact human resources and Explain strategies to minimize legal

Identify legal risks and strategies for more effective HR administration

Topics Include:

Wrongful termination

Employment discrimination under state and federal law

Sexual (and other) harassment

Workplace privacy

Wage and hour regulations

Immigration

Labor unions

Collective bargaining

Strikes and picketing under the National Labor Relations Act

Leaves of absence

Noncompetition and trade secrets

Alternative dispute resolution

Substance use and abuse in the workplace

Affirmative action plans and requirements

COBRA

Independent contractor vs. employee

Workers' compensation and reductions in workforce

Professional Credit:

HRCI®---PHR®, SPHR® and GPHR® general recertification credit: 19.25 hours.

Effective February 22, 2020, this course is valid for 19.25 PDCs for the SHRM-CP® or SHRM-SCP®.

Leading People Through Change

1.0 Units

The increasing rate and scope of change is having a profound effect on the workplace. In this course, you will learn essential leadership skills, including how to inspire and motivate individuals, manage talent, influence without authority, and lead teams. Managers, supervisors and Human Resource professionals often bear the responsibility of maintaining morale and productivity during difficult change processes. Doing this effectively requires grasping the impact of change on people, understanding the change process, acquiring critical coping skills, optimizing the positive payoffs from change, and implementing action plans for leading people through change. You will obtain practical resources and develop a personal action plan for leading people through change.

Learning Outcomes:

At the conclusion of the course, students will be able to:

Identify and explain the pressures for change

Explain the causes, consequences, and costs of mismanaging change

Assess strategies used by businesses in planning for and dealing with change

Understand the process of change management

Describe the role of a change agent

Develop a change plan

Describe how organizations can identify and evaluate the impact of change on corporate culture, employees and performance

Create and communicate your vision as a leader

Explore specific roadmap for managing change

Identify and explain different change models

Professional Credit:

HRCI®---PHR®, SPHR® and GPHR® general recertification credit: 10 hours.

Effective June, 2021, this course is valid for 10 PDCs for the SHRM-CP® or SHRM-SCP®.

Effective the Summer 2021, this course will be offered for 1 credit unit.

Lean-Agile Project Management: Achieving Business Value

1.5 Units

This course introduces managing development projects and programs at both the team and enterprise levels using Agile methodologies and Lean principles. Students will study the implementation of Lean and Agile within the Scrum, Kanban and Scrumban project management frameworks. We will also address the business case for agility, lean projects, and becoming a Lean-Agile enterprise. Other topics include the role of management in Lean-Agile development, the kaizen culture, and mapping the value stream and the Kanban/Scrumban methods for accelerating the delivery of business value.

Learning Outcomes

At the conclusion of the course, you should be able to

Comprehend the business benefits of agile development and Lean principles

Perform value stream mapping to increase process flow and decrease cycle times

Understand and use the Scrum and Kanban development frameworks

Demonstrate your ability to develop a new product within a Scrum team

Construct information radiators such as Burn-Down Charts and Cumulative Flow Diagrams

Understand and apply Little's Law of process flow, cycle time and Work-in-Progress

Demonstrate improved process flow using the application of Agile and Lean principles

Understand the key strategies and hurdles for achieving enterprise-wide agility

Topics Include

Lean principles, the value of agility, minimizing process times, fast flexible flow, value stream mapping and defining value

Overview of lean-agile project management methodologies

The Scrum development methodology

Going beyond Scrum with Kanban and Scrumban methodologies

Lean-agile planning and estimating, visual controls, information radiators

Becoming an agile enterprise, including teams and management roles in lean-agile development

Professional Credit

The Project Management Institute (PMI)®--PMP® 15 Professional Development Units.

Learning Theories and Styles

1.0 Units

This course may be eligible for HRCI---PHR, SPHR and GPHR general recertification credit. This seminar for training and learning professionals covers adult learning theories and styles, and allows participants to explore their own learning style/preferences through instruments, discussion and experience, how to be flexible when relating to others' styles, identifying learning problems related to style issues, and resolving these issues are addressed.

Topics include how to incorporate a variety of learning experiences to accommodate different styles when instructing or designing training. Emphasis is placed on assisting participants in the use of creative and effective training methods to reach learning objectives. A learning assignment is completed in class. Discussions focus on application for self, work and the training environment.

Legal Nurse Consultant Training Course

4.2 CEU's

This exciting program prepares Registered Nurses and Physician's Assistants for a career in the legal field as legal nurse consultants. Building on the medical education and clinical experience of RNs and PAs, this course provides the RN and PA with fundamental skills necessary to advise law firms, health care providers, insurance companies, and governmental agencies regarding medically-related issues and to appear in court as expert witnesses. The curriculum of this course is designed to comply with the educational guidelines specified by the American Association of Legal Nurse Consultants. Successful graduates will be awarded a Certificate of Course Completion from the university through which they are registered.

This six week, 45 hour course will provide a comprehensive analysis of the principles and practices

of legal nurse consulting (LNC), with an emphasis on law and expert witness testimony. The course content will also provide a systematic review for those preparing to take the Legal Nurse Consultant Certified (LNCC) examination. While most of the main subject matter will pertain to legal nursing standards, professionals in other health care disciplines (pharmacy, physical therapy, physician assistants, etc.) may gain increased skills and knowledge of the medical legal system to enhance their roles as service providers and functions as expert witnesses, but participants without an RN background might not be able to take the LNCC exam after graduation. For more information about the LNCC exam, please contact the American Association of Legal Nurse Consultants at 877-402-2562.

Enrollment and Course Materials

Students are required to enroll directly through The Center for Legal Studies. You can learn more about curriculum details and enroll at Legal Nurse Consultant Training Course , or by contacting CLS at (800) 522-7737 or info@legalstudies.com .

Refund Policy Students enrolling in the Center for Legal Studies programs and courses are accountable to the Center for Legal Studies refund policy and the associated fees. Learn more by visiting the Center for Legal Studies Course Policies.

Leveraging Content and Social Analytics

2.0 Units

How do product managers, marketers, entrepreneurs and engineers quickly learn to use social data to be more persuasive, refine messaging and illustrate the value of social programs to stakeholders? They begin by building social relationships. They nurture conversations with customers, advocates and influencers who help them build a sustainable revenue stream.

In this course, students learn best practices to find customers and implement the three Ms of process improvement: manage, maximize, and measure. Learn to increase engagement and harvest customer leads on leading social media platforms. Practice successful social listening and use analytics to find, track, and measure campaigns. You'll use a listen-first approach, create a brand story, and develop social campaigns on different channels.

As a final team project, you will design a social media marketing plan and present it to an audience of industry experts. Some familiarity with social media skills and how to create a Facebook business page is recommended to take this course.

Learning Outcomes

At the conclusion of the course, you should be able to:

Conduct a brand analysis using Hootsuite. Surface values, differentiators, image, perceived quality, buying patterns, member characteristics. Describe how these KPIs influence market share, transactions and loyalty. Influence stakeholders and customers using the latest social media marketing and analytics tools. Make recommendations, demonstrate success and report on ROI. Present measured results using charts and visualizations

Position a brand across the social landscape to generate leads, locate your target audience and develop communication strategies. Meet different goals for each social channel

Compose blogs with WordPress and post articles and customize themes and features representing your personal or business brand. Add all written assignments to your creative portfolios

Use social media expertise to critique a successful or failed social campaign. Describe why, when,

where, how and what in a published case study

Team up to create a social media marketing plan for a fictitious business and make your case in order to receive funding from a panel of industry experts

Leverage conversations on Facebook, LinkedIn, Twitter, Pinterest and Instagram by being passionate, vocal and connected

Linux, Introduction

2.5 Units

This course introduces the Linux operating system. Linux is gaining popularity on personal computers, devices, embedded systems and enterprise servers. The course gives students an opportunity to use Linux for personal or professional purposes. Students will learn basic Linux administration, Linux file and directory structure, basic network configuration, shell programming and various utilities available in Linux. The course provides students with a hands-on approach for learning Linux through assignments and projects. **Learning Outcomes:**

At the conclusion of the course, you should be able to:

Explain the different Linux distributions

Describe how to install Linux on laptop or desktop computer system

Understand UI desktop provided by different Linux distributions

Determine how to use consol window for Linux command line operations

Outline how to configure and use Linux network capabilities

Note(s): This course is the recommended prerequisite to the Certificate in Linux Programming and Administration. Students are encouraged to use their own personal computers with Debian for practice. Instructor will provide installation instruction on the first day of class. Options include VMWare, VirtualBox, LiveCD, disk partition or separate drive.

Linux Kernel and Drivers, Advanced

3.0 Units

Advanced knowledge of Linux kernel data structure and the ability to use its framework for writing device drivers is critical for Linux programmers.

In this course, students learn to differentiate between the kernel development environment and writing user space programs. They study Linux kernel subsystems, such as Linux scheduler, memory management, networking stack, and Linux block layer, all of which helps them build high-performing kernel drivers.

We will develop kernel modules that use kernel facilities and services to perform actions, such as interrupt handling, direct memory access (DMA), bus-independent device access, invoking kernel threads, and mapping device memory into the user space.

By introducing students to the proper use of available Linux synchronization primitives such as mutex, rwlock, semaphores, and read copy-update (RCU), students will learn to handle

concurrency issues in the driver code.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Demonstrate how to avoid common mistakes and pitfalls when writing kernel code.

Apply Linux device driver APIs to Linux kernel subsystems.

Explain how to use kernel services for interrupt handling, DMA, memory mapping, and debugging.

Describe Linux device drivers and practical driver examples that can be readily applied in the work environment.

Topics include:

Implementing device driver file operation methods: read(), write(), poll(), and mmap().

Scheduling driver tasks via timer API and delegates background work to kernel threads via work queues.

Exploring Linux device models and building user interfaces to driver functions via procfs and sysfs pseudo file system.

Building kernel modules via kprobe for debugging and profiling (eBPF) production drivers.

Developing a fully functional network driver for an emulated Realtek RTL8139 PCI ethernet card, as part of a final project.

Linux Kernel & Drivers

3.0 Units

The growing popularity of Linux—the preferred operating system for servers, embedded systems, and mobile devices—is driving a huge demand for programmers who can modify the open-source kernel for optimal performance. In this course you will gain in-depth knowledge of the latest 5.x kernel so you can understand the architecture and write kernel code to achieve a desired output. The course introduces kernel-level programming in Linux and writing kernel modules, covering core kernel with a hands-on coding approach. We will start with the kernel source code organization, learn how it functions and address various data structures and algorithms used in the Linux kernel. Students will explore making static and dynamic changes to the kernel as well as the underlying portability considerations.

We will explore the design and implementation of device drivers in Linux, such as the interfaces to the Linux kernel for writing device drivers, resource allocation paradigms and error-handling best practices. Other topics include understanding concurrency from a driver perspective, for example, the impact of CPU hyper-threading and task preemption.

The instructor will share code samples and real-world experiences of device and kernel porting to augment your learning. In your assignments you will get to analyze, develop, and debug different modules and kernel drivers. Any distribution is fine so long as the Linux kernel version is recent.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Build a Linux kernel

Describe the implementation of system calls

Develop and build modules

Create and debug kernel and modules

Model Char, Block and Networking drivers

Design a fully-functional Char driver

Develop simple block and networking drivers

Skills Needed: Proficiency of C programming language and knowledge of Linux Systems Programming or equivalent experience is recommended. You will need access to a Linux environment with root privileges. Options include VMWare, VirtualBox, LiveCD, disk partition or dualboot.

Linux Programming and Administration Certificate Completion Fee

Once all of the certificate requirements have been met and your final grades are posted, please access your Student Portal to enroll in the "Certificate Completion Fee" to begin the review process. Please allow 4-6 weeks to receive your certificate.

Linux Shell Programming

3.0 Units

This course is designed for Linux professionals who are interested in becoming more productive by improving their understanding of Bash shell, the most common command line interpreter for the Linux operating system. Whether you are a system administrator, a developer, or a power user, you will learn how Bash shell scripts allow you to automate just about any task on a Linux system. We will explore how to use the text processing utilities—sed, a stream editor, and AWK, which is primarily used for data extraction and reporting—to read and edit data in text files. Sed and AWK combine the power of all the Linux user-land utilities with a powerful bash scripting language.
Learning Outcomes:

At the conclusion of the course, you should be able to:

Describe the features of the Shell language

Discuss the language features and how they are connected to each other

Explain any shell script in terms of the script commands/syntax and what the script accomplishes

Identify and correct the errors in a shell script

Topics Include:

Bash environment

Local variables

Reading and writing to text files

Functions

Loops

Case statements

String operations

Command line arguments

Parent/child processes

Linux System and Network Administration

3.0 Units

This is a foundation course on building and maintaining a server for Linux professionals and system administrators. The focus is on basic network configuration, networking services security, remote access configuration and administration of Linux server. The course covers system logging, inter-networking and services security, which are designed to help administrators ensure that their systems are secure. Students perform basic administrative tasks such as adding and managing users, creating and maintaining file systems, imposing a security policy, maintaining shell, installing and supporting network facilities such as NFS, DNS and DHCP. Instruction includes hands-on lab exercises. By the end of this course, participants will be able to administer and manage networked services on Linux-based platforms in a business environment.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Master the Linux distributions/installation and package management

Describe how to configure and use Linux network capabilities

Explain Linux Network Security

Determine how to do data backup under Linux

Illustrate how to setup Web, NFS, SAMBA server service and print server

Create shell scripts and adapt them to manage servers

Note(s): To practice, students are encouraged to have Debian Linux installed on their computer systems. Instructor will provide download and installation instructions in the first class.

Skills Needed: A basic knowledge of Linux, networks, or comparable industry experience.

Linux System Performance in the Cloud and Data Center

3.0 Units

Linux is the dominant operating system in data centers and the cloud. Its robust networking and IO stacks can support high volume transaction processing. Linux has a rich set of resource management, monitoring and tracing capabilities. Well-tuned Linux systems can deliver low latency transactions and high throughput computing, even on commodity servers. This course introduces common methodologies for hosting workloads on Linux in the cloud and in data centers, including workload characterization, system profiling, performance management and benchmarking. The course is ideal for system administrators and solution integrators who want to learn the fundamentals of performance measurement, debugging and optimization methods used in these environments. The course begins with measurement and tuning concepts. It reviews how the components of Linux kernel (scheduler, network and IO stacks) and application API (with asynchronous and multi-threaded programming) interact and work together seamlessly as scalable solutions. You will learn how to identify resource contention issues resulting in lower throughput and higher latencies. You'll also learn how to use the Linux resource management framework (Cgroups, containers) and server virtualization technologies to improve agility in resource provisioning. Additionally, you'll gain experience simulating production workload for problem isolation and benchmarking.

You will gain hands on experience using the rich set of monitoring and tracing tools available in Linux, including pidstat, iotop, fio, and sysbench, as well as advanced tools to perform full software stack analysis such as systemtap, perf and sysdig. Students will also be exposed to the key cloud technologies such as data sharding, auto-scaling, Service Oriented Architecture (SOA) and the DevOps model, which allow companies to deploy cloud native services to provide new services at a scale not possible in the data center-based environment.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Describe keys, Linux System metrics and Tunables

Identify performance inhibitors and build scalable and optimized solutions by applying methodologies learned in class

Complete profiling complex workloads and performing full stack analysis by hands on experience with advanced Linux tool

Build custom tools for deeper system analysis by using Linux Tooling frameworks

Identify differences in public cloud and datacenter resource utilization that help companies on cloud migration strategies

NOTE: Students are required to bring their own laptops to do labs in class.

Linux Systems Programming

3.0 Units

System calls are functions called from within a C program, which provide access to the lowest level resources of the OS. Topics on Systems Programming covered in this class will enable a C

programmer to understand and implement standard utilities (e.g. ls, wc, cat). It includes conceptual background, functional interfaces and topics on I/O control, file systems, access, and locking; signal handling; process and threads management; IPC using pipes and TCP/UDP sockets; and related discussions on makefiles, man pages and rpm packaging utilities. This course covers developing a complete ftp package, including client-side interface and the server-side components. The course materials include examples showing the use of all system calls introduced in the course, as well as complete client-server programs using TCP, UDP and RPC. This course is based on the POSIX standard, however, portability considerations for BSD extensions and SVR4 differences are discussed throughout.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Design and demonstrate implementation of standard LINUX utilities (e.g. ls, wc, cat)

Explain programming interfaces and topics on I/O control, file systems, access and locking

Describe the use of signal handling interfaces

Describe Process and threads management

Describe IPC using pipes and TCP/UDP sockets

Discuss makefiles, man pages and rpm/apt packaging utilities

Note(s): To practice, students are expected to install or have access to Linux Operating System version 7, or higher (version 9 is preferred) on their home computers. Options include VMWare, VirtualBox, LiveCD, disk partition or separate drive.

Skills Needed: A basic knowledge of C language programming and a working knowledge of the Linux/UNIX operating environment are required.

Logistics and Transportation Management

3.0 Units

Logistics management is the art of getting materials from here to there. It includes transporting products through modes such as truck, rail, and air. This course will discuss the history of teach mode, including the oldest form of transportation, water. Government oversight and regulation of transportation will be covered, as well as the deregulation of transportation that occurred in the 1980s. What are the best methods of transport for local shipments? What about transport to other parts of the world? Each transportation mode has its own set of advantages and disadvantages, which will be covered in this course.

It is highly recommended that students take "Evolving Role of Supply Chain Manager" as the first course prior to taking this course.

Learning Outcomes

At the conclusion of the course, you should be able to:

Identify the various modes of transportation and their advantages

Review key elements of transportation law and deregulation

Recognize international shipping terms used in the industry

Recognize how global supply chains coordinate the flow of goods and services

Explain how supply chain decisions can impact global channel structures

Review commonly used international shipping terminology

Topics include:

History and evolution of logistics

Modes of transportation

Costs of transportation

Class and commodity rates

Transportation law and deregulation

Internal logistics and global supply chains

Leading technology and trends in logistics

Making Money with Data

3.0 CEU's

The exploding demand for data science professionals is well documented, with average salaries above six figures and LinkedIn reporting a shortage of over 150,000 people with data science skills. That demand aside, this course is designed for everyone in pretty much every walk of life because as Peter Drucker, the famed management consultant, once said that what you can't measure, you can't manage. And measure means asking the right questions about a problem at hand and to go about assimilating the right sets of data. And manage means making decisions and implementing actionable insights to grow a business, to design a better product, to improve a process, to reduce cost or to do anything and everything that helps the bottom-line.

Data-driven decisions are just better decisions - it's as simple as that. So this course is not only for students looking to explore jobs in data science, but also for anyone interested in exploring the power of statistical thinking in less conventional areas of their lives and careers.

The course broadly covers the fundamentals of making money with data. Students will be exposed to data science concepts like cleaning, organizing and visualizing data. Each module also includes lessons on how to apply a data driven mindset to real world situations. Some examples:

The need and the fundamentals of evidence-based decision making

Capital markets theory and what it takes to start a business

Personal finance basics and investment portfolio design concepts

Business and personal risk management and the data science math behind it

Writing, communication and persuasion skills

This course combines short video-based lessons & exercises with case-based homework assignments. All lessons and exercises are performed in Jupyter Notebook.

Learning Objectives:

Basic statistical concepts - random variables, variance, covariance, correlation, distributions, confidence intervals, statistical significance, hypothesis testing and the rest.

Python for data analysis

NumPy & pandas basics

Dataframes

Regular expressions

Data aggregation and merge techniques

Data visualization

Predictive analytics

This course is offered in a hybrid format. There are live-online meetings twice weekly with the instructor, short, video-based lessons, and case-based homework assignments. While some content within the course can be studied at your own pace, you will be expected to meet weekly homework assignments and to attend the live-online class. Online class participation is part of your final grade.

Synchronous online meeting days/time: Mondays & Wednesdays 7-8:00 pm

Management of Clinical Practice

3.0 Units

In this course educational specialists delve into the business realities of establishing a successful independent educational therapy or a learning specialist practice. Students focus on best practices for one-on-one instruction to young students and adult learners with learning differences. Learn how the role of the educational therapist/specialist includes working as an investigator/support person and strategically communicating with a client's family, school, community, and culture. Additional course materials encourage students to dig deeper into the psychosocial aspect of learning differences and address topics of transference, counter transference, and termination.

This is an online course, and all assignments and lectures are hosted though Canvas. In addition to lectures, students master the content by:

analyzing case studies;

interviewing parents;

developing marketing collateral such as business cards, flyers, and essential information forms; and

writing by prompt for self-discovery.

Upon the conclusion of the course, students will be able to:

Articulate the role of an educational therapist/specialist

Assess the unique developmental needs of each client

Manage a caseload of multiple clients

Adhere to the ethical and professional standards of working with their clients

Develop a roadmap and toolkit for every stage of student instruction from intake through termination

Develop a personal outline/structure for their own clinical practice including details like marketing procedures, collaboration with other therapists, office procedures, record keeping, fee structure, time management, and work-life balance

Distinguish between the work of an educational therapist and other service providers

Establish appropriate partnerships/collaborations with other caregivers/service providers of each client

Managing Global Supply Chains

1.5 Units

The products that consumers use every day do not reach their local stores by accident. They are produced, assembled, and shipped from all over the world. Knowing how a product reaches its final destination is an important part of supply chain management. This class will cover trends in global supply chains, such as ocean transportation and overseas manufacturing (offshoring). How can we make the best sourcing decisions and how do we ensure supplier performance when they are in another country and time zone?

It is highly recommended that students take "Evolving Role of Supply Chain Manager" as the first course prior to taking this course.

Learning Outcomes

At the conclusion of the course, you should be able to

Recognize how global supply chains coordinate the flow of goods and services

Understand how supply chain decisions can impact global channel structures

Review commonly used international shipping terminology

Topics Include

Planning and sourcing in the supply chain

Strategy development and market research

Operations, delivery and inventory management

Global logistics management and trends

International trade agreements

Technology tools in global logistics

Outsourcing and offshoring

Make or buy decisions

Managing International Projects

1.5 Units

As businesses globalize, project managers must collaborate with team members from multiple countries. Surveys indicate that less than 40% of international projects succeed at meeting their baseline business objectives. This course provides project managers with tools and techniques for developing international projects that succeed in the competitive multinational business environment.

You'll learn critical success factors for international projects, using objective metrics, as well as applicable resources and techniques and lessons learned. The course covers techniques for expanding projects into the international business arena and finding partners in emerging markets.

Learning Outcomes

At the conclusion of the course, you should be able to

Describe Major Global Project Management Standards

Discuss business, technical, and organizational values of global projects

Explain unique characteristics of Managing International Projects

Identify challenges facing Projects Managers dealing with global projects

Topics Include

Global business trends

Characteristics of international projects

Critical success factors for international projects

International organizational options

Intellectual property management

Managing international contracts and agreements

Effective communication management in a geographically fragmented project team

Unique international project costs

Finding international partners

You'll be assessed on a practical problem-solving, exercise-based project. If your company is looking to extend its market reach, or if your start up is seeking a footprint in emerging market spaces, this is the course for you.

Professional Credit

The Project Management Institute (PMI)®--PMP® 15 Professional Development Units.

Managing Projects at Startup Companies

1.5 Units

Standard practices and techniques in the Project Management Body of Knowledge (PMBOK Guide), work very well at established companies, but are not always applicable to young companies or fast-track projects. In the turbulent environment of young companies, change occurs faster than in more mature companies. In this course, students learn how to adapt generally accepted project-management techniques to young companies where project timelines are compressed.

Learning Outcomes

At the conclusion of the course, you should be able to

Understand startup culture and your role and responsibilities as a project manager

Develop Release Plans & Roadmaps with Adaptive Planning techniques

Acquire Leadership Skills to deliver business value, manage rapid change, and executing with speed

Topics Include

Adapting planning, scheduling, tracking, and control techniques to accelerated projects

Leadership, politics, and the strategic aspects of project management

Key project-management processes; managing virtual and cross-functional teams

Web-based project management

This course shows managers and executives at young companies how to customize and use generally accepted project-management practices. In-class exercises and homework assignments lead students to results they can take back to work and immediately apply to their own projects.

Professional Credit

The Project Management Institute (PMI)®--PMP® 15 Professional Development Units.

Managing Projects with Microsoft Project

1.5 Units

This course presents practical concepts and techniques for using a commonly available but often misused management tool—Microsoft Project. A general-purpose scheduling tool Microsoft Project applies to Agile, Critical Chain, and other project management methods. It is appropriate for small, isolated projects, as well as multiple, coordinated projects and programs and can aggregate resource workload for comparison with resource capacity. In this course, you will learn parametric estimating and how to use progress tracking to improve estimating data for future projects. Microsoft Project helps you shape your organization's future.

Many project managers attempt to self-educate on project scheduling and, for years, remain beginners, using a small fraction of the tool's capabilities. In this course, you will learn to configure Microsoft Project for ease of use, to plan a project using a schedule template included with Microsoft Project, to update tasks correctly, and to recover from delays.

Learning Outcomes

At the conclusion of this course, you should be able to:

Plan a project using a schedule template provided with Microsoft Project.

Use Microsoft Project at an intermediate level.

Apply a schedule template for rapid project scheduling, for incorporating lessons learned, and for improving estimating data.

Transition generic resource assignments into persons, set their average daily effort allocation, level their workload, and set the project baseline and deadline.

Include both a risk reserve developed from a registry and a project estimating uncertainty buffer developed from task range estimates.

Track task progress correctly and recover from delays.

Microsoft Project Course Topics:

Hand scheduling

Configuration of Microsoft Project options and artifacts

Dependencies among tasks in the schedule template

Specific project schedule copied from a schedule template

Scaling of estimating data according to specific project size, complexity, and resource productivity

Estimating uncertainty

Resource pool

Transition generic resources into persons and allocate resources per workday

Project priorities

Workload leveling, critical path, and slack (float)

Baselining and deadlining

Addition of shock absorbers (risk reserve and estimating uncertainty buffer)

Correct updating techniques

Delays from task late starts, interruptions, revised estimate, increased lag

Recovery techniques: fast-tracking, crashing, and crunching

Advanced Techniques

Professional Credit

This PMI®-approved course qualifies for 15 Professional Development Units for people already holding the PMI Project Management Professional® certification.

Managing Software Projects

1.5 Units

New and experienced project managers wanting to improve their management of software projects need to include key planning elements, appropriate techniques, effective communications, and ideas for self-improvement. In this interactive course, new and experienced project managers explore the most common causes of project failure; and are introduced to up-to-date methodologies, principles, and practices for successful software projects.

The course is excellent for those seeking to improve their software project management skills for producing full scope, adequately tested, on time and on budget results. Students are guided to those processes outlined by the Project Management Institute

Learning Outcomes

At the conclusion of the course, you should be able to:

Select appropriately among methods such as Agile, Critical Chain, and Critical Path

Discuss processes outlined by the Project Management Institute

Explain the root causes of software project troubles

Identify preventative actions for ongoing and future software projects

Professional Credit

The Project Management Institute (PMI)®--PMP® 15 Professional Development Units.

Managing the Development of New Products

1.5 Units

On average, high-tech projects are late most of the time despite the use of modern-day tools. Learn the winning formula of best practices that project managers are using worldwide to get results in half the time and at half the cost. This course addresses the root problems and demonstrates proven techniques to create product visions, build effective teams, make wise cost-benefit-risk tradeoffs, and learn the step-by-step development flow in order to achieve fast time to market. This course shows you how to put common sense into practice and get outstanding results in industries such as hardware, software, IT, Web systems, services, medical, biotech, and more.

Learning Outcomes

At the conclusion of the course, you should be able to

Support a culture of ideas in the organization

Build an Integrated Project Management System

Set up the steps of a new product development project

Understand quality, process improvement and project metric tools

Provide leadership and promote teamwork critical to product development success

Topics Include

Product vision process

New product-development flow methodologies

Teamwork and leadership on rapid projects

Quality function deployment and the customers

The course is appropriate for project leaders, team members, engineering and marketing managers, directors and vice presidents.

Professional Credit

The Project Management Institute (PMI)®--PMP® 15 Professional Development Units.

Managing the HR Staffing Function

1.5 Units

Recruiting top talent for an organization is one of the most difficult challenges for staffing departments today. Those responsible for staffing are under immense pressure to obtain the talent necessary for organizations to meet business goals. This workshop explores critical issues related to managing the staffing function. Course exercises reinforce student understanding and student projects provide an opportunity to demonstrate the knowledge acquired.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Describe how a company determines their need for staffing and what to do to fill the staffing need Discuss the processes involved for managing the staffing function Explain the necessary tools and methodologies to follow Identify the assumptions, strategies and tactics necessary to help a company achieve its staffing needs

Topics Include:

Understanding staffing models

Workforce planning

Budgeting and managing staffing costs

Marketing the staffing function

Developing effective hiring processes

Selecting and evaluating resources

Maximizing the recruiting website

College recruitment and employee referral programs

Managing global requirements

Measuring performance

Professional Credit:

HRCI®---PHR®, SPHR® and GPHR® general recertification credit: 16.5 hours.

Effective February 22, 2020, this course is valid for 16.5 PDCs for the SHRM-CP® or SHRM-SCP®.

Marketing in Practice

2.0 Units

In this capstone course for the Marketing Management certificate program, students apply knowledge gained from their marketing certificate studies, integrating the tools, concepts, and experience into a complete marketing plan.

Students will conduct external, internal, and market analyses to formulate a customer-driven, go-to marketing strategy that includes an implementation plan, budget, and controls.

Learning Outcomes

At the conclusion of the course, you should be able to:

Analyze a company and its marketing strategy

Analyze the marketing environment

Develop a customer-driven marketing strategy with an implementation and monitoring plan

Marketing Management Certificate Completion Fee

Once all of the certificate requirements have been met and your final grades are posted, please access your Student Portal to enroll in the "Certificate Completion Fee" to begin the review process. Please allow 4-6 weeks to receive your certificate.

Mastering Data Structures and Algorithms: A Practical Approach

3.0 Units

Prepare yourself to answer the data structure and algorithm questions that often come up in Silicon Valley job interviews. In this course, students will get the extensive practice they need to master data structures and algorithms— the foundation of good software engineering. Students will use high-level languages like Python, C, C++, or Java to learn a practical approach to solving data structure and algorithm. The course starts with a review of time and space complexity. Analysis of algorithms and basic math is involved. We review basic data structures such as arrays, strings, linked lists, stacks, queues, and priority queues, and progress to more complex tasks involving hashes, trees and graphs. Students learn through working on a relevant problem for each section that helps them understand such data structures. They review basic algorithms and problem-solving techniques: including recursion, dynamic programming, divide and conquer, sorting and searching, and some graph algorithms. Testing is emphasized as a critical part of solution building.

Students who successfully complete this course will be well-prepared to answer questions and solve problems related to data structures and algorithms in their next job interviews.

Students must program their solutions in Python, C, C++, or Java.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Demonstrate the ability to measure computational and space complexity: Big O notation

Identify and utilize the most appropriate Data Structures to solve a given problem

Design algorithms for problems involving Sorting and Searching

Demonstrate ability to solve Recursive problems

Identify when it is best to use Greedy algorithms, Divide and Conquer, Dynamic Programming, and Backtracking to solve a given problem

Skills Needed: C, Java, Python or C++ as taught in the following courses: Python for Programmers, C++ Programming Comprehensive, C Programming Advanced , or Java Programming Comprehensive. Knowledge of basic data structures and algorithms are required (as taught in an undergraduate Computer Science program).

Math Development in Young Children

2.0 Units

This course focuses on teaching math to young children and covers California math standards for early childhood. You'll participate in hands-on activities and create exciting math games for young children. The course also addresses how young children recognize patterns in nature and how you can connect math to art. With ample instructor modeling, you'll practice ways to create unforgettable moments of discovery, enchantment, and magic by studying geometric patterns and numbers. This course is recommended for teachers, parents, and caregivers of preschoolers and kindergartners. A strong background in mathematics is not required.

At the conclusion of the course, you should be able to Learn preschool through kindergarten standards for math

Learn a value of hands-on activities

Design hands-on math activities

Learn the relationship between math and art

Describe patterns in nature and the importance of patterns in math

Introduce hands-on activities related to patterns for young children

Create line art and origami activities to do with young children

Collect ideas about presenting math activities from the other students

Brainstorm and reflect upon activities done by other students and see how they can be implemented for different age groups

Topics Include: Curriculum principles for early childhood mathematics

Mathematical learning for children ages 3 through 8

Mathematical processes in early childhood curriculum

Promoting development of key skills and concepts through math play

Medical Device Process Validation

2.0 Units

Validation is a critical aspect of medical device development and manufacturing and insufficient or noncompliant validation is a common reason for warning letters. Through lectures, assignments, in-class games, you will learn about industry best practices in a hands-on manner on how to set up and maintain a validated process. Utilizing an example surgical device, you will gain a thorough understanding of when to validate a process, how to develop and conduct IQ/OQ/PQ, qualify methods through Gage R&R, and extend concepts to sterilization and packaging validation. You will also be provided templates for validation plans, validation protocols and reports that are compliant with US FDA regulations as well as harmonized regulatory requirements from the IMDRF (International Medical Device Regulators Forum).

Learning Outcomes:

At the end of the course, students should be able to

Identify FDA and harmonized IMDRF requirements for validation of medical device manufacturing processes

Explain the criticality of validation and the consequences of insufficient validation on product quality and compliance

Develop a validation protocol based on risk-based analysis of the production process and conduct a validation study

Understand process monitoring to maintain a validated state, and developing impact analyses for design and process changes

Analyze measurement systems through Gage R&R; studies

Apply principles to other validation of processes like cleaning, sterilization and packaging based on identifying key international standards

Medical Devices Certificate Completion Fee

Once all of the certificate requirements have been met and your final grades are posted, please access your Student Portal to enroll in the "Certificate Completion Fee" to begin the review process. Please allow 4-6 weeks to receive your certificate.

Medical Devices: Regulatory Strategies and Marketing Pathways

1.5 Units

Medical devices are different from drugs and biologics in their regulation and paths to market. Effective clinical trials design and management for devices requires a solid understanding of these issues. This course defines medical devices and explains routes to market, regulatory pathways,

successful investigational device exemption (IDE) and PMA submissions to the FDA. You'll also learn how to get devices effectively to market, manage and report adverse device events (MDRs) and other post-market FDA surveillance tools and get a glimpse into the future of device regulations. Topics include:

The FDA's role in the American medical device industry

Risk-based classification of devices

Regulatory pathways for medical devices

Uses of clinical data and clinical studies including the IDE program

522s, medical device reports (MDRs), and recalls

Note(s): Students pursuing the Clinical Trials Certificate who are also interested in the Regulatory Affairs Certificate may take "Regulation of Medical Devices and Diagnostics" to fulfill the "Medical Devices: Regulatory Strategies and Marketing Pathways" requirement in the Clinical Trials Program. You can use the extra 1.5 units towards meeting the elective requirement for the Clinical Trials Design and Management Certificate program.

Professional Credit: CA BRN/LVN Credit - Provider #CEP13114.

Medical Professional Legal Consultant

4.5 CEU's

This exciting program prepares Medical Professionals for a career in the legal field as medical professional legal consultants. Building on the medical education and clinical experience of medical professionals, this course provides students with fundamental skills necessary to advise law firms, health care providers, insurance companies, and governmental agencies regarding medically-related issues and to appear in court as expert witnesses. The curriculum of this course is designed to comply with the educational guidelines specified by the American Association of Legal Nurse Consultants.

This six week course is approved for 45 Category 1 continuing medical education (CME) hours by the American Academy of Physician Assistants (AAPA). This course will provide a comprehensive analysis of the principles and practices of medical professional legal consulting (MPLC), with an emphasis on law and expert witness testimony. While most of the main subject matter will pertain to legal nursing standards, professionals in other health care disciplines (pharmacy, physical therapy, physician assistants, etc.) may gain increased skills and knowledge of the medical legal system to enhance their roles as service providers and functions as expert witnesses. Successful graduates will be awarded a Certificate of Course Completion from the university through which they are registered.

Enrollment and Course Materials

Students are required to enroll directly through The Center for Legal Studies. You can learn more about curriculum details and enroll at Medical Professional Legal Consultant , or by contacting CLS at (800) 522-7737 or info@legalstudies.com .

Refund Policy Students enrolling in the Center for Legal Studies programs and courses are

accountable to the Center for Legal Studies refund policy and the associated fees. Learn more by visiting the Center for Legal Studies Course Policies.

Medical Writing

2.0 Units

All biopharmaceutical companies must produce scientific reports and summary documents for regulatory agencies. Good documentation should be not only scientifically sound, but also clear, effective and concise. This course provides the practical skills needed to write effective documents for the healthcare industry. You'll gain practice through hands-on exercises and group projects based on documentation used in pharmaceutical development. Topics include:

The essentials of good writing required for any profession, including the proper use of grammar and punctuation

Copyright, permission, and ethics

Working with journal editors and regulatory reviewers

Writing letters to the editor, scientific review articles, clinical study protocols, clinical study reports, and press releases

Preparing scientific posters

Drafting documents that are user-friendly and comply with regulations

Creating clear and concise content

By the end of the course, you should be able to demonstrate the basics of effective writing and streamline the writing process from raw ideas to finished documents.

Professional Credit: CA BRN/LVN Credit--Provider #CEP13114.

Methodology of Bilingual and English Language Development

4.0 Units

What are the most effective methods for teaching bilingual English language development? New methods, in tandem with traditional methods, have triggered a surge in effective language teaching and learning. In this content-rich course, you'll review both the theory and practical methods needed to deliver bilingual education and teach English language development. Topics include program design, instructional strategies, current methods and approaches, such as immersion, two-way bilingual programs, total physical response, and literacy development. You'll gain hands-on experience applying selected methods and approaches and will present a mini-lesson to get constructive feedback from your peers and instructor. **Topics Include:** Audio-lingual method

Total physical response

Natural approach

Communicative language teaching

Community language learning

Participatory approach

Silent way

Accelerated learning (Suggestopedia)

Mobile Application Development - Android and iOS, Advanced

3.0 Units

In this course students move from the introductory concepts of our first Mobile Application Development course to a more comprehensive coverage of popular concepts and architectural topics required for developing successful, high quality mobile applications. Students will enhance their understanding and skills using a more advanced technology stack including background operations, web operations, and image handling. You will also practice interactions with operating system features—audio, video, camera, telephony, maps, location services, notifications, advanced GUI layouts, and navigation bars. This course also covers performance and memory management recommendations. Through coursework and classroom exercises of increasing depth, students will create a fully functional mobile application involving multiple advanced features and cloud back-end. To truly complete the picture, you will explore the basics of cloud-based backend infrastructure and its integration with mobile applications. Using the Firebase cloud platform from Google, we will focus on essential topics such as user authentication, data synchronization across multiple mobile devices, analytics, and continuous application monitoring. This course also covers fundamentals of cyber security techniques for both Android and iOS mobile platforms, an extremely valuable skill set for any professional developer.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Discuss advanced architecture and design for applications on both platforms – Android and iOS

Demonstrate the best practices of development

Explain design patterns used towards solving common problems

Create a professional quality mobile application with cloud backend services and in line with the fundamentals of mobile cyber security guidelines

Topics include:

Background operations

Navigation and notifications

Web and connectivity

Common operating system functionalities

Maps and location services

Backend cloud services

Cyber security fundamentals

Memory management and performance

Skills needed: Familiarity with at least one higher-level language such C++, Java, C#, Python, or PHP and Introduction to Mobile Application Development.

Mobile Application Development - Android and iOS, Introduction

3.0 Units

In this comprehensive overview course, both beginning and experienced students learn mobile application development for Android and iOS while exploring Flutter, Google's latest cross-platform development framework; and the Kotlin and Swift programming languages. Through coursework and classroom exercises of increasing depth, students will create a fully functional mobile application.

You will get exposure to the latest technologies while learning the fundamental building blocks of application development, such as understanding architecture, life-cycles, GUI, and MVC design pattern. Developing a basic Android and iOS application during the class gives you valuable hands-on experience. A combination of theory and practical programming experience will best prepare you for your career.

This course also benefits individuals in management or on developer teams who want to efficiently execute on mobile application projects. At the end of the course, students will understand the fundamentals of building a cutting-edge mobile application on Android and iOS and how to publish it as well.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Explain the fundamentals of mobile application development with an in-depth understanding of architecture and design for application on both platforms – Android and iOS

Implement development best practices

Discuss design patterns used towards solving common problems in application development

Efficiently create basic mobile applications

Topics include:

Development environment setup

Android architecture

iOS architecture

Flutter framework

Hello mobile app

GUI development

Swift and Kotlin overview

Persistent data storage

Tips and tricks

Publishing on Google Play

Publishing on App Store

Overview of advanced topics

Skills Needed:

Familiarity with at least one higher level language, such as C++, Java, C#, Python, or PHP

Mobile e-Commerce, Fintech and Cryptocurrency

3.0 CEU's

Explosive growth in mobile e-commerce is paving the way for new, intuitive, and disruptive technologies to reshape the fintech industry creating exciting opportunities for entrepreneurs, marketers, programmers, and engineers. AI, data analytics, and deep machine learning are driving innovations that map the consumer journey in the store, on the web, and in an app for a ubiquitous and unified shopping experience. In this introductory course, students with a business background or programming experience will have an opportunity to develop an in-depth understanding of the transaction process. We will explore the consumer journey—from merchants to acquirer, and from processor to brands and banks—getting a better understanding of how major traditional and online companies are investing in the development of e-commerce. You'll also learn how check-out free stores like Amazon Go are utilizing sensor fusion, computer vision and smart IoT solutions to reduce friction and increase consumer convenience.

Starting from magstripe to secure chip-card and mobile wallets such as Apple Pay and Google Pay, this course covers advancements in e-commerce, security, payments, blockchains, and artificial intelligence. You will learn details of alternate payment methods such as AliPay and Wechat Pay and how to use methods such as Amazon Pay, PayPal, Visa checkout, and Stripe for online commerce. A new module will provide introduction to voice-based commerce using Alexa Skills. We will dive into the role of data analytics, AI and deep machine learning for fintech, security and risk management, concluding the course with a focus on blockchains, crypto-currencies, and emerging trends. Depending on your experience and background, you will either produce a case study or build an e-commerce project in an iOS or Android environment.

By the end of the course, you will understand the fundamentals of e-commerce, mobile payments, security, AI in fintech and intelligent data analytics to offer a seamless commerce experience. You will be better prepared to engage in developing innovative platforms and applications and pursue new market opportunities.

Topics include:

Fundamentals of international commerce/e-commerce

Traditional magnetic strip and secure chip-based EMV payment systems

the transaction process

Security

Mobile wallets: Apple Pay, Google Pay

Alternate payments: AliPay, WeChat Pay

User experience and consumer journey

NFC, SE, BLE, QR codes

Voice-enabled e-commerce

Multi-factor authentication

AI, data analytics and DML in fintech

Risk management

Standards, certification, and compliance requirements

Blockchain applications, cryptocurrencies

Future trends

Skills Needed: General understanding of e-commerce and some programming experience.

Mobile Health: The Evolving Industry and Regulatory Landscape

1.0 Units

This interactive course will help students understand the regulations, standards and guidance related to the evolving mobile health technology sector. Mobile health is developing novel technological solutions that spans the scope of healthcare, from wellness to patient and clinician support, to chronic disease management to digital therapeutics. Through lectures, case studies, assignments, and in-class games you will learn in a hands-on manner on how to develop and implement a mobile health device regulatory strategy, develop supporting clinical evidence, handle post-market changes to devices, and handle aspects of privacy, confidentiality. The course will extensively review current FDA policies on General Wellness, Mobile Medical Applications, Software as a Medical Device (SaMD) and AI/ML devices.

Learning Outcomes:

At the end of the course, students should be able to

Demonstrate knowledge of current framework for FDA's regulatory oversight of mobile medical devices and apps

Demonstrate knowledge of how to develop and execute a mobile medical device regulatory strategy

Explain regulatory aspects related to privacy, cybersecurity and confidentiality of mobile medical devices

Develop strategies to handle the regulatory implications of post-market changes for software and AI devices

Mobile Interface Design

3.0 Units

There are hundreds of thousands of mobile apps in the App Store, but only a small portion of them have innovative design principles, friendly user interfaces, and most importantly, widespread adoption by users. In this hands-on lab and lecture course, you will learn the core principles for creating effective user interfaces for mobile devices incorporating iOS 14/15, Android Material Design, responsive/parallax design, lean mobile UX, form factors, GPS, gestures, tactile experiences, sensors, commerce, tagging and more. You will discover useful patterns for developing mobile products and design a mobile user experience using an iterative and user-centered design process. The school provides short-term licenses of commercial prototyping tools (Balsamiq Mockups and Fluid UI) for sketching wireframe and mobile prototyping. Designing your own prototype will provide opportunities to explore new types of touch- and gesture-based user interaction that can expand the functional possibilities of your apps. This exercise will demonstrate how mobile products can be rapidly developed and released to the market.

The course covers the trends, industry practices and techniques for the most popular platforms, and by the end of the course, you will have created an engaging user interface prototype for a mobile application or the web. This mobile UI prototype will incorporate the new conceptual and technical skills learned, and can also function as a portfolio piece for future endeavors.

Topics include:

Latest iOS 14/15 and Android Material Design Human Interface Guidelines

Responsive Design/Parallax UX Design

iOS 14/15 and Android UI patterns

Cryptocurrency & Blockchain UX

Lean Mobile UX

Windows mobile UX/UI design

Mobile design strategy

Mobile platforms and technology

Meaningful mobile experiences

Form factor user interface

Low fidelity mobile concepts

Mobile prototyping software

Prototyping methods

Mobile storytelling workflow

Gesture experiences

High fidelity mobile prototyping

Designing for the developing world

Tactile interfaces

Mobile tagging

Methods to pitch your product to VC

Design portfolio showcasing your app

Skills needed: Familiarity with a drawing tool is recommended for the exercises (e.g. Adobe Illustrator, Photoshop, or Sketch) but not required.

Molecular Diagnostics

1.5 Units

Rapid advancements in molecular diagnostics are drawing the attention of the bioscience industry, regulatory agencies, clinicians, patients and insurers alike. This survey course provides a foundation in the basic science and technologies that underlie the emerging field of molecular diagnostics, and highlights potential impacts on the healthcare landscape. Interactive lectures explore the intricate relationship between the human genome and diagnostic tests. The instructor addresses the growing importance of personalized medicine, and touches upon the role of pharmacogenomics in the development of new therapeutics and treatment options. She uses case studies to present the applications of molecular diagnostic tools in infectious disease identification and early detection and diagnosis of cancer. Professional Credit: CA BRN/LVN Credit--Provider #CEP13114.

Moving Beyond Our History: Diversity Tools for Today

1.0 CEU's

This course takes an intensive approach to the historical, legislative, and modern day implications of diversity, equity, and inclusion and the roles we choose today to strengthen our relationships and the world around us. Participants will learn:

Types of diversity and their origins;

Components of cultural equity;

Strategies for creating inclusive environments; and

Ways to be an effective ally.

Upon completion, you will be proficient at crafting and facilitating diversity, equity, and inclusion (DEI) training for any sector.

Learning outcomes for Moving Beyond Our History: Diversity Tools for Today

Define and contextualize diversity, equity, and inclusion

Identify and learn strategies to mitigate cultural and workplace inequities

Articulate principles of inclusion in various environments

Employ best practices for allyship

MySQL and Oracle Database for Developers and Designers

2.0 Units

Oracle and MySQL are both reliable database engines commonly used for storing and serving data as web content. They are popular among developers of open source platforms and projects on the Web. High volume major websites use them. They also have a significant user base in the enterprise database market. This course is intended for DB developers and designers who want to learn MySQL and Oracle technology in depth. The course begins by reviewing the basic SQL queries, DDL and DML operations, data retrieval from multiple tables, and different types of storage engines in databases. It then introduces the aggregate, the index merge, data manipulation, and stored procedures in MySQL. You will learn to write complex queries and get hands-on experience with advanced features such as creating sub programs, data security, triggers, and dynamic SQL. You will also learn a performance tuning strategy, server configuration, loading techniques and the application architecture for efficient database design. This is a hands-on lab-based course designed to help students master MySQL features and tune for performance. **Learning Outcomes:**

At the conclusion of the course, you should be able to:

Perform DDL and DML operations using SQL commands

Develop and manage database stored procedures including best practices

Develop Database Triggers to automate database operations

Understand Database Partitions and create tables with different types of partitions for improving database performance

Perform exception handling and error handling capabilities in both Oracle and MYSQL

Understand different strategies used for improving database performance through Database Indexes, Optimizer, Explain Plan, and database hints

Topics include:

Review of MYSQL and Oracle database essentials

Understanding MYSQL storage engines, transactions and features of the database and how it differs from Oracle

Performing DDL and DML operations using SQL commands

Retrieving data from multiple tables using JOINS

Writing complex queries using JOINS, SUBQUERIES and nested SUB QURIES

MYSQL functions including single-row, multiple-row, group and aggregate functions

Understanding Oracle and MYSQL optimizer and index merge method

Developing and managing database stored procedures including best practices

Exception handling and error handling capabilities in both Oracle and MYSQL

Utilizing database triggers to automate database operations

Oracle and MYSQL performance enhancements with queries and indexes

Database loading techniques and their effects on performance

Skills Needed: Students should have prior knowledge of the installation and basic operation of MySQL.

Natural Language Processing

3.0 CEU's

This advanced three-segment course introduces students to many aspects of natural language processing (NLP), the artificial intelligence component of using human languages to interact with computers. We will start with an overview of NLP, natural language understanding (NLU), and natural language generation (NLG), and discuss algorithms such as: the bag-of-words (BoW) model

word2vec

n-grams

skip-grams

Students will learn about: term frequency (tf), inverse document frequency (idf), and tf-idf.

In addition, you will learn about recommendation systems, sentiment analysis, and document classification. In the second portion of the course, you will be introduced to deep learning (DL) and how DL and NLP can be combined. We will look at the success of convolutional neural networks (CNNs) in solving NLP tasks and the popularity of architectures that use bidirectional long short-term memory (LSTM), an artificial recurrent neural network (RNN) architecture, to solve NLP tasks, such as search.

In the third portion of this course we explore reinforcement learning (RL) and deep reinforcement learning, learning how to combine deep RL and NLP. These combined technologies have improved state-of-the-art natural language processing and reinforcement learning, and contributed to the progress in a plethora of other fields. You will also learn about some more recent advances in DL, such as ELMo, BERT, ERNIE 2.0 and the transformer architecture that has superseded bidirectional LSTMs in many areas of NLP.

After completing this course, you can continue your study of NLP to acquire a deeper understanding of NLP and more sophisticated combinations of NLP with other branches of machine learning and with deep reinforcement learning.

Students are required to bring Laptops for classroom work.

Skills Needed: Moderate level of computer programming ability in Python, comfortable with an editor, familiarity with basic command-line operations on a laptop, and a good understanding of Machine Learning models and Deep Learning models.

Note(s): Students are required to bring laptops for classroom work. The code samples use Python 3.6.8 and TensorFlow 2/Keras, along some Jupyter notebooks in Google Colaboratory (students can optionally pre-register for a free account). Students also have the option of installing the Python 3+ version of Anaconda distribution on their laptops from the following link: https://www.anaconda.com/ on their machines.

Networking Fundamentals

3.0 Units

This foundation course covers the concepts and technologies required for understanding today's data voice and video networks. It provides a comprehensive survey of networking standards and protocols used to define, understand, and work with a wide range of network topologies such as building or campus networks (LANs), mobile/regional (MANs), and large-scale networks such as company intranets, public internet, or data center networks. Through lab projects, you will also gain a strong foundation in networking protocols, hardware, industry standards, and connectivity solutions. After taking this course, you will have a strong base for other courses and IT areas that rely on networks. You'll have the knowledge for high-demand positions such as a network engineer, production engineer, and site reliability engineer. Understanding networking is also key in any IT administration role.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Describe the media, data link layers & physical networks

Explain Network Layer Concepts and the use of IP Addressing/Subnetting

Explain how IP routing, TCP/IP and UDP work

Identify the concepts fragmentation, sliding window and congestion control

Contrast core protocols including IPv4, IPv6, and IPSec.

Employ core Internet application protocols including DNS, DHCP, NAT, and HTTP

Analyze the basic public/private key Cryptography and the basis of protocols like TLS/SSL

Discuss SDN, Networking Visualization and the Future of Networking

Neurodivergent Learners

1.0 Units

A growing body of scientific research and evolving cultural awareness have affirmed the value of addressing neurodivergent learners in the classroom and in the workforce.

In this course for educators and professional trainers, we will explore brain differences, reduce cultural prejudice, and identify tools to support the creative potential and abilities of neurodivergent learners. Students will examine the social and cultural dynamics of being neurodivergent and address inequities in the current educational paradigm.

Once we explore difficulties such as overdiagnosis and gaps in educator training, we will examine how the Universal Design for Learning (UDL) can be a strategy for leveling the playing field and put it to use in a new design for the classroom or workplace.

This course is designed for K-12 teachers, college educators, school administrators, home-schoolers, therapists, and HR professionals.

Course takeaways

Understanding short- and long-term impacts of being neurodivergent

Recognition of signs of neurodiversity

Awareness of social and cultural issues related to neurodivergence

Communication skills to discuss studies and experiences with neurodiverse individuals

Identification of strengths and contributions of neurodivergent learners

Universal Design for Learning and accommodations to design a classroom or workspace

Next-Gen Sequence Analysis Tools - A Hands-On Approach

3.0 Units

There are numerous algorithms available as freeware or by public access in the cloud that make complex biological sequence analyses accessible to everyone. This self-paced, introductory course, aimed at professionals who want to break into the sequencing-related field of bioinformatics, explores important public access tools used for analyzing biological sequence data.

Through hands-on examples and exercises, you will learn how to access public databases for raw sequence data and perform the basic steps in processing next-generation sequence data for RNA, DNA, and ChIP sequencing data to obtain interpretable results.

You will get to explore the analytical parts of next-gen sequencing without having to do wet lab work because we've designed this course for people who are interested in a quick introduction to tools that allow for quick problem-solving without a deep theoretical understanding of how the tools work.

Most job postings for technicians and scientists in the molecular biology field ask for experience with next-gen sequencing. Having experience with the analytical tools is considered a plus on job applications.

Learning Outcomes:

At the end of the course, students should be able to

Process raw sequence for DNA and RNA for use in analytical algorithms

Use Galaxy and R programs for performing data analyses

Generate graphical outputs from the analytical results

Annotate analytical results to convey biological meaning about the samples analyzed

NoSQL Databases, Introduction

3.0 Units

NoSQL schema-optional or non-relational databases support Big Data by providing scalability, high availability, clustering, efficient storage and easy access to huge amounts of semi-structured data.

This introductory course gives you a hands-on overview of the two most popular NoSQL databases—MongoDB and Cassandra—as well as an overview of core concepts and other types of open-source NoSQL databases.

We will cover installation, database shell usage, programmatic access, data modeling, scaling/clustering, categories of NoSQL databases (column-based, document-based, key value-based, or graphic-based), the CAP theorem, and BASE semantics.

You will have the opportunity to gain hands-on experience via homework assignments and a course project that involves setting up, populating (with publicly available datasets), and using a NoSQL of your choice (subject to instructor approval).

Learning Outcomes:

At the conclusion of the course, you should be able to:

Describe the need for NoSQL databases and the types of problems NoSQL databases help solve

Discuss the "foundation concepts" of Mongo DB and Cassandra including semi-structured datasets and wide rows

Explain how Mongo DB and Cassandra databases support horizontal scaling to support Big Data sharding and clustering

Demonstrate how Mongo DB and Cassandra support fault tolerance - replication, clustering

Describe the relationship between cloud computing platforms and the databases we study

Write code to work with Mongo DB and Cassandra database APIs

Apply basic administration of Mongo DB and Cassandra

Topics Include:

Why use NoSQL databases?

Types of NoSQL databases: Key value, document, column, graph

MongoDB basics

MongoDB data modeling, GeoData

MongoDB sharding, replication, clustering

Cassandra basics

Cassandra data modeling, real-time data with wide rows

Cassandra rings, replication

Other NoSQL databases: Neo4J, DynamoDB

Accessing NoSQL database APIs: Coding

Deploying NoSQL databases in the cloud: Amazon AWS

Using publically available datasets

CAP theorem, BASE

Skills Needed: You will need experience using a programming language such as Python, Ruby, or Java and the ability to set up open-source software, databases, tools, and development environments on personal computers.

Object-Oriented Analysis and Design

3.0 Units

Object-oriented design involves transforming the descriptive analysis models into computational models for coding. During an object-oriented requirements analysis, a descriptive model of the problem domain is developed into system specifications. This course is intended for software engineers and managers who will be involved in the design of an object-oriented system. The course focuses on case studies and carries them through the design phase. Instruction uses the notation specified by the Unified Modeling Language (UML) developed by Booch, Jacobson and Rumbaugh. Students will learn Agile and Iterative Development methodologies, such as Unified Process and SCRUM, and use case design and requirements driven design, among other important topics. The course covers the principles of object-oriented design as well as practical considerations for applying these principles. The course includes a comprehensive final project for students to practice requirements gathering and documenting design using different UML diagrams. Upon successful completion of this course, students should have an understanding of the principles of object-oriented design and system modeling and experience in applying these principles to real-world projects.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Describe the principles of object-oriented design

Read and design using UML

Complete real-world projects utilizing the principles of object oriented analysis an design

Skills Needed: Programming experience required in an object oriented language. e.g. Java, C++, C#, Python, etc.

Online Learning Design for Beginners

1.0 CEU's

Engaging online learning products have never been in stronger demand, but competition has also never been as challenging. We are flooded with content. In this two-day, boot camp-style course, you will learn how to make professional and effective online learning experiences.

We will cover the fundamentals of learning theory, key considerations in approaching analysis, design, delivery platforms, and assessments, as well as the technology to engage your targeted audience.

Whether you are in the education field, work in human resources, or launching a new product, this course is a great place to get started.

Takeaways

By the end of the course, you will have gained: Practical design and development tools for creating online learning experiences.

Familiarity with learning theory application and strategies to emerging technology and online learning design.

Your own online learning product using a learner-centered approach to analysis, design, development, and evaluation.

Course Format

We'll work in an online classroom with a blended learning format. You will participate in live instruction and enjoy videos, project aids, community chats, live Q&A;, and critiques. Students will work on projects remotely from their own device.

Prerequisites

No prerequisites.

Organizational Development and Change

2.0 Units

Students in this course study the planned, systemic change interventions that increase effectiveness and enhance individual development. In addition to gaining exposure to evidence-based models for effective organizations, students practice the art of navigating through ambiguity. They learn to work with different personality types. In this experiential, interactive course, students engage in-group activities and collaborate on a team project, both in and out of the class.

Designed for leaders who are charged with bringing about change, this course builds a valuable foundation for managers, human resource professionals, internal and external consultants, and those interested in pursuing a career in this field. It provides an overview of the field of OD, the nature of change, and the role of the OD practitioner.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Describe what an organizational intervention is

Discuss the impact of values, the definition of roles, and methods used when implementing large and small-scale change(s)

Understand and explain basic teams and team dynamics

Identify three major areas of organizational interventions

Apply some of the tools and techniques of organizational development to your own work situation

Topics Include:

The 21st century organization

Organizational structure, design, culture, systems and rewards

Management and leadership

Diagnostic models and systematic change intervention

Professional Credit:

HRCI®---PHR®, SPHR® and GPHR® general recertification credit: 19.25 hours.

Effective February 22, 2020, this course is valid for 19.25 PDCs for the SHRM-CP® or SHRM-SCP®.

Outsourcing and Contract Management

1.5 Units

Securing the best outside people to get things done requires strategic planning, project bidding, negotiation, and subcontractor management. In this course you learn everything you need to know to successfully manage outsource procurements as self-contained projects. Find out how to efficiently plan your next outsourcing project, organize procurement management teams, and prepare clear request-for-proposals. You'll also gain valuable insights for successfully managing subcontractors and containing costs in a contract period.

Learning Outcomes

At the conclusion of the course, you should be able to

Plan a project outsourced procurement

Understand and use procurement tools and techniques

Identify the best contract type

Select the best bidder

Conduct a project procurement

Control and close a project procurement

Topics Include

The reason behind the growing demand for outsourcing

Effective procurement management planning

Organizing procurement management teams (PMTs)

Developing procurement requests-for-proposals (RFPs)

How to write an effective statements of work

Understanding contract types and incentives

Evaluating bidder proposals

How to select the best bidder

Negotiation strategies and techniques

Monitoring and controlling subcontractors

Analyzing subcontractor performance

Managing subcontractors when things go wrong

Terminating subcontracts

Students enjoy a varied and interactive curriculum of textbook readings, supplemental online procurement articles, engaging threaded discussions, bid selection practice, and detailed instructor materials that complement textbook reading assignments.

Professional Credit

The Project Management Institute (PMI)®--PMP® 15 Professional Development Units.

Paralegal Core Certificate Course©

9.0 CEU's

The nationally acclaimed core paralegal curriculum is a 14-week intensive program designed for beginning and advanced legal workers, such as legal secretaries, file clerks, and paralegals without formal paralegal training. While not a University of California, Santa Cruz-designated certificate program, the Paralegal Core Certificate Course© taught through the Center for Legal Studies (CLS) meets state of California paralegal certification requirements, and culminates in a certificate of completion. The instruction is practice-oriented and focuses on high-demand paralegal skills. Curriculum includes: Legal terminology, documentation, ethics, and the litigation process;

The evidentiary predicate—an introduction to the rules of evidence and civil procedure;

Identification of relevant authority;

Legal research techniques for use in legal memoranda, motions, and briefs;

Shepardizing® statutes, case law, the West Key Number System®, and the use of computerized legal research terminal; and

Legal writing and appellate procedure, emphasizing preparation and critique of legal memoranda, the interoffice memorandum of law and an appellate brief.

Student research assignments are thoroughly discussed and critiqued.

Course Structure

The subject material for this course is provided in two seven-week modules: Paralegal I and

Paralegal II. Your course fee includes both sessions. At the conclusion of Paralegal I, you will be asked to enroll in Paralegal II. Registration for Paralegal II is handled through CLS, not through UCSC Extension.

Enrollment and Course Materials

Students are required to enroll and purchase WESTLAW access for this course directly from The Center for Legal Studies. You can learn more about curriculum details, enroll and purchase required text books and Westlaw access at Paralegal Core Certificate Course©, or by contacting CLS at (800) 522-7737 or info@legalstudies.com .

Refund Policy: Students enrolling in the Center for Legal Studies programs and courses are accountable to the Center for Legal Studies refund policy and the associated fees. Learn more by visiting the Center for Legal Studies Course Policies.

People Analytics - Delivering Measurable Business Impact

1.5 Units

In People Analytics, students learn the power of using data to drive measurable business outcomes and design data-driven people strategies to catalyze change and transformation in the workforce. You will see how to find and use data, win support for your new people analytics program, diagnose missteps, predict success, and prescribe change based on data rather than intuition. With data as our foundation, we will discuss the four stages of analytics and common pitfalls of people analytics programs. Learn to motivate and inspire leaders to integrate data and analytics with their personal expertise, thus enabling a more effective use of an organization's most precious resources: people's time and energy.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Describe the key elements that make up a People Analytics program and be comfortable with basic statistics and analysis that are used in the field today.

Discuss how an organization might initiate a People Analytics program using existing internal and external data to measure business impact of human resources activities.

Explain how data can be used to measure business outcomes in a way that others in human resources and in the organization can understand and also action for improved business outcomes.

Identify what data is actionable, how that data can be used to understand the underlying impact of business activity, how to use data to predict and prescribe business outcomes in the field of human resources.

Professional Credit:

HRCI®---PHR®, SPHR® and GPHR® general recertification credit: 16.5 hours.

Effective February 22, 2020, this course is valid for 16.5 PDCs for the SHRM-CP® or SHRM-SCP®.

Personal Financial Planning Certificate Completion Fee

Once all of the certificate requirements have been met and your final grades are posted, please access your Student Portal to enroll in the "Certificate Completion Fee" to begin the review process. Please allow 4-6 weeks to receive your certificate.

Personal Financial Planning, Practicum

4.5 Units

This final course in the certificate program is open only to students who have completed all other required courses. You'll apply the skills and knowledge gained in prior courses through the extensive use of case studies, then undertake the process of preparing and presenting a complete financial plan in an environment of non-liability. You'll be exposed to the practical business and professional aspects of conducting a financial counseling practice, including ethics, and CFP®; standards of practice.

It is important that you have already successfully completed the two Foundation courses and five Required courses prior to enrolling in this final Capstone course. If you have any questions or have not met the prerequisite requirement, contact the department for approval by emailing extension@ucsc.edu before enrolling in this course. Learning Outcomes

At the conclusion of the course, you should be able to:

Demonstrate a comprehensive understanding of the content found within the Financial Planning curriculum and effectively apply and integrate this information in the formulation of a financial plan.

Effectively communicate the financial plan, both orally and in writing, including information based on research, peer, colleague or simulated client interaction and/or results emanating from synthesis of material.

Collect all necessary and relevant qualitative and quantitative information required to develop a financial plan.

Analyze personal financial situations, evaluating clients' objectives, needs, and values to develop an appropriate strategy within the financial plan.

Demonstrate logic and reasoning to identify the strengths and weaknesses of various approaches to a specific problem.

Evaluate the impact of economic, political, and regulatory issues with regard to the financial plan.

Apply the CFP Board Financial Planning Practice Standards to the financial planning process.

Personal Financial Planning, Survey

4.0 Units

This course introduces the professional and technical content of personal financial planning. It emphasizes the identification and quantification of financial objectives and the interrelated facets of a wide range of technical material. Topics include data gathering, income taxation, investment analysis and procedure, insurance, employment benefit plans, debt management, estate planning and cash-flow management. This course also covers the ethics, strategies and processes of professional practice and CFP® standards of practice. Included in the course work is an

introduction to some basic concepts of economics.

Note(s): An HP-12C or equivalent financial calculator is required.

Learning Outcomes

At the conclusion of the course, you should be able to:

Have a good understanding of the career opportunities and career paths for CFP® practitioners. Students will be introduced to various professionals and business models

Be able to evaluate how clients' beliefs, culture, and psychology influence financial behavior

Know how to identify the technical, business and communication skills utilized by a personal financial planning practitioner

Have a cursory knowledge of several subject areas required of a CFP® including: Income Tax, Investments, Risk Management, College Funding, Retirement Planning, and Estate Planning

Understand the background and the business, structural, and regulatory environment in which the personal financial planning profession operates and, in particular, that of a CFP®

Be comfortable with the basic economic principals such and supply and demand, GDP, the business cycle, interest rates, exchange rates

Be familiar with the steps involved in the personal financial planning process and recognize unethical practices based on the CFP® Board Standards of Professional Conduct.

Physical Design Flow From Netlist to GDSII

3.0 Units

With shrinking process technologies, physical design is becoming extremely challenging. Physical designers are responsible for producing high quality design tapeout, and an understanding of all aspects of physical design from synthesis to tapeout is critical to success. This course is an introduction to the ASIC physical design flow and tools from netlist (gate level) to GDS-II (fractured data). After an overview of the ASIC physical design flow and synthesis, the course starts with floor planning and block pin assignment. It then covers placement and clock-tree synthesis, followed by routing, and post-route optimization. You will learn RC extraction, static timing analysis, and physical verification. Upon completion of this course, you will possess the essential knowledge and hands-on experience with the backend physical design flows, from a synthesized netlist all the way to layout completion for ASIC chip tapeout.

In the lab, the instructor will explain the tools used primarily for the placement and route part using IC Compiler (ICC). Other tools will be integrated within the flow but are available for students to practice on their own.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Explain the terms and acronyms used in Physical Design

Discuss the concept of Physical Design, ASIC design flow (RTL-to-GDS)

Demonstrate the core features of IC Compiler which is used during the course

Generate a GDS from an RTL design

Skills Needed: Basic knowledge of backend design flow. Hands-on experience with Linux/Unix will be required for lab exercises.

PMP® Examination Preparation: 35 Hour

3.5 Units

Prepare for the PMP test with a PMI® Authorized Instructor.

This comprehensive 35-hour PMP® exam prep class provides an in-depth review of the most current exam content as well as study methods and techniques to pass the rapidly evolving, rigorous exam.

UCSC is an Authorized Training Partner with PMI-certified instructors trained in agile and hybrid approaches, PMI facilitation techniques, and modern learning and meeting delivery in a virtual environment.

We will cover each topic in the current version of the PMI® source document for the exam: A Guide to the Project Management Body of Knowledge, 6th Edition, Project Management Institute, Inc., 2017, as well as other key topics, not included in the PMBOK®.

Upon completion of the course, you will qualify for 35 education contact hours toward PMP eligibility.

Learning Outcomes:

The PMP® certification signifies that you speak and understand the global language of project management and connects you to a global community of professionals, organizations, and experts.

At the conclusion of this course, the successful student has: Successfully completed numerous practice exams.

Mastered test-taking and time-budgeting techniques to successfully complete the PMP® exam.

Practiced logical deduction to determine the best answers to exam questions, statements, and scenarios.

Gained a working comprehension of PMBOK® Guide terms, definitions, process groups, knowledge areas, and processes.

Learned to identify the inputs, tools and techniques, and outputs of the PMBOK® Guide's defined processes.

Note

This course does not meet the elective requirement for our Project and Program Management certificate program.

The Project Management Institute (PMI)®, the Project Management Professional (PMP)®, and the PMBOK® Guide are registered marks of the Project Management Institute, Inc.

PLEASE NOTE REFUND POLICY FOR THIS COURSE:

You may drop this course and receive a course refund any time BEFORE March 29, 2022.

Positioning and Brand Management

2.0 Units

Dynamic market positioning is a strategic process designed to build awareness of companies and their products. Through lecture, case-histories, and discussion, this course examines the step-by-step process used to position high-technology companies and their products. This course is designed for marketing-communication and product-marketing managers who are planning to launch new products or need to reposition existing products, and is of equal benefit to business owners and CEOs of small companies who want to understand how to leverage their marketing dollars by establishing powerful brands and positions in the market.

Learning Outcomes

At the conclusion of the course, you should be able to:

Consider basic models of Product/ Service Strategy, which inform Differentiation and Target Market selection

Evaluate how the Marketing Mix (4Ps) is used to differentiate Products/ Services

Understand the Product/ Service Positioning Process, including the basis for Differentiation

Understand Brand Architecture, its relevance and Brand Maintenance activities

Apply concepts in Positioning and Branding to your own projects in a practical workshop setting

Topics include

Assessing and analyzing markets based on benefit and feature sets

Evaluating existing positions and windows of opportunity

Understanding and developing brand values, touch points and personas

Mapping competitors in the market

Creating positioning statements

Establishing brand management throughout a company

Devising methods to preserve and enhance the brand

Post-Market Regulatory Obligations for Medical Devices

1.5 Units

Once medical devices are on the market, manufacturers are required to follow specific requirements and regulations. This includes investigating complaints, submitting to the FDA's eMDR system for reporting device malfunctions, injuries or deaths; handling recalls, managing post-market surveillance studies requirements under section 522 of the Federal Food, Drug and Cosmetic Act, as well as post-approval studies required at the time of approval of a premarket approval (PMA); and handling advertising and promotional labeling. This course offers the opportunity to apply these post-market regulatory requirements via in-class activities using case studies.

Power of Market Research

2.0 Units

Executives need market research to make informed strategic business decisions on product planning, target markets, customer requirements, communications strategies, pricing, distribution channels and many other factors. From high tech case studies where the feature set of a product and its competitors is the most important thing to research, to high volume internet and consumer businesses where user trends need to be statistically analyzed and forecasted, this course will show the market power you can gain from key knowledge points.

Topics range from basic survey techniques in both primary and secondary research to an understanding of the power of statistical fact-gathering and analysis including:

Sources of secondary research

Primary research process and costs

Developing a survey for in-person and online usage

Translating, assessing and defining market trends

Customer profiling and typical product persona development

Competitive market segment and customer analysis

Integrating results into business planning

Learning Outcomes

At the conclusion of the course, you should be able to:

Select the appropriate types of research to meet a specific business need/question.

Develop a research plan.

Create a survey script to collect primary data to achieve research objectives.

Analyze primary and secondary data to extract pertinent information.

Make recommendations based on data collected.

Through lectures, projects, reading, analysis of case studies and class discussions, you will learn to identify the strengths and limitations of market research, as well as the proper ways to gather and

present information.

Practical Design with Xilinx FPGAs

3.0 Units

Field Programmable Gate Arrays (FPGAs) are configurable logic devices with programmable links. They allow you to implement, update, and ship ASICs with low non-recurring engineering costs and are widely used in system design. This course offers a practical introduction to programmable logic design with Xilinx FPGAs, emphasizing design implementation. The course focuses on improving design methods to advance overall design quality; in essence, to bulletproof a design. Standard logic designs translate automatically and effectively to the world of field programmable logic devices. The course covers common methods based on design constraints used in most design software. You will learn design implementations such as clocking (which creates various clock frequencies from an external reference), including how to handle control and data signals migrating across different clock domains, how to manage clock jitter and debounce input asynchronous signals. You will also learn to manage ground bounce and control power dissipation, while including considerations for safety and security. Practical design examples include discussions of RAM, DSP blocks, basic fabric and A/D converters.

The course places an architectural focus on the Virtex-7, Artix and Kintex families, as well as the Zynq programmable system on a chip. In-class demonstrations and student design projects will feature the Xilinx Vivado Webpack design software. By the end of the course, you should be able to complete practical designs with Xilinx FPGAs and understand design and timing reports. The course includes a student project with design tools; real device implementation or programming is optional.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Implement a practical design on Xilinx hardware

Debug a design on Xilinx hardware

Use the Xilinx Vivado tool

Explain common Xilinx FPGA features and how to use them in the software tool

Demonstrate a broader view of FPGA applications and an understanding of programmable products in the market

Note(s): Students are required to purchase a Zynq-based board for their project (approximately $100, not included in the tuition). Detailed board information and instruction will be provided on the first night of class.

Skills Needed: Experience with logic design of digital systems or equivalent knowledge. Familiarity with Verilog design language.

Practical DFT Concepts for ASICs: Nanometer Test Enhancements

3.0 Units

Below 45 nanometers, testing application-specific integrated circuits (ASICs) and system on chips (SOCs) becomes very challenging. The dense spacing of lines on silicon, gigahertz clock rates, newly-emerging fault classes—these factors make it difficult to reach even 98% coverage. This course is ideal for integrated circuit (IC) designers seeking a deeper understanding of test issues, or test engineers wanting to stay current with emerging trends and tools. This course is filled with engineering insights. It first builds a solid foundation in scan-based design —a necessary skill for understanding more recent techniques like delay-fault testing, scan compression, and built-in self test (BIST). Students will gain hands-on experience in building scan chains and generating test patterns, using Synopsys DFT Compiler (DFTC) and TetraMAX ATPG. You will learn advanced topics such as inserting multiple scan chains, employing sequential ATPG to handle non-scan flops, optimizing DFT logic, understanding LBIST and MBIST, and following nanometer trends in testing.

The systematic hands-on labs reinforce techniques introduced in lecture, and are packed with useful information and practical guidelines. By the conclusion of the course, you will be able to hand off a full-scan design and generate a high-coverage test program for nanometer ASIC.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Use Design for Test Compiler (DFTC) to perform test-smart synthesis and insert scan chains

Explain in detail how full-scan design enables ATPG to generate a pattern for particular testable fault in fault universe

Hand off a full-scan design from DFTC to TetraMAX, and make use of all key features of the ATPG tool to generate a high-coverage test program. Employ sequential ATPG to handle non-scan flops

Explain how on-chip BIST replaces external ATE, generating patterns and compacting the response

Discuss nanometer trends in testing, such as detecting delay and bridging faults, adaptive scan, strategies for IP cores, testing low-power designs, and supporting testing of on-chip analog content

Skills Needed: A working knowledge of digital logic design is recommended.

Practical Emotional Intelligence for Agile and Project Leaders

1.5 Units

This course provides a practical set of leadership tools you can immediately use to develop strong working relationships among agile and project team members and stakeholders. The introduction to enhanced communications will help to minimize conflict management tensions, reduce staff turnover, and keep schedules and budgets on track.

Learning Outcomes

At the conclusion of the course, you should be able to:

Practice non-tangible leadership traits demonstrated by successful agile and project leaders to develop a team culture of accountability and responsibility.

Define and use emotional intelligence (EI) composites.

Apply emotional intelligence concepts within real-world scenarios.

Apply methods leaders use to align and motivate diverse teams to collaborate toward a common goal.

Develop communication strategies and constructive win-win outcomes to encourage strong teamwork.

Implement action plans to immediately begin using their new EI leadership skills in the workplace.

Key Topics

Real-world (EI) scenarios Recruitment strategies

Agile critical success factors

Situational leadership

Applying the PMI Talent Triangle®

Communications among scrum teams and stakeholders Mission and gaining commitment

Communicating with differently thinking people

Matrix team management and alignment

Real-time communication challenges

Conversation, collaboration, and the innovate cycle

Professional Credit

The Project Management Institute (PMI)®--PMPR 15 Professional Development Units.

Predictive Analytics: Applications of Machine Learning

3.0 Units

Over the past decade, machine learning has emerged as a critical research area with wide-ranging practical applications in engineering and commerce. Industries as diverse as retail, robotics, manufacturing, and social networking continually provide new examples. How do machine learning engineers know which techniques to implement in this dynamic and evolving field? In this fundamentals course, we prepare you to answer that question. Through hands-on activities you will begin to understand, build, and test machine learning techniques. You will receive a broad introduction to the key learning methods, including regression, classification, clustering, and recommender systems. The focus is not on individual algorithms but rather the ideas that make them work.

In addition to reviewing the steps involved in building predictive models, including data collection, feature selection, algorithms and evaluation, you will learn from case studies to fine tune the performance of these models and plan for practical implementation issues.

Using Python/R you will work with machine learning concepts, terms, and methodology gaining an intuitive understanding of the mathematics underlying it by building actual applications. The techniques you'll learn are the foundation for real-world applications such as classification, regression, image analysis, and bioinformatics. Pseudocode will be provided for most of the algorithms. Homework assignments are designed for in-depth practice.

By the end of the course, you will have a basic understanding of machine learning techniques and know how to apply basic machine learning tools in practical situations. You will have experience with methods to formulate and solve machine learning problems in Python/R and will have completed several assignments and a project using supervised or unsupervised learning algorithms.

Topics include:

Review of R/Python (NumPy, SciPy, pandas, Scikit-Learn, Matplotlib)

Fundamentals of machine learning

Linear regression and logistic regression

K-nearest neighbors (k-NN) and support vector machine

Bayesian classifiers: naïve Bayes

Decision tree and random forests

Unsupervised learning

Dimensional reduction: PCA, ridge regression and lasso methods

Performance evaluation

Brief introduction to deep learning

Skills Needed: Skills Needed: Basic programming experience is recommended. Python/R experience can be helpful. Basic knowledge of probability and statistics is required.

Preparing for FDA Inspections and Conducting Sponsor Audits

1.5 Units

In the regulated pharmaceutical and biotech medical device industries, inspections by government agencies are often a prerequisite for new product-marketing approvals. Knowing what to expect and how to prepare for and respond to such inspections is as critical as conducting sound clinical research. As the FDA and other regulatory authorities increase the frequency of inspections, it is imperative that everyone involved in the development of new therapies be familiar with government inspection processes and their role during these inspections. This course helps participants prepare for FDA inspections and conduct sponsor audits. Topics include:

Investigator and sponsor/monitor inspections

How and when inspections occur

FDA inspection procedures and practices

Conducting sponsor audits and inspections

Interacting professionally with inspectors

Responding effectively to inspectors' observations

This course benefits professionals involved in all aspects of clinical research including sponsor clinical development personnel, quality assurance and compliance, investigators, monitors, regulatory affairs personnel, data managers, and safety surveillance personnel.

Professional Credit: CA BRN/LVN Credit--Provider #CEP13114.

Principle Based Leadership for Project Managers

1.5 Units

The landscape for project management is changing, requiring an iterative, value-based, model to remain competitive in a dynamic, changing market. To align with organizational goals and customer value, project managers need to create a set of actionable outcomes to execute projects based on values and principles.

In this course, you will assess values and principles, including Waterfall, hybrid, and agile models and frameworks. You will learn how to make value-added decisions for the benefit of project stakeholders that are in alignment with the goals of an organization.

Learning Outcomes

At the conclusion of the course, you should be able to:

Review and understand principles from Waterfall, hybrid, and Agile project management frameworks

Create a strategic objective from an assigned case study

Design a strategic plan that maps values to principles to outcomes

Create a strategic work breakdown structure (WBS) that maps principles to tactical execution items

Topics

Compare and contrast agile frameworks—Scrum, Agile Manifesto, Modern Agile, Disciplined Agile, Scaled Agile

Compare and Contrast project management frameworks

Discuss the strategic values of a company case study

Professional Credit

The Project Management Institute (PMI)®--PMPR 15 Professional Development Units.

Principles of Business Analysis

3.0 Units

This course provides a sound foundation in business analysis concepts and lays the groundwork for advanced studies. You'll learn the Six Sigma techniques to define value; including the project management skills needed to plan, manage, and communicate; requirements management approaches needed to elicit, analyze, solicit, and verify requirements; and enterprise architecture techniques to promote knowledge retention, reduction of complexity, and reuse. Learn to control your current business processes and derive business requirements for process and automation projects that add value to your organization. The course includes group and individual exercises, a threaded case study, and an action planning on-the-job (OTJ) implementation.

Learning Outcomes

At the conclusion of the course, you should be able to:

Discuss fundamental business analysis concepts

Distinguish between the roles of a business analyst and project manager

Identify the key business analyst responsibilities and deliverables in each of the knowledge areas

Identify stakeholders and select appropriate techniques for eliciting their requirements

Understand business analysis tasks necessary to complete a business analysis effort

Describe how a business analyst works with stakeholders to identify and comprehend their needs

Understand how a business analyst manages issues and changes to maintain agreement on solution scope

Decide which business analysis activities are most appropriate to identify needs

Clarify needs and solutions with various stakeholder groups

Define business analysis tasks that progressively elaborate stakeholder and solution requirements

Determine business analysis tasks that progressively elaborate stakeholder and solution requirements when gaps are identified

Professional Credit

The Project Management Institute (PMI)®--PMP® 20 Professional Development Units.

Principles of Drug Discovery and Development

4.0 Units

The discovery and development of a new drug is a complex, lengthy, and expensive process, and given that regulatory approval to market a drug is required before a company can generate revenue, it is one of the most risky endeavors that a company can undertake. In this course, you will examine this process -- from the discovery of small synthetic and generation of large biologic drug molecules through the preclinical efforts involved in evaluating and enhancing the pharmacologic properties of a potential drug for safety and efficacy. We'll discuss the objectives, the overall mechanics, and ethics of testing investigational drugs in clinical studies with human volunteers. Lastly, we'll take a look at how the U.S. Food and Drug Administration (FDA) reviews the marketing application for a new drug, and the post-approval requirements it imposes on biopharmaceutical sponsors. During the course, you'll get a sense of what makes the biopharmaceutical industry a fascinating area for study when we consider the science and government regulations underlying the development of drugs, as well as the politics often associated with bringing a new drug to the marketplace. Many of the topics discussed in the course are infused with real-world examples to demonstrate the challenges that those employed in the biopharmaceutical industry routinely face as they try to advance a potential new drug through the developmental pathway to FDA approval. The course provides an important foundation in drug development for professionals from all disciplines who are currently working in or are considering a move to the biopharmaceutical industry.

Principles of Educational Therapy

3.0 Units

This course provides an interactive overview of the educational therapist's role, including discussions of ethical practices, state and federal laws related to professional responsibilities and the therapist's limitations. The responsibilities of the therapist, including case management, information gathering, assessment practices, goal setting and intervention strategies are also examined.

Learning Outcomes:

At the conclusion of the course, you should be able to

Define the profession of educational therapy and its relationship with other allied professions

Identify the common qualities of educational therapists

Describe the history of the profession

Discuss the variations across different forms of educational therapy practice with particular attention to individual clinical practice

List the components of a clinical, educational therapy practice

Identify common ethical issues

Determine one's eligibility for meeting educational therapy standards of practice

Principles of Marketing

2.0 Units

Marketing is the convergence point for issues involving the customer, the competition, and corporate capabilities. It is the constantly evolving field of exchange relationships.

In this course, students explore the fundamental principles of marketing in context of corporate, economic, and societal influences. We take a deep dive into the strategies and best practices in today's marketing world, focusing on the practical knowledge that managers need to be effective in both product- and service-based industries.

Learning Outcomes

At the conclusion of the course, you should be able to:

Describe what marketing and strategy are;

Conduct market and industry analyses; and

Apply different strategies to build a customer-driven strategy and mix.

Topics may include:

The role of marketing in shaping and developing new ideas;

Factors that affect pricing;

Channels through which products and services are distributed;

Elements of wholesaling and retailing; and

The strategies, mechanisms and techniques behind advertising, direct sales, and other forms of promotion.

We will also analyze the impacts of changing lifestyles and international market forces on American buying patterns, as well as consumer and organizational buying behaviors. Students will get an overview of the world's leading markets and businesses and learn methods and resources for researching and segmenting. Group discussions will include the career opportunities in marketing and marketing management.

Printed Circuit Board Design for Signal Integrity and EMC Compliance

1.5 Units

This course presents simplified design techniques for the design and layout of printed circuit boards to achieve both signal integrity and electromagnetic compatibility (EMC). Signal integrity is a primary concern for system functionality while EMC compliance allows a product to be legally sold.

This course was developed for both experienced and entry level engineers who are responsible for printed circuit board designs and system level products. Upon completion, students should be able to create a high-density, high technology printed circuit board that meets or exceeds test and system level requirements easily. In an informal tutorial format, design and layout techniques are introduced in a simple to follow step-by-step presentation that allows plenty of opportunities to address specific questions. Major instructional emphasis is placed on real-life examples that demonstrate good layout practices that can be incorporated immediately. Simulation results will be presented to demonstrate basic principles. This course is taught at the fundamental level, not tied to any PCB tool. Rigorous mathematical analysis and theory will not be presented. Multi-layer, high-density designs is the focus of the course, however, single- and double-sided designs are examined based upon fundamental concepts for multi-layer boards.

Topics Include:

Fundamental concepts of signal integrity and EMC

Material science related to construction of a printed circuit board

Suppression and grounding

Layer stackup assignments

Power distribution networks (bypassing/decoupling)

Transmission lines requiring impedance control and routing

Transmission line termination

Interconnects and I/O

Electrostatic discharge protection

Backplanes and large busses

Miscellaneous design techniques and concepts

Skills Needed: Prior experience with printed circuit board and system level design and testing is highly desired. A solid foundation in basic electrical engineering principles helps one understand fundamental design concepts. This course targets the spectrum of designers, from entry-level to senior engineer, including EMC engineers.

Procurement and Supply Chain Management Certificate Completion Fee

Once all of the certificate requirements have been met and your final grades are posted, please access your Student Portal to enroll in the "Certificate Completion Fee" to begin the review process. Please allow 4-6 weeks to receive your certificate.

Product Marketing and Management

2.0 Units

Formerly titled "Product Management: Moving the Product to Market."

This in-depth introduction to product management, product marketing and product marketing engineering covers everything from core concepts and terminology to process management. The

course is designed to meet the needs of product managers, product marketing managers and product marketing engineers who are charged with driving products to market but who may be new to the disciplines and processes involved. Participants learn to manage the process of shaping final products and taking them into the marketplace all from the perspective of the customer advocate.

Learning Outcomes

At the conclusion of the course, you should be able to:

Provide hands-on experience taking a concept through the product life cycle.

Give students access to product management industry leaders to provide feedback and exposure.

The objective is to teach real world business and product management skills. We are focused on practical skills and how this works in real life over theoretical frameworks

Equip students who wish to pursue a PM career with the skills and knowledge they need to succeed.

Teach students need-finding skills and general problem-solving skills.

Topics Broadly Include

Concept of the 'whole' product and product lifecycle

Product planning, scoping markets, pricing and margins, forecasting

Product management, MRD and PRD, roadmaps, metrics

Product packaging, costing, production

Product positioning, persona, promotion, launch planning

Product support for sales, channels, merchandising

End of life (EOL) planning

Analyzing customer needs

Researching and sizing markets

Evaluating competition

Developing product requirements

Assessing ROI

Managing product lifecycles

Working with engineering, marketing and sales

Working with sales channels

Prerequisite Skills: Familiarity with basic concepts in business, marketing, would be relevant. Besides that, there are no prerequisite skills needed for this course.

Programming for Cloud Computing: Amazon Web Services

3.0 CEU's

Amazon Web Services (AWS) is the leading Infrastructure-as-a-Service (IaaS) cloud provider. AWS provides a large suite of services - accessible via APIs - that are used to set up a "virtual" IT infrastructure, run applications in the cloud, and provide services to applications running outside of the cloud. This course focuses on the concepts and programming techniques used by both IT professionals and application developers to setup, configure, and deploy applications into AWS. The course also covers the use of AWS cloud services from applications and tools that run outside of the AWS cloud. The course will start with a brief overview of cloud computing that focuses on IaaS. Discussions will address the various AWS compute, storage, database, networking, messaging, monitoring, and deployment services as well as APIs including: EC2, Auto-Scaling, EBS, S3, SimpleDB, RDS, ElastiCache, Load Balancing, VPC, SQS, SNS, SES, CloudWatch, and Beanstalk.

Upon completion of this course, you will understand the technologies and tools used to work with the AWS cloud. You will gain hands-on experience through a class project that involves designing, coding, and deploying a cloud-focused tool or application. Students interested in an "IT-centric" project can use scripting languages (e.g. Ruby, Perl, or Python) to set up and manage an AWS cloud. Students interested in a software development approach can use programming languages such as Java, Objective-C, C#, or Ruby-on-Rails to develop and deploy an application that uses AWS Cloud services or resides in the AWS Cloud.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Describe REST-based APIs

Demonstrate how to setup and configure AWS services

Explain how to use Amazon's AWS APIs for EC2, S3, SNS, SQS, DynamoDB, and other services

Topics include:

Review of cloud-computing concepts: scalability, cost, virtualization, IaaS

Accessing AWS: the AWS console

Using AWS services: using an AWS programming library

Compute: EC2, Auto-scaling, regions and availability zones

Volumes: EBS

Storage and database: S3, SimpleDB, RDS, ElastiCache

Networking: Load Balancing, VPC, Direct Connect, Route 53

Messaging: SQS, SNS, SES

Monitoring: Cloud Watch

Application deployment: Beanstalk

Note(s): There will be an additional cost for accessing AWS capabilities for class project. Cost may vary but is generally low.

Skills Needed: Experience developing programs in any of Python, Perl, Java, C# or Ruby.

Programming for Data Science with Python Specialization (instructor-led)

Curriculum in this introductory specialization prepares you for a data science career by teaching you the fundamental data programming tools: Python, SQL, command line, and git. Working through a series of projects you will investigate a database; use Python to explore company data and answer analytical questions, and write code; and post your work on Github, learning key, widely used programmer tools. **Takeaways**

By the end of this program you will understand: SQL fundamentals such as JOINs, aggregations, and subqueries.

How to use SQL to answer complex business problems.

Python programming fundamentals such as data structures, variables, loops, and functions.

How to work with data using libraries like NumPy and Pandas.

Version control and how to share your work with other people in the data science industry.

Format

This specialization, estimated to take four months, is an instructor-led format that meets together weekly as an online class to discuss material and assignments.

Month-by-Month Subscription at $899 per month

The model allows you to pay in full upfront or on a month-by-month basis. Learn more about the subscription model in our FAQ section.

Prerequisites:

None

Programming for Data Science with Python Specialization (self-paced)

Curriculum in this introductory specialization prepares you for a data science career by teaching you the fundamental data programming tools: Python, SQL, command line, and git. Working through a series of projects you will investigate a database; use Python to explore company data and answer analytical questions, and write code; and post your work on Github, learning key, widely used programmer tools. **Takeaways**

By the end of this program you will understand: SQL fundamentals such as JOINs, aggregations,

and subqueries.

How to use SQL to answer complex business problems.

Python programming fundamentals such as data structures, variables, loops, and functions.

How to work with data using libraries like NumPy and Pandas.

Version control and how to share your work with other people in the data science industry.

Format

This specialization, estimated to take four months, is taught in a self-paced, online curriculum format.

Month-by-Month Subscription at $399 per month

The model allows you to pay in full upfront or on a month-by-month basis. Learn more about the subscription model in our FAQ section. .

Prerequisites:

None

Project and Program Management Certificate Completion Fee

Once all of the certificate requirements have been met and your final grades are posted, please access your Student Portal to enroll in the "Certificate Completion Fee" to begin the review process. Please allow 4-6 weeks to receive your certificate.

Project Integration and Risk Management

3.0 Units

In order to compete in today's economic environment, companies must be able to develop products and services rapidly and successfully. This course equips students with project-integration and risk-management tools and skills, including how to plan and organize projects, determine and manage product requirements, and handle project risks.

Students will learn from weekly team exercises designed to simulate a real-world project planning and execution environment. This course shows participants how to put powerful tools and techniques into practice and get outstanding results in industries such as systems, software, IT, Web, integrated circuits, hardware, services, medical, biotech, and more.

Learning Outcomes

At the conclusion of the course, you should be able to

Work in a self-organizing agile team to iteratively develop and deliver complex products

Integrate all aspects of a project by developing a comprehensive project plan

Define and manage project scope to eliminate "scope creep" and "scope leap"

Elicit and analyze product requirements using a Work Breakdown Structure

Identify, evaluate and respond to project risks

Quickly and accurately minimize the overall project schedule

Develop critical path schedules

Estimate and justify project reserves

Control changes to the project plan using integrated change control

Monitor and control a project using Earned Valued Management

Conduct scope verification and properly close the project

Topics Include

Integrating all aspects of a project

Managing project scope

Conducting efficient project status-review meetings

Eliciting, analyzing, and validating product requirements

Successfully managing project risks

The course is designed for project leaders, team members, engineering and marketing managers, directors and vice presidents, and provides a proven set of global best practices to help them achieve fast time to market.

Professional Credit

The Project Management Institute (PMI)®--PMP® 30 Professional Development Units.

Project Leadership and Communication

3.0 Units

This course is designed to equip students with the "soft skills" needed for managing projects, including leadership, communications, team organization and development, conflict management, quality management, and negotiating. Using case studies and exercises, students explore vital aspects of project leadership such as the use of participative management to build commitment, leadership styles, organizational cultures and configurations, interpersonal skill development, project staffing, and working with distance-separated teams. Students also learn to establish clear project goals, overcome communication problems, write performance reports, and manage agreement.

Learning Outcomes

At the conclusion of the course, you should be able to

Describe and apply various leadership styles

Recognize various organizational structures and operate efficiently within them

Demonstrate several motivational and influencing skills

Assess one's own leadership strengths and weaknesses and create a development plan

Describe how and why we filter "reality" – in other words, perception

Demonstrate methods for gaining commitment to projects

Establish open and honest communications within a project

Acquire, organize, motivate and reward teams

Describe and Demonstrate techniques for leading both co-located and virtual teams

Delegate efficiently

Manage conflict and negotiate effective agreements

Topics Include

Project leadership versus project management

Improving project communications

Building commitment to the project

Successfully managing conflict

Using the Johari Window to assess your interpersonal skills

Professional Credit

The Project Management Institute (PMI)®--PMP® 30 Professional Development Units.

Psychology of Human Learning

3.0 Units

The principles of cognitive, developmental and social psychology, as they apply to the exceptional learner, are examined in this course. Current research is reviewed as it relates to individual differences, the learning process, and theories and problems of learning, including the impact of motivation and intelligence on the special learner. The fundamentals of physical, motor, social and emotional development at critical stages are examined. This course covers the key human learning

theories, including classical, social, Piagetian, and information-processing perspectives.

Learning Outcomes:

At the conclusion of the course, you should be able to

Understand cognitive, social, and linguistic development

Learn theorists and theories of learning (past and present)

Understand and apply core concepts of learning differences, assessment, and memory

Public and Analyst Relations

2.0 Units

Formerly titled "Public Relations: Winning the Mindshare Battle". In today's world, the concept of mindshare is crucial to building successful public relations campaigns. Because customers have access to more information about a company, there is an increasing amount of public discussion about its activities, products and services. Without mindshare, marketing efforts can become misguided, superior technology fails to be adopted, and even the most promising companies fail to blossom. Yet winning the mindshare battle is more challenging than meets the eye.

Today's public relations practitioner needs to be an integrated media person who can build trust and credibility by gaining exposure and creating an ongoing dialogue with customers. By leveraging a variety of readings, exercises, case studies and guest speakers, this course explores the power of public relations to build credibility, trust, goodwill and reputation. The course is a good fit for professionals at various stages of their careers who want a strong foundation in PR basics and are interested in building comprehensive PR strategies.

Learning Outcomes

At the conclusion of the course, you should be able to:

Define public relations

Describe a comprehensive view of public relations strategy

Apply some of the tools of public relations

Identify a career path in media and analyst relations, using diverse skills such as writing and editing, rich media, social media, communications planning, positioning and messaging, executive communications, or measurement and analysis

Topics include

Communications channels

Trade shows and event management

Photography

Wire services

Search-optimized press releases

Editorial calendar management

Press conferences and press tours

Product reviews

Ongoing public relations management

Budgets for international PR

Spokesperson training

Crisis communications

In-house vs. agency PR

Python for Data Analysis

3.0 Units

With data now being created at the rate of 2.5 quintillion bytes a day, there is a tremendous demand for people who can explore vast amounts of data. In this lab-based course, you will learn how to glean empirical truth from data using Python with Pandas, how to make the right decisions, and how to bring order from chaos.

Experience Python's straight-forward syntax, built-in data types, and object-oriented programming (OOP) and make your own data types. Learn how Python's brilliant architecture allows you to jump into any of more than 100,000 libraries provided for Python. In this course you work with the Pandas, Numpy, and Matplotlib libraries to inspect data, manipulate data, calculate statistics, and provide informative and beautiful visual representations for data sets via interactive Jupyter Notebooks. **Learning Outcomes:**

At the conclusion of the course, you should be able to:

Describe Python's underlying object model, operators, and syntax

Employ Pandas, Numpy, and Mathplotlib through Python and Jupyter Notebooks

Clean, manipulate, analyze, and graph data

Create Python functions to customize the behavior of data transformations

Grasp and emulate the online Python/Pandas/Matplotlib data analysis examples

Topics Include:

Pandas, DataFrames and Series for data sets:

* Cleaning

* Collating

* Extrapolating

* Analyzing

* Dealing with timed data

Matplotlib for presenting graphs

Python for using the data libraries effectively

Skills Needed: Helpful, but not required, are a basic experience in any programming language and a rudimentary knowledge of statistics.

Python for Machine Learning and Artificial Intelligence, Essentials

3.0 Units

This course introduces students to the Python programming language essential for data manipulation, statistical analysis, and modeling techniques required for machine learning and artificial intelligence.

We will explore the wonderfully concise and expressive use of Python's advanced module features and apply it in probability, statistical testing, signal processing, and various other applications.

Students will explore mathematical operations with array data structures, optimization, probability density function, interpolation, fast Fourier transform, basic signal processing, and other high-performance benefits of core scientific packages such as NumPy, SciPy, sklearn and scikit-learn, and Matplotlib.

Once you gain a deep understanding of the practical aspects of Python for data wrangling involved in ML and AI applications, you will be a more effective problem solver when dealing with engineering and scientific challenges in your own career.

Learning Outcomes

At the conclusion of the course, the student should be able to:

Develop complex functions and scripts to perform complicated calculations to solve engineering, financial, mathematical and scientific problems and visualize the results of these calculations.

Install, configure Python and essential Python development tools and write programs to perform data analysis, statistical analysis, learning and AI techniques.

Manage and manipulate data, perform data type conversions, merge datasets, deal with missing values, and extract, delete, or transform subsets of data based on logical criteria.

Attain deeper understanding of the mathematical toolkit provided by powerful core packages and acquire hands-on experience.

Skills Needed: Basic Programming Knowledge and Fundamentals of Statistics

Python for Programmers

3.0 Units

Python language is gaining popularity because its use enhances program correctness and increases programmer efficiency. Because of its clear and elegant syntax, dynamic typing, automatic memory management, and straight-forward module architecture, Python is simple to learn and fun to use. Its code is easy to read, write, extend and modify. This lab-based course offers proficiency in the core concepts of Python, and the skills and knowledge for building applications using any of the hundreds of thousands of task-specific Python libraries.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Learn and practice writing Pythonic code: efficient, accurate, easy to read/write

Describe the Python environment and code introspection

Express Python Syntax: flow control, function protocols, exception handling and functional programming

Use Built-in data types: strings, tuples, lists, dictionaries and sets

Apply Object-oriented features: classes, inheritance and overriding

Build applications, packages, and libraries

Create iterators, generators, decorators, and context managers

Topics include:

The Python environment: interpretation, integrated development environment, code introspection

Syntax: flow control, f-string formatting, function protocols, exception handling, functional programming

Built-in data types: strings, tuples, lists, sets, dictionaries

Sequence manipulations: slicing, accessing, packing, unpacking, sorting by an arbitrary sort key

Object-oriented features: classes and inheritance

Building applications, modules, packages, and libraries

Popular libraries: os, sys, copy, unittest, cProfile, optparse, unittest, shutil, tempfile, subprocess, and more

Pythonic thinking: namespaces, internationalization, iterators, generators, decorators, dynamic coding, context managers

Note(s): The Python interpreter is free software and runs on all popular platforms.

Skills Needed: Significant experience in any programming language.

Python: Object-Oriented Programming

2.0 Units

Demand for Python programmers who understand the latest skills in today's fastest growing computer language, grows every day. Object-oriented programming (OOP) has become a must-have technique in today's high-tech software development jobs.

In this intermediate course, students will use Python to explore OOP techniques including: encapsulation, polymorphism, and inheritance. The material is introduced and explained through the development of graphical user interface elements and, in a fun way, by building highly approachable, simple computer games. The Python language, because of its simple syntax, makes the implementation of OOP very clear. To build interactivity, we will use the well-known Pygame extension to introduce event-driven programs. Along the way, you will gain an intermediate level of understanding of the Python language. After this course, you should be able to translate the underlying concepts to other OOP languages with ease.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Implement event-driven programs

Describe the elements that make up an object (class, instance, instance variable, method, class variable)

Explain how objects allow data and code to work together as a cohesive unit (as opposed to simple functions)

Describe the three main tenets of object-oriented programming: encapsulation, polymorphism, and inheritance

Make informed decisions about when it is appropriate to use encapsulation, polymorphism, and inheritance in practice

Take a complicated programming problem and break it down into a set of manageable, potentially re-usable classes

Incorporate graphical user interface (GUI) elements in programs, and describe how the underlying GUI code works

Topics include:

Object-Oriented Programming: Encapsulation, Polymorphism, Inheritance

Intermediate Python

Event-driven systems

Building graphical user interface elements

Simple games

Skills Needed: Basic programming experience with Python.

Python Programming for Beginners

1.5 Units

This hands-on, lab-based course is intended for newcomers to programming. Python is favored by first-time programmers because it presents engineering concepts in a straight-forward, clear language, while quietly and behind-the-scenes, it takes care of the difficult, tedious and error-prone details that present the major obstacles to writing a program in older languages. Python is an open-sourced language with rich features and is used extensively in the industries. The course covers the important concepts and programming mechanisms that exist in all programming languages: reading and writing to standard IO, using operators, controlling the flow of execution, using functions, reading and writing files, and basic object-oriented programming concepts. It also includes Python specific facilities such as code introspection, re-use, built-in sequence types, and iteration.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Develop programs using a basic IDE (Integrated Development Envornonment)

Develop small to medium size programs that demonstrate a solid understanding of software development in Python

Write Python programs using the core elements of variables and flow control structures

Write Python functions to facilitate code reuse

Work with the Python standard library

Write python programs following a specific style guide

Explore Python's object-oriented features

Note(s): If you are already familiar with any programming language, the pace of this course may be slow. If you have a basic understanding of Python, you may want to consider the intermediate level "Python: Object-Oriented Programming" (CMPR.X420). More experienced programmers should take "Python for Programmers" (CMPR.X416).

Python Specialization Completion Fee

Once all the requirements have been met and your final grades are posted, please sign into your student portal to enroll in the "Python Specialization Completion Fee" to begin the review process. Please allow four to six weeks to receive your credential.

Quality Management for Enterprises, Products, and Programs

2.0 Units

Quality management (QM)—planning, assurance, and control—is a critical skill in today's fast-paced business environment. In Quality Management for Enterprises, Products, and Programs, you will learn the widely adopted methodologies, such as Lean, Six-Sigma, and Continuous Improvement, which build successful outcomes. These are the techniques that produce organizational, product, and service excellence in corporations around the world.

You'll have the opportunity to work with typical framework, analytical techniques, and underlying principles and receive guidance with quality standards setting, root-cause analysis, and tactical decision making.

Learning Outcomes:

After successful completion of the course, students will:

Gain understanding of the importance of QM for products or services and its relation to customers / stakeholders' satisfaction

Strengthen their knowledge of the essential components of a QM plan, and experience the process of identify quality standards and criteria, and how to ensure or inspect for them

Distinguish among the main Quality Improvement methodologies and choose the most appropriate for the given situation

Utilize the most common Quality Assurance and Controls tools, understand analytical techniques, and synthetize information to prompt action or resolution

Gain exposure to upcoming trends in data analytics and prescriptive Process Control

Professional Credit

The Project Management Institute (PMI)®--PMP® 20 Professional Development Units.

Quality Management Systems for Medical Devices: ISO 13485 and FDA Requirements

2.5 Units

Through a series of lectures, interactive discussions and case studies, this course provides in-depth exposure to the fundamental concepts and major issues central to regulatory compliance in the medical device sector. The course emphasizes using the principles of the medical device quality system (QS) regulations and ISO 13485 as tools to take a process-oriented, risk-based approach to compliance, while achieving strategic business objectives in today's dynamic regulatory

environment. You will learn about key processes in the quality system medical device regulation (21 CFR 820) and ISO 13485, while learning how to address noncompliance challenges from a practical standpoint. The instructor provides insight into implementing an effective CAPA system and using it as an improvement tool. The course also discusses current industry trends, FDA initiatives, best practices for interacting with regulatory agencies, and a brief overview of the FDA Quality System Inspection Technique (QSIT) and Medical Device Single Audit (MDSAP) programs. formerly titled Medical Device Quality Systems Topics include:

"GXPs" and how they relate to each other

The FDA QS Regulation vs. ISO 13485, including updates to ISO 13485:2016

Regulatory intelligence resources

How to use principles of the FDA Quality System Regulation to critically analyze a real-world company

How to prepare and host regulatory inspections and use the quality system as a tool to achieve strategic business objectives

Note(s): This course was formerly titled "Medical Device Quality Systems" & "Quality Systems for Medical Devices: FDA QSR and ISO 13485"

Real Estate Investments for Professional Advisors

1.5 CEU's

Real estate investment can play a key role in any portfolio. In this course, we'll explore investment real estate fundamentals, the cash flow model, entity and group investing, financial behavior, and the intersect of real estate and personal financial wellness.

A highly interactive classroom environment includes course lecture, guest speakers, class participation, a cash flow analysis project, and a final exam.

Learning Outcomes

Understand the fundamentals of investment real estate

Apply the financial planning process to the evaluation of real estate

Create a real estate cash flow analysis

Calculate real estate cash flow, cap rate, and internal rate of return

Identify the merits of using debt in real estate

Recognize the tax benefit of owning investment rentals

Discuss the risks inherent in owning rental property

Integrate real estate into a comprehensive financial plan

Requisite Skills

You will need a level of comfort with basic calculations, financial concepts, and Excel software.

Note:

8/30/2021: We will NOT be offering the CFP® Board Continuing Education Credit for this course.

Real-Time Embedded Systems Programming, Introduction

3.0 Units

A real-time embedded system is designed to monitor and respond to external environments within a time deadline. A wide variety of devices that you see on the market today fall into this category - personal health and fitness trackers, smart thermostats, home security systems, and smart video cameras, to name a few. These systems interact with the environment using a variety of hardware and software interfaces. The embedded software manages these interfaces and makes sure that the tasks are accomplished within tight timing constraints. The Real Time Operating System (RTOS) on these devices is responsible for scheduling independent tasks and managing processes. This introductory course provides a foundation in the features and programming models of real-time embedded systems with hands-on learning. The course introduces the fundamentals of real-time scheduling and resource management protocols that are essential in designing and building commercial products and covers the use of RTOS to effectively design tasks and device drivers to meet real-time requirements. You'll learn about important topics in real-time systems, such as priority-based real time scheduling, interrupt handling, using timers, and detecting and preventing deadlocks. The course will also discuss multi-threading, cooperative versus preemptive multi-tasking and inter-process communications, focusing on programming in FreeRTOS and understanding internals such as schedulers and idle tasks.

You'll design and code a real-time embedded systems project in C language on an open source FreeRTOS emulator. Upon completion of the course, you'll understand real-time embedded systems programming and the interactions of hardware, software, and the OS in such systems.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Explain the fundamental concepts of real-time embedded systems including various scheduling and resource management protocols

Explain the software architecture of a real time embedded application, the hardware/software interfaces, the RTOS foundation, and the multitasking based design needed to meet real time requirements of the system

Use the hardware interfaces that embedded applications typically need to work with

Explain the RTOS kernel, scheduling mechanisms, task management, interrupt management as well as IPC mechanisms

Design and program an embedded system application using a RTOS simulator

Compare and contrast existing commercial RTOS for performance and applicability

Skills Needed: A strong background in C programming and an understanding of embedded system architecture.

Redesigning Your Career - Accelerated Weekend Career Workshop

1.5 CEU's

The job environment has become more complex with the use of computerized resumé tracking systems, online applications, and a myriad of other technology-based recruiting tools. Knowledge of how to penetrate the job market, particularly the 75 percent of the market that is never published, is more important than ever. In this course students will discover how to take charge of your career and develop a personalized, effective job-hunting toolbox for your life.

You will learn assessment methodologies, such as StrengthFinder and MBTI®, as well as goal-setting techniques, resumé craft, personal branding, marketing and key principles of effective job interviewing. Effective time management strategies become the foundation for consistent, lifetime career growth.

In this comprehensive two-Saturday course you will identify hidden career opportunities that fit your current career aspirations and your future career goals and then develop an effective marketing strategy and action plan. You will practice live interviews and participate in valuable feedback sessions.

The focus of this course is on jobseekers who are new to the U.S. job market, as well as people who are returning to the job market after taking time off for family and other personal reasons.

Learning Outcomes:

After successful completion of the course, you will:

Understand the importance of creating a lifetime career networking strategy.

Strengthen your knowledge of essential career plan components.

Experience the process of identifying sound career options and how to match those options to potential jobs.

Distinguish among popular assessment tools and choose how to use them most effectively in your career search.

Utilize common personal branding tools.

Understand interviewing techniques, and maximize the likelihood of obtaining interesting job opportunities.

Course Topics:

Identifying target careers

Developing networking strategies

Creating a personal brand

Building an effective LinkedIn profile

Developing a portfolio of resumés

Identifying interview pitfalls

Creating effective answers to difficult interview questions

Practicing and reviewing video of your actual interviews

Building effective support networks

Developing a strategic career plan

Creating a career action implementation program

Regulation of Drugs and Biologics

3.0 Units

Complex regulations govern the development, manufacture, and commercialization of biomedical products. This course will help you understand the regulatory requirements, both U.S. and international, for patented and generic pharmaceuticals, over-the-counter drugs, and biological products. Through lectures, case studies, and hands-on exercises, you'll gain knowledge and insight into the regulatory agencies and their roles and responsibilities, regulatory applications and pathways, post-marketing requirements, the impact of regulatory differences between U.S. and other countries, and how regulatory approval processes affect corporate strategy.

Regulation of Drugs & Biologics: Strategic Biopharmaceutical Product Development

3.0 Units

Complex regulations govern the development, manufacture, and commercialization of biomedical products. This course helps participants understand the regulatory requirements, both U.S. and international, for patented and generic pharmaceuticals, over-the-counter drugs, and biological products. This course also provides the basics of regulatory strategy in biopharmaceutical development examining the various regulatory pathways. Through lectures, case studies, and hands-on exercises, students gain knowledge and insight into the regulatory agencies and their roles and responsibilities, regulatory applications and pathways, post-marketing requirements, the impact of regulatory differences between U.S. and other countries, and how regulatory approval processes affect corporate strategy. The requirements and logistics of regulatory submissions will also be explored.

Learning Outcomes:

At the end of the course, students should be able to

Discuss FDA's jurisdiction and the reason for food, drug, and cosmetic laws

Define the various regulatory pathways available for biopharmaceutical products

Understand individual roles/responsibilities and how the biopharmaceutical industry works in general

STUDENTS: if you have taken and passed REGL.x403, you do not have to take REGL.x411 under the updated / new requirements for Track 1. REGL.x411 incorporates content that was in REGL.x403 and REGL.x406.

Regulation of in vitro Diagnostics in Europe and the US

2.5 Units

This course offers a comprehensive overview of the current European and U.S. Regulatory and Quality Affairs for in vitro diagnostic (IVD) products. You will gain a perspective on the critical elements of the regulatory requirements for obtaining IVD marketing approval. This course will take an extensive look into specific in vitro diagnostics topics and learn about the new and emerging regulatory requirements surrounding them. Learn about the impending transition for IVDs from the current European Directives (IVDD) to new substantially different European Regulations (IVDR), which will bring a majority of currently self-declared IVDs to require Notified Body involvement. Skills needed: "Quality Systems for Medical Devices: FDA QSR and ISO 13485" or working knowledge/experience in Quality Systems is needed.

Learning Outcomes:

At the end of the course, students should be able to

Discuss the current EU and US in vitro diagnostic device submission requirements

Explain the EU list based and risk-based method for classification of devices in the US and new EU IVDR

Understand how to create strategies to gain access to the current EU market

Define actions that can be taken at this time to prepare and facilitate transitions in conformity with the forthcoming European Regulations (IVDR)

Understand how to create strategies to gain access to the US markets

Discuss the critical elements and core principles for IVD device development

FDA's jurisdiction in the design, testing, marketing and post-marketing of medical devices; risk assessment

Explain the regulatory requirements for in vitro diagnostics manufactured in European healthcare institutions

Explain the regulatory requirements for US laboratory developed tests (LDTs) and device manufacturer requirements for clinical laboratories

Describe the diagnostic tests and test systems requirements to be issued a CLIA certificate of waiver

Discuss the effects of regulation of IVD diagnostics in US clinical laboratories and EU healthcare institutions and its effect on the IVD device manufacturing industry

Regulation of Medical Devices and Diagnostics

3.0 Units

What's the origin story of a medical device? Medical devices encompass a broad array of products, ranging from the tongue depressor to surgically implanted stents and pacemakers. This course provides individuals from all backgrounds with a solid grounding in the laws, regulations and institutions that underlie the process of medical device and diagnostic product development and marketing. The instructor first defines medical devices, provides an overview of the medical device industry and the historical roots of medical device regulation. You'll learn the unique aspects of medical devices and the pathways through which various classes of product are moved into the U.S. marketplace with a brief comparison to OUS approval processes.

Through lectures and case studies, you'll gain in-depth exposure to key routes to market, including 510(k) premarket notification and premarket approval applications (PMA). The instructor provides insight into the rationale and strategies for using each of these paths and others. You'll also learn the pre-clinical and clinical testing of devices, the investigational device exemption (IDE) application and process, and international laws and regulations as they relate to the U.S. counterparts.

The instructor also details post-marketing issues, including recalls, corrections and removals, as well as medical device surveillance and reporting requirements. The course also highlights current industry issues such as stand-alone software, IVDs, combination products, distribution of off-label information, physician payments, and more.

Individuals who are pursuing the Medical Devices Certificate Program who have already completed the "Introduction to Medical Device Regulation," do not need to retake the "Regulation of Medical Devices and Diagnostics" course.

Regulatory Affairs Certificate Completion Fee

Once all of the certificate requirements have been met and your final grades are posted, please access your Student Portal to enroll in the "Certificate Completion Fee" to begin the review process. Please allow 4-6 weeks to receive your certificate.

Regulatory Submissions: Devices and Diagnostics

2.5 Units

This course is designed to provide individuals with pragmatic knowledge of how to craft medical device submissions for approval by the FDA. Students should already have a foundation in medical device terminology, classification, and regulations prior to taking this course. Through lectures,

case studies, and hands-on exercises, new and experienced regulatory professionals learn how to work with the regulations, guidance documents, and style guides to write portions of key medical device submissions that both comply with the requirements and are clear to the reviewers. Students explore the content and process of medical device submissions, as well as gain insight into timelines, important strategic considerations and business impacts.

Learning Outcomes:

At the end of the course, students should be able to

Find the required regulations and guidance documents for device and diagnostic submissions

Use regulations and guidance documents to outline and construct a variety of device submissions

Appreciate the role that regulatory strategy play in the submissions process, for US device submissions

Topics include:

510(k)s: Traditional, special, abbreviated

PMA

Panel and Pre-submission preparation

Warning letter responses

Medical Device reports and IDEs

Note: In order to obtain maximal benefit, this hands-on course requires substantial out-of-class work on a submission project, where you will be crafting a 510K. Please plan your course schedules accordingly.

Relational Database Design and SQL Programming

3.0 Units

Most business and technical data consists of multiple tables with interlocking relationships. Such databases must provide reliable storage, transaction management, access security and multi-user support. In this course, you will learn the concepts and design for a Relational Database Management System (RDBMS) and focus on the Structured Query Language (SQL) to define and manipulate data. The course covers how to create conceptual, logical and physical designs of relational databases in response to a set of user requirements. Instructions will be provided through the use of several case studies. You will learn design methodology, entity-relationship diagrams (ERD) and normalization principles. You will use an Oracle database to design the ERD and implement a working database. SQL is the query language used to access, maintain and share data with the relational database. You will learn methods for producing readable output, creating and manipulating tables and creating and managing constraints using SQL.

The concepts and SQL language learned here apply to all major RDBMS. You will gain

understanding of the relational DB and have hands-on experience in creating database and working with data. The instructor recommends MySQL as an example database.

Learning Outcomes:

At the conclusion of the course, you should be able to

Describe a business or other activity in terms suitable for defining a relational database for that activity

Discuss and communicate database design and implementation with other practitioners

Compile the SQL code needed to create a database, as well as to insert, access and update the information in the database

Identify some of the key bottlenecks and deal with them

Topics Include:

Relational database concepts

Entity-relationship model

Normalization

SQL basics

SQL functions and operators

Restriction and formatting

Sorting and aggregating data

Transaction management and stored procedures

Combining queries with set operators

Managing tables and database performance

Skills Needed: Familiarity with general database concepts and ability to install software or databases on a personal computer.

Risk Management for Regulated Industries

3.0 Units

This course discusses how risk management is applied in the medical device, biotechnology, pharmaceutical and in vitro diagnostic (IVD) industries. Lectures and workshops delve into risk management concepts and tools, including hazard identification, hazard analysis, fault tree analysis, failure modes and effects analysis (FMEA), Hazard Analysis and Critical Control Point

(HACCP), mitigation application, regulatory requirements, the creation of risk management plans, reports and files, how to conduct Risk Management Reviews, and what might be audited in your Risk Management System. By the end of the course, you'll be able to conduct risk management for a variety of products, processes and services within the biomedical industries and beyond.

Learning Outcomes:

At the end of the course, students should be able to

Develop an understanding of Risk Management as part of the product and process development cycle by defining a hazard, levels of risk, types of harm, and to rank risk mitigation activity

Prepare a Hazard Analysis including hazards, hazardous situations, harms, and understand risk estimation

Perform a HACCP (Hazard and Critical Control Points) analysis as a qualitative process hazard analysis for process risk management for any process

Assess the application and results that critical tools of quality such as a Failure Modes and Effects

Analysis and Fault Tree Analysis can provide

Compose and document mitigations to risk in a suitable regulatory format

Enumerate the fundamental documentation requirements of ISO 14971 (Medical Devices – application of risk management to medical devices)

Prepare a Risk Management Plan in a device, a pharmaceutical product, a diagnostic product, or a process, which describes the tasks involved in successfully leading an ISO Quality System implementation project from start-up through Registration

Apply structured qualitative and quantitative risk management concepts and tools leading to a documented Risk Management Plan and Risk Management File that can be used in any due diligence for reducing risk in product, process or service development

Prerequisite(s): Students need to possess reasonable experience, background, and/or theoretical knowledge of medical devices, diagnostics or pharma. "Quality Systems for Medical Devices FDA QSR and ISO 13485" formerly titled "Medical Device Quality Systems" and "Introduction to Medical Device Regulation," or "Regulation of Medical Devices and Diagnostics," or "Medical Devices: Regulatory Strategies and Marketing Pathways," or equivalent experience.

Risk Management in Personal Financial Planning

3.5 Units

This course provides a survey of risk management with a focus on applying the fundamentals of risk management to such personal issues as premature death, medical costs, long-term care, property and liability exposures. After a review of the fundamentals of risk management, this course covers the techniques and strategies of risk management, including the use of various forms of

insurance and risk retention and reduction. You'll use readings, case studies, in-class discussion, and a review of real-world situations to understand of the often-overlooked, yet critically important, dimensions of personal risk management.

Learning Outcomes

At the conclusion of the course, you should be able to:

Explain the risk management process.

Analyze and evaluate risk exposures.

Compare and contrast group and individual health insurance alternatives.

Describe the differences between short term and long-term disability and calculate disability needs.

Identify the triggers for Long Term Care and advise about LTC options.

Explain the basics of annuity contracts and understand the differences among types of annuities.

Understand Individual Life Insurance, the underwriting process, types of life insurance policies, and provide recommendations.

Recognize the complications of closely held businesses and how to mitigate the associated risks.

Perform all types of insurance needs analysis.

Define and communicate main insurance policy terms.

Identify the components of property and casualty insurance; auto, liability and home.

Understand credit reports and scores and how to establish and maintain good credit.

Provide an overview of the social security system.

Role of the Project Manager

1.5 Units

The primary objective of this course is to acquaint students with a broad overview of project management and the roles that a project manager plays in the five project process groups involved in managing projects. In this course, the skills needed to successfully play these roles are identified and discussed. In addition, learning the life cycles of typical projects provides a basis for understanding the variety of skills needed, how these skills can be assembled, and how they relate to each other. A simulated project and exercises are used to illustrate the application of these skills.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Discuss the essential skills and traits project managers need to be effective in today's business environment.

Explain the five primary project life cycle phases and the responsibilities project managers have in

each of them.

Know the key constraints that impact all projects and how to manage them.

Create a Project Charter and identify the key stakeholders in your project environment. Develop the scope, schedule, and critical path of a project.

Develop an effective Communication Plan to inform all stakeholders.

Identify potential risks and qualitatively assess the likelihood and possible impact to your project with a Risk Register.

Monitor your project to determine if it is on target with respect to budget and time.

Take actions when controlling the project to keep it on track

Topics Include:

An overview of the five primary project-management processes

Writing an effective project plan; developing successful project schedules

Executing and controlling the project plan

The "triple constraint" and how it affects the project manager

Understanding project phases and project life cycles

Professional Credit:

The Project Management Institute (PMI)®--PMP® 15 Professional Development Units.

The Project Management Institute (PMI)® and the Project Management Professional (PMP)® are registered marks of the Project Management Institute, Inc.

Safeguarding the Supply Chain: Best Practices in Cybersecurity

2.0 Units

Rarely does a day pass without troubling reports of a new data security breach and the challenges organizations face as they scramble to mend new and persistent vulnerabilities. The federal government is prioritizing the nation's cybersecurity. Large organizations are rededicating tremendous resources to manage their risks. Smaller organizations, however, usually don't have the same resources to put critical safeguards in place and thus can introduce additional risk in the supply chain relationship.

In this high-level overview course, we will discuss the range of cyber threats, their impact, regulations, and best practices in the industry.

Learning Outcomes

At the conclusion of the course, you should be able to

Distinguish the impact of cyber threats in the supply chain

Explain basic NIST cybersecurity framework and security compliances

Compare and contrast cybersecurity best practices

Students will participate in interactive working sessions and highlight practical solutions for implementation at small and medium-size organizations.

Topics

Cyber threats

Impact of cyberattacks

National Institute of Standards and Technology cyber security framework

Cybersecurity hygiene and best practices for supply chain safety

Industry cyber compliance and requirements (NIST SP800-171, CMMC Levels 1-5, PCI DSS, HIPAA)

NIST cybersecurity framework

Cybersecurity Maturity Model Certification

Cybersecurity best practices

California Consumer Privacy Act and why you need to implement "Reasonable Security"

Sales Development Science Certificate Course

0.7 CEU's

The Sales Development Science certificate course is designed with one goal in mind: to provide you with the skills, credentials and knowledge to successfully land and launch a career in sales.

In this 10-week course, you'll learn the basics of how a sales organization operates and where sales development fits in. You'll get hands-on with data and sales intelligence tools, as well as key concepts like lead generation, lead qualification, and pipeline management.

Key Salesforce Tools and Career Insight

No. 1 CRM—You'll learn how to use Salesforce, the world's No. 1 customer relationship management system, including data input and import, dashboard creation, and report generation.

Trailhead Badges—You'll also earn resume-boosting Salesforce Trailhead badges that help you stand out as a qualified candidate.

Industry Knowledge—You'll gain an understanding of the key steps you can take to accomplish a successful on-ramp into sales and we'll break down roles in a sales organization and discuss potential paths for advancement.

Sales Dev Playbook—You'll walk away with in-demand skills, industry-recognized Salesforce credentials, and a Strategic Sales Development Playbook that showcases your sales knowledge and selling capabilities.

This course is provided in partnership with GreenFig.

Follow this link to enroll in the Sales Development Science Certificate Course.

Sales Operations Science Certificate Course

7.0 CEU's

In this 10-week course, we'll focus on operational efficacy, engage in best practices from leading experts, master critical concepts and strategies, and put your new skills to the test with hands-on practice in your individualized Salesforce Sales Cloud Developer environment. You'll also create a Strategic Sales Operations Playbook to help a real-world company reach more prospects, produce more pipeline, improve key processes, and generate more revenue.

Industry expert guest speakers

Strategic Sales Operations Playbook

14 Salesforce Trailhead badges

Demos and skill-development exercises in your Salesforce developer environment

Feedback from mentors

Expect to spend four to six hours each week completing assignments engaging with content created by industry experts, including hands-on activities and assignments in an online learning portal (LMS). Additionally, optional (but recommended) weekly mentor-led peer roundtables (one hour) are available for engaging live and online.

* Note: You can enroll up to one week after start date.

This course is provided in partnership with GreenFig.

Learn more about how to achieve success in Sales Operations.

Schedule Optimization Techniques for Managers

1.5 Units

As time-to-market reduction drives organizations to shorten their schedules, managers strive for optimal scheduling of people and other resources to keep project duration to a minimum. Recent developments in scheduling theory have provided managers with new techniques to find the best schedule for each project. These techniques take into account such factors as tasks of varying duration, precedence constraints, resource capabilities, resource loading, and business objectives.

This course presents several scheduling techniques that can be used for various projects including techniques for scheduling simultaneous projects in a matrix organization. Students are shown step-by-step examples of each technique and then work through several exercises in class. Participants learn how to select the best scheduling technique for a particular business objective and how to use schedule performance metrics to evaluate the effectiveness of the optimization techniques.

Learning Outcomes

At the conclusion of the course, you should be able to

Perform the calculations for that selected optimization technique

Evaluate quantitatively the performance of that optimization technique

Select the appropriate schedule optimization technique for a particular project business objective

Professional Credit

The Project Management Institute (PMI)®--PMP® 15 Professional Development Units.

Science of Clinical Trials Design

2.5 Units

This course reviews the science that forms the basis of effective clinical trial design. You'll learn to classify and describe trial design by stage in drug and device development. The course covers the purposes of clinical trials, including types of trial designs. You'll learn to define hypothesis and study objectives and determine population and sample size. Additional topics include:

Study procedures

Stopping rules

Basic protocol

Local standards of practice affecting clinical trials

Safety information measures

Scientific and ethical considerations

Validity of design, execution, analysis and reporting

Pharmacoeconomics

Merging phases for economic and marketing purposes

Multiple endpoints

Working with marketing to identify unmet medical needs

You'll gain hands-on experience designing clinical trials synopses and Phase 2 development strategies.

Professional Credit: CA BRN/LVN Credit - Provider #CEP13114.

Science Play: Inquiry-Based Learning Made Easy

1.0 Units

Young children ask a lot of questions. They are naturally curious about the world around them. Through playful science activities, teachers of young children can leverage that curiosity to create inquiry-based learning investigations. This course explores how easy it is to design an inquiry-based investigation using hands-on experiments, games, puppet shows, story books, and more. Lesson plans, mathematics connections, and California learning foundations in science will be discussed in the broader context of early childhood education. Science Play will inspire you to expand your comfort with science education and feel confident teaching science while keeping it developmentally appropriate and highly engaging.

Educators will learn to design hands-on lessons and units that connect to general curricular topics incorporating circle time activities, puppet shows, literature connections, and ideas for extending investigations. You will also learn inquiry-based and emergent science curriculum development, including methods for teaching children to document their own experiments and observations, and ways to document and communicate classroom science learning for parents and colleagues. Grades are based on reflections, lesson plans, and class participation.

As a foundation for understanding science principles appropriate for the early childhood classroom, the course examines the California Preschool Learning Foundations in science, as well as science position statements from the National Science Teachers Association and the National Association for the Education of Young Children.

Learning Outcomes:

At the end of the course, students should be able to

Describe how young children engage in science practices

Discuss how adults can leverage children's play in creating science investigations

Explain developmentally appropriate ways a child might demonstrate scientific understanding

Identify the California Science Learning Foundations for Preschool

Search Engine Marketing

2.0 Units

Your web site is your marketing window to the world. But how will the world find you and will they stay once they arrive? How can you score better with search engines by having an active organic

search (SEO) program? When does it pay to advertise online and use SEM/PPC campaigns? What are the options? How do I track spending and results? How do I use Social Media to improve my search engine rankings and what tools are available? Find answers to these questions and learn to create a complete and effective Web-marketing program.

This interactive, hands-on course employs live case studies and projects to explore the uses of blogs, micro-blogs, animation, videos and online competitions. Bring your own interactive marketing needs to class and learn first hand how to cut through the noise and promote your company and products online.

Search Engine Optimization: Gain as much as exposure as possible through organic search

Search Engine Marketing: Get results from pay-per-click and other ad programs

Using Social Media to help build your search marketing programs

Beyond Google and Bing: The other ways to win online

Measurement and analytics: Major tools and statistics

Lead tracking and conversion

Tie-ins with other marketing communication programs including integrating email, display and print

Learning Outcomes

At the conclusion of the course, you should be able to:

Understand the underlying approach that search engines use to return search results

Be able to communicate with development team to accomplish best practices in organic search engine optimization

Understand the basics of the Google Ads advertising environment

Create and optimize your first Google Ads campaign

*See section notes for Required Tools and Materials.

Smart Cities: Foundations, Principles and Applications

2.0 Units

In this course students will gain a deep understanding of the digital technologies, infrastructure, and social political forces shaping the future of our urban environments. They will use worldwide and local smart city case studies to better understand the eight key aspects that define a smart city—smart energy, smart building, smart mobility, smart infrastructure, smart technology, smart healthcare, smart citizen, and smart governance.

The class will explore how current methods in urban analysis and governance can lead to more sustainable and high-performing cities. At the end of the class, students will select a smart cities project, investigate, and present a case solution to the class.

Learning Outcomes

At the conclusion of the course, you should be able to

Describe the concept of smart cities, drivers, challenges, and components of smart cities, such as smart energy, smart transportation, smart education, and smart buildings.

Explain the what, why and how of each smart city component.

Distinguish worldwide and local smart cities projects.

Create a strategic plan and solution for smart city project cases.

Explain the smart city problem and proposed solution.

Social Media Marketing Fundamentals

2.0 Units

The contemporary marketing toolset has expanded dramatically with the mainstreaming of digital technologies, bringing social media skills into high demand for marketers and professionals in many other careers. Students in this course focus on digital technologies and the tools used to compete for customers in the digital economy. You will gain an understanding of key social media channels—Facebook, LinkedIn, Twitter—as well as branded communities, Google+, blogs, and video and learn how they fit into B2B and B2C marketing strategies. Explore how messenger apps have unalterably affected marketing, and practice online market research fundamentals and sponsored content campaigns. Emphasis is placed on best practices and on conveying an understanding of how you can leverage social media to create measurable business results. You will create a basic social media marketing plan and understand how it adds value to particular job functions so you can exceed performance goals.

A background in marketing is recommended for this course—preferably Implementing Winning Marketing Strategies or Principles of Marketing. Learning Outcomes

This course will focus on all the integrated digital elements of the digital marketing landscape. At the conclusion of the course, you should be able to:

Explain the core concepts of Social Media Marketing Fundamentals, strategies, and tactics

Develop social media channels from scratch and manage them

Understand how to integrate social media into an existing marketing strategy

Employ digital best practices to drive desired marketing results in the media mix

Understand the activation and best practices around social selling

Build a social marketing plan

Software Engineering and Quality Certificate Completion Fee

Once all of the certificate requirements have been met and your final grades are posted, please access your Student Portal to enroll in the "Certificate Completion Fee" to begin the review process. Please allow 4-6 weeks to receive your certificate.

Software Essentials for the Law Office

5.0 CEU's

This dynamic course is designed for legal professionals interested in improving their skills and knowledge of commonly used computer technology and programs within the law office. Course topics include: computer operating systems and peripheral devices; time tracking and billing software; database, case management and docket control software; litigation support software; electronic discovery, and trial presentation and graphics software.

Hands on exercises will prepare students to work with popular programs such as MS PowerPoint*, Clio, Trial Director and LexisNexis Casemap & TimeMap, as well as understand the common functions and purposes of similar programs.

Common billing procedures and payment agreements, accurate time tracking, proper calendar and docketing procedures as well as the processes involved in electronic discovery will be addressed through a variety of exercises. In addition, students will be presented with real-life scenarios and asked to identify and examine ethical issues raised by the use of technology in a legal practice.

System Requirements: Please note that the software demos require a Windows operating system (7, 8 or 10). *Microsoft PowerPoint application is not included.

Enrollment and Course Materials

Students are required to enroll directly through The Center for Legal Studies. You can learn more about curriculum details and enroll at Software Essentials for the Law Office , or by contacting CLS at (800) 522-7737 or info@legalstudies.com .

Refund Policy Students enrolling in the Center for Legal Studies programs and courses are accountable to the Center for Legal Studies refund policy and the associated fees. Learn more by visiting the Center for Legal Studies Course Policies.

Software Quality Assurance and Testing

2.0 Units

The requirements for high-quality, reliable, predictable software becomes increasingly necessary as its use continues to grow both generally and in mission- or life-critical environments. As the software industry evolves, the need for qualified engineers trained in the principles, methodologies, techniques and tools of software quality assurance has grown. This course presents the specifics of software quality assurance and software testing. The course also describes how these processes fit into the software development process. **Learning Outcomes:**

At the conclusion of the course, you should be able to:

Identify critical processes that instill quality assurance in the SW development life-cycle

Focus on Verification activities within software development

Understand various validation methodologies

Understand test tools

Understand SW Test terminology

Write a successful Systems Test Plan

Develop a Traceability matrix

Specialization for Administrative Professionals Completion Fee

Once all of the specialization requirements have been met and your final grades are posted, please access your Student Portal to enroll in the "Specialization for Administrative Professionals Completion Fee" to begin the review process. Please allow four to six weeks to receive your credential.

Specialization in AI Application Development Completion Fee

Once all the requirements have been met and your final grades are posted, please enroll in the "Specialization in AI Application Development Completion Fee" to begin the review process and pay the fee. Please allow four to six weeks to receive your Specialization certificate.

Specialization in AI for Business Completion Fee

Once all the requirements have been met and your final grades are posted, please enroll in the Specialization in AI for Business Completion Fee to begin the review process and pay the fee. Please allow four to six weeks to receive your Specialization certificate.

Specialization in DEI for Early Childhood Success Completion Fee

Once all the requirements have been met and your final grades are posted, please enroll in the Specialization in DEI for Early Childhood Success Completion Fee to begin the review process and pay the fee. Please allow four to six weeks to receive your Specialization certificate.

Specialization in DEI for Educators Completion Fee

Once all the requirements have been met and your final grades are posted, please enroll in the Specialization in DEI for Educators Completion Fee to begin the review process and pay the fee. Please allow four to six weeks to receive your Specialization certificate.

Specialization in DEI Leadership Completion Fee

Once all the requirements have been met and your final grades are posted, please enroll in the "Specialization in DEI Leadership Completion Fee" to begin the review process and pay the fee. Please allow four to six weeks to receive your Specialization certificate.

Specialization in DevOps and Virtualization Completion Fee

Once all the requirements have been met and your final grades are posted, please sign into your student portal to enroll in the "Specialization in DevOps and Virtualization Completion Fee" to begin the review process. Please allow four to six weeks to receive your credential.

Specialization in Enterprise AI Implementation Completion Fee

Once all the requirements have been met and your final grades are posted, please sign into your student portal to enroll in the "Specialization in Enterprise AI Implementation Completion Fee" to begin the review process. Please allow four to six weeks to receive your credential.

Specialization in Lean-Agile Project Management Completion Fee

Once all of the specialization requirements have been met and your final grades are posted, please access your Student Portal to enroll in the "Specialization in Lean-Agile Project Management Completion Fee" to begin the review process. Please allow four to six weeks to receive your credential.

Specialization in Mobile Application Development Completion Fee

Once all the requirements have been met and your final grades are posted, please access your student portal to enroll in the 'Specialization in Mobile Application Development Completion Fee' to begin the review process. Please allow four to six weeks to receive your credential.

Specialization in Social Media Marketing Completion Fee

Once all of the specialization requirements have been met and your final grades are posted, please access your Student Portal to enroll in the "Specialization in Social Media Marketing Completion Fee" to begin the review process. Please allow four to six weeks to receive your credential.

Specialization Internet of Things Completion Fee

Once all the requirements have been met and your final grades are posted, please enroll in the "Specialization Internet of Things Completion Fee" to begin the review process and pay the fee. Please allow four to six weeks to receive your Specialization certificate.

Specialization in Web Development Completion Fee

Once all the requirements have been met and your final grades are posted, please sign into your student portal to enroll in the "Specialization in Web Development Completion Fee" to begin the review process. Please allow four to six weeks to receive your credential.

Specialization in Workplace Cultural Competency Completion Fee

Once all the requirements have been met and your final grades are posted, please enroll in the "Specialization in Workplace Cultural Competency Completion Fee" to begin the review process and pay the fee. Please allow four to six weeks to receive your Specialization certificate.

Statistical Analysis and Modeling for Bioinformatics and Biomedical Applications

3.0 Units

This course introduces the essential probabilistic and statistical methods used in bioinformatics and biomedical research. You'll learn the fundamentals of probability, including first notions, probability axioms, conditional probability, random variables (discrete & continuous), probability distributions, expectation and variance, inferring a binomial proportion, the normal distribution, and the central limit theorem. The course also covers statistics, including the following topics:

Estimating statistical parameters and fitting them to probability distributions

Testing hypotheses and assessing goodness of fit

T-tests and confidence intervals

Analysis of variance (ANOVA)

T-test versus ANOVA analysis of microarray data

Relevant applications, including stochastic processes, Markov chains and hidden Markov models, pairwise alignment using HMMs, statistics applied to machine learning, probabilistic graphical models, and the Broad and Bayesian approaches to testing a null hypothesis

You will learn the basics of the R programming language in R-based labs using applications of the theory. Lab exercises will teach you to infer a binomial population, conduct R analysis and statistical analysis of microarray data, analyze t-tests versus ANOVA and pairwise alignment using HMMs. The course also introduces the popular machine learning software known as Weka.

You will be graded on a number of homework assignments, one midterm and a final project. Lab assignments are not turned in. Calculus is not required to achieve a passing grade in the class, but familiarity with it is helpful to understand the conceptual framework. Online lecture notes outlining this knowledge will be provided. Previous programming experience is not required.

Note(s): This course was formerly titled "Data Analysis and Modeling for Bioinformatics."

Statistics

5.0 Units

This course explores the fundamentals of statistical methods and reasoning. Topics include descriptive methods, data gathering, probability, interval estimation, significance tests, one- and two-sample problems, categorical data analysis, correlation and regression. The instructor will demonstrate the use of spreadsheets and statistical software to analyze and interpret data. Examples are drawn from a variety of fields including biology, business and marketing. While not too mathematically rigorous for the novice, the course provides some mathematical detail to illustrate basic concepts. No prior background in calculus or statistics is required.

Learning Outcomes:

At the conclusion of the course, you should be able to

Display sample data using histograms and similar graphing techniques

Analyze raw data, whether grouped or ungrouped, by calculating sample statistics including mean, median, variance, standard deviation and range

Determine the rank of an individual piece of data by determining the particular percentile to which the data belongs

Solve a variety of problems related to normal distributions

Find confidence intervals for population mean and proportions and calculate sample sizes required for various confidence levels

Set-up, calculate and analyze one-sample hypothesis tests of population means and proportions

Differentiate between situations involving one population and those involving two

Plot scatter diagrams of paired data and use the principles of linear regression and correlation to analyze such data, predict values of a dependent variable from the regression equation and determine whether the correlation is sufficient to make the regression equation a useful predictor

Test for independence of row and column characteristics (and homogeneity) in two-way tables

Understand and use One-Way ANOVA

Stem Cell Biology

1.5 Units

California is at the forefront of stem cell research and the industry continues to offer exciting opportunities in the Bay Area. This introduction to stem cells and their applications is geared towards professionals in the pharmaceutical, biotech, medical device, and healthcare industries. It addresses the basic biology and clinical applications of embryonic and adult stem cell therapies, provides a market overview of stem cell startup companies, and touches on the FDA regulation of biologic products. This course prepares students conceptually and technically for the emerging stem cell and biologics therapy market. Skills Needed: Basic cell biology knowledge is recommended but not required.

Professional Credit: CA BRN/LVN Credit--Provider #CEP13114.

Storage Technology in Data Centers

3.0 Units

The data center is becoming the hub of Information Technology in today's enterprises. The industry is trending toward software-defined data centers (SDDC), where the majority of infrastructure is virtualized and delivered "as a service". Such software-configured, hyper-converged data centers allow IT professionals to meet the demands of scaling, performance, capacity and multi-tenancy. This course is an in-depth exploration of the technologies needed to overcome these challenges. The course introduces the fundamental building blocks of enterprise storage such as SAN, NAS, Fibre Channel (FC), Fibre Channel Over IP (FC/IP), FCoE, and the core concepts of block, file, and object storage. It demystifies today's storage technologies in flash, cloud, mobility, converged storage, software-defined storage, SDDC, and Big Data storage. The course also covers the blueprint of cloud computing and the implementation of public, private and hybrid cloud storage.

By the end of the course, you will understand the essential storage and network virtualization technologies used in today's data centers, as well as how to establish a baseline for performance, capacity and ROI.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Understand and differentiate between the hard disk drive and Flash Storage technologies

Recognize various networking technologies such as DAS, SAN, NAS and new Hyper-Converged technologies

Understand the underlying storage and network storage protocols such as FC, IP, FCIP, iSCSI, FCoE

Explain how Storage Consolidations and Virtualization works, and how it meets the SLAs, RTOs and RPOs requirements

Know how the storage Tiering, multi-tenancy, Scale-Out, Scale-Up NAS Clusters works

Understand the fundamentals of Business Continuity and its asynchronous & synchronous Data Replication methods

Understand the main sources and attributes of the BIG Data

Prepare for and embrace future industry trends regarding software defined data centers, cloud storage & services, IoT, and analytics

Note(s): Registered students will be invited to join the NetApp Certified Storage Associate (NCSA) program, which grants them free access to additional online courses and online lab exercises that cover NetApp storage configurations. Students will also receive a voucher applicable toward the NCSA certification exam fee. Participation is optional.

Skills Needed: A basic technical understanding of networking and storage concepts and terminology.

Strategic DEI Initiatives for HR Professionals

1.5 Units

Human resources is an evolving profession adapting to demographic and societal changes in the workplace and the continued globalization that is shaping our organizations. In this course, you will learn strategies to engage employees in diversity, equity, and inclusion initiatives. We'll discuss the HR role in deploying DEI education and training throughout an organization, creating a more inclusive culture, and facilitating DEI conversations. We'll also see how an organization can leverage DEI as a competitive advantage to enhance business performance, innovation, and collaboration. For those in HR who are new to the DEI initiatives, this course covers lectures, class discussions, and a team exercise.

Learning Outcomes

Understanding of HR's role in leading DEI initiatives throughout an organization

The interweaving of a DEI perspective in HR roles and work

Effective assistance to organization leaders who are implementing DEI initiatives

Increased awareness of today's most pertinent social issues and how to communicate effectively and more inclusively

Skills to unify an organization by creating a workplace culture of inclusiveness

Familiarity with the dos and don'ts in leading difficult DEI conversations

Strategies for preventing misunderstandings that can lead to formal grievances

Understanding of DEI initiative tracking to support workforce engagement and productivity

Learning the different ways inclusion can be increased in organizations

Ability to identify and correct systematic issues that negatively impact organizational culture

Awareness of how policies and procedures can obstruct equity in organizations

Topics Include:

Defining Equity vs. Equality

The language of Diversity & Inclusion

Racial identity and Dynamics

Gender Roles and Identity

What is implicit/explicit bias

How to bring DEI Initiatives in organizations

Strategic Marketing Operations

2.0 Units

Formerly titled "Marketing Operations: Tactical Discipline to Strategic Vision."

Strategic marketing operations is the next-generation role that elevates marketing performance by instilling organizational accountability, alignment and agility across your marketing department. It is not to be confused with customer relationship management, database marketing, customer acquisition, digital marketing, and analytics—topics commonly covered in other courses.

The new dynamics of this decade require next-gen scope expansion to connect the dots across the marketing ecosystem, optimize and expand resources and talent, facilitate organizational learning and change management, ensure customer-centricity, minimize chaos to maximize scalability, model the future, monitor value, and champion strategic opportunities.

Learning Outcomes

At the conclusion of the course, you should be able to:

Connect the dots between Marketing strategy, guidance, processes, metrics, technology, ecosystem

Identify appropriate Lean/Six Sigma/Agile techniques to increase Marketing's effectiveness and efficiency

Guide Marketing resource management decisions in budgeting, technology optimization, talent development

Assess and direct Marketing's alignment across its internal and external stakeholders

Elevate the C-team's positioning of Marketing from a cost center to a strategic impact center of excellence.

Topics include

The Optimizer: agile marketing applied to every Marketing specialty

The Chaos Minimizer: ease-of-work via governance, line-of-sight, policies, project management, resource management, process management

The Social Butterfly: sharing of data, best practices, post-mortems, lessons learned, i.e. knowledge management, org learning, change management

The Customer Conscience: build trust, mutual value and alignment to customers' natural rhythms across lifecycle and CX journey

The Connector: end-to-end flow, closed-loop communication, hand-off smoothness among marketers, partners and stakeholders

The Resource Expander: budget management business cases, supplier management, marketing resource management, talent development

The Strategic Opportunist: balance short- and long-term well-being, mutual value, collective interests, scalability, nimbleness

Strategic Partnership Development

1.2 CEU's

They say it's all in who you know. In this course for sales and business development professionals as well as startup and corporate leaders you will learn how strategic partnerships are a key component of any company's go-to-market strategy.

We start the course with identifying and analyzing opportunities to leverage enterprise partners to successfully scale a business, covering the initial development of a partner strategy through to successful negotiation of partnership agreements and the subsequent joint customer engagement.

In addition to discussion about the challenges you may encounter along the way, topics include:

Introduction to partnering

Partner strategy involvement

Partner recruitment

Negotiating a partnership

Partnership execution and management

Each week through a combination of tailored content, real-life case studies, and practitioner perspectives, we'll recommend best practices for positioning, partner negotiations, and market execution. Discussions will highlight diverse industry perspectives. Initial partner business development experience is not required.

Additional course takeaways

Develop a tailored partner strategy

Define requirements to support partnering

Develop a partner value proposition

Determine critical partner segments

Discuss characteristics of various partner models

Develop a negotiation strategy

Discuss selected commercial and legal terms

Understand joint go-to-market approaches and risks

Determine critical requirements for a joint market rollout

Mitigate key challenges to successful execution

Discuss strategies to maintaining and expanding partnerships

Strategies for Learning Differences in Mathematics

3.0 Units

This course deals with two key areas of math learning: computation and problem solving. You will learn the background of "mathematics differences" and strategies for dealing with math anxiety, risk factors, and the importance of developing "number sense." Important elements of mathematical reasoning will also be addressed, including the role of attention, memory, and language in math. You'll learn the use of multisensory math and gain strategies for improving long-term and working memory capacity through case studies of students with math learning differences.

Learning Outcomes:

At the conclusion of the course, you should be able to

Identify risk factors for developing difficulties with math

Recognize specific behaviors presented by students who have difficulties with learning

mathematics by using a numeracy screener

Researching and understanding a math topic in depth before teaching it

Preparing a series of math lessons on a topic of choice

Supply Chain Decisions and Data Analytics

2.0 Units

Data analytics is a growing market that takes advantage of the seemingly endless data that is available to us. This course will cover hypothesis testing, linear regression and factor analysis, along with the computer programs needed to analyze the data. Students will gain an understanding and appreciation of data analytics, so that they can apply it to make sound decisions in the business world.

It is highly recommended that students take "Evolving Role of Supply Chain Manager" as the first course prior to taking this course.

Learning Outcomes

At the conclusion of the course, you should be able to

Acquire an understanding of data analytics

Apply data outcomes to real life business situations

Evaluate different data and information types methods and models

Understand leading trends in the use of customer data

Identify key areas in the supply chain where data analysis is the most relevant

Topics Include

Data analytics and business decisions

Decision analysis methods

Developing key performance indicators

Data collection and data integrity

Data analysis and linear regression

Data improvement plans

Supply Chain Operations Management

3.0 Units

This course covers operations from a supply chain perspective—from understanding the importance of processes and process thinking to managing the flow of products, services, and information. You will learn how supply chain partners and functional groups are becoming more integrated and how they interact with each other. You will also learn about inventory models, optimization using MS Excel's linear programming add-in, forecasting, aggregate planning, and quality tools. Students will be able to define and describe the planning activities required to manage operations across the supply chain from the supplier to the customer and end user.

It is highly recommended that students take "Evolving Role of Supply Chain Manager" prior to taking this course.

Learning Objectives Define supply management and its role in an organizational setting

Establish clear performance objectives and process measures by acknowledging the importance of quality management (QM) and the use of QM tools

Compare various process technologies applied to production and service operations

Discriminate between the requirements of push and pull manufacturing processes

Define the roles of aggregate planning, inventory models, MPS, MRP, ERP and scheduling

Topics Covered Inventory management

Optimization using linear programming

Forecasting methods

Quality tools for improvement

Managing processes and capabilities—Six Sigma methodology

Planning and scheduling

Managing projects activities

Risk analysis and managing risk

Sustainable Supply Chain Strategies

1.5 Units

It can be said that every purchase has hidden social, environmental, and financial impact. What products are today's companies buying and how do they impact future generations? This class will discuss strategies that leading organizations throughout the world employ in their day-to-day procurement decisions. These include the use of products that minimize harm to the environment and human health, as well as purchasing decisions that support local communities and small businesses. All sectors are implementing procurement practices that promote equity and diversity, and require a certain level of performance by suppliers.

It is highly recommended that students take "Evolving Role of Supply Chain Manager" as the first course prior to taking this course.

Learning Objectives Acquire an understanding of sustainability and its impact globally

Consider attributes of sustainable products and services

Identify key terminology associated with sustainable procurement

Gain an appreciation for the importance of diversity and equity in procurement

Topics Covered History and definition of sustainability

Corporate social responsibility and leading practices

Green product resources and industry tools

Third party certifications and greenwashing

Closed loop supply chains

Trends in green procurement

System and Functional Verification Using UVM (Universal Verification Methodology)

3.0 Units

Universal Verification Methodology (UVM) is the industry standard for functional verification methodology developed by key EDA vendors and industry leaders. It uses a SystemVerilog-based, OOP-centric approach to improve interoperability and code reusability. In this course, you will use the OOP testbench knowledge learned earlier to create a full-fledged, flexible verification environment for solving today's increasingly complex functional verification challenges. You will also gain real-world, hands-on experience developing an industrial-strength UVM-based testbench that is layered, interoperable, constrained-random, and coverage-driven. The course introduces the UVM architecture; its core set of base-classes and utility methods, and associated factory automation techniques. This framework forms the basic building blocks that facilitate the development of layered, modular, scalable, and reusable verification environments in SystemVerilog. You will be immersed in the practical application and deployment of UVM base-classes, understand their role in the verification environment to reduce design time and risks, as well as increasing quality and efficiency. The main base-classes covered are the UVM test classes, sequence classes, component classes, messaging and reporting mechanism, factory, configuration database, transaction-level modeling (TLM), scoreboarding, coverage and phasing mechanism. You will learn the power of UVM for successfully designing complex constraint-random coverage driven verification projects.

Concepts introduced in class are reinforced in the lab. In addition to in-class hands-on labs and

weekly take-home assignments, you'll work on a project to build an advanced UVM verification environment for a selected application with transaction-level and layered architecture. You will form a project team, create a test plan, develop a UVM-based verification environment, perform functional coverage, and submit a complete project report.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Understand the UVM hierarchies and various components needed to build a comprehensive UVM Testbench

Design and implement various testbench components, such as driver, monitor, sequencer, agent, environment, scoreboard, coverage, and environment

Understand the configuration databases, factory override, Transaction Level Modeling (TLM)

Understand virtual sequences and virtual sequencers

Build a framework for UVM Testbench

Skills Needed: Students should have experience with object-oriented programming, C/C++, or have taken "Advanced Verification with SystemVerilog OOP Testbench" course. Prerequisite topics will not be repeated here. Hardware verification experience is helpful.

SystemVerilog Assertions and Formal Verification

3.0 Units

Technologies like machine learning, autonomous driving, IoT, and cloud computing are ushering a new era of chip design with innovative architectures and advanced process nodes. With billions of dollars at stake, the race to be first-to-market is putting new challenges on the chip design and verification community. In this course, you will be introduced to SystemVerilog (1800-2017 IEEE standard), a unified hardware design, specification and verification language that is being rapidly adopted by chip designers and verification teams to boost productivity and ensure first-pass silicon success. While it's based on Verilog and some extensions, the SystemVerilog language improvements include enhanced scheduling semantics, rich data types, interfaces with emphasis on assertions, and formal verification—all covered in this course.

You will also be introduced to SystemVerilog Assertion (SVA) concepts and syntax, using small examples and realistic design protocols. You will learn about immediate and concurrent assertions, their differences and use cases, and how to write assertions for formal verification. In the second part of the course covering formal verification theory, students will run the formal tool, debug a counter-example, and learn the refinement process.

This is a lab-based course giving you the opportunity to dive into key topics in detail—from language constructs to assertion coding guidelines that include practical examples of how to use assertions in verification. Students will also learn methodology choices and assertions in a formal context. The course provides hands-on exercises using assertions in simulation (VCS) and formal verification (VC-Formal).

Learning Outcomes:

At the conclusion of the course, you should be able to:

Understand SystemVerilog data types, interfaces and their use cases

Understand the role of Assertions in the verification process

Identify functional blocks appropriate for verifying using SystemVerilog assertions

Create an Assertion test plan based on specifications

Write assertions for the given design specs and run them in simulation

Run SystemVerilog assertions using formal verification tool and analyze results

Be familiar with Formal verification Apps use models and applications

System Virtualization Fundamentals

2.5 Units

Virtualization is a fundamental technology underlying most modern computer systems and networks, yet little understood by many in industry. Virtualization products are now being applied at the network level, in storage infrastructure, and for virtualized operating systems. They are helping to meet critical IT goals such as cost reduction, productivity, scalability, and cloud computing. This course builds the foundation skills that IT and engineering professionals need to make use of this important technology. The course covers virtualization at various levels. For computer systems, it includes hardware virtualization and support for Hypervisors. For network virtualization, it addresses virtual LANs, virtual SANs, WAN acceleration, network access control, server load balancing and firewall virtualization. In the area of storage virtualization, discussions cover basic concepts and deployment at the device block level, file system level, and more. Licensing issues arising from virtualization are also covered. You will learn the basic concepts of virtualization and how it is applied to CPUs and operating systems, networks, and storage systems.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Describe general virtualization concepts and their applications to various areas of computing

Discuss the working principles of several commercial virtualization products in the area of storage, networking, and licensing

Explain the principles of software and hardware hypervisors

Explain how virtualization has been applied to networking and the storage fields

Explain how virtualization affects other areas like licensing, backups, and disaster recovery

Identify the advantages and disadvantages of virtualization at various levels and in different areas

Topics Include:

History of virtualization

Software virtualization

Hardware virtualization: Hypervisors and CPU support for hypervisors

Network virtualization: Load balancing, WAN acceleration, Firewalls, Network access control

Storage virtualization: File system level, Data block level

Other topics of interest: Licensing and virtualization, Data de-duplication and backups, Disaster recovery

Skills Needed: A basic understanding of storage systems and networking concepts.

Talent Acquisition 101

1.5 Units

Finding good, skilled talent is always a challenge for a company. This challenge is true across all industries and all stages of an organization's development. The solution starts with good, skilled recruiters. This course is a survey of recruiting processes, programs, tactics, strategies, resources and tools.

Learning Outcomes

At the conclusion of the course, you should be able to:

Understand the steps involved in the recruiting process from identifying the need to hire.

Think strategically about each step in the recruiting process.

Evaluate the latest recruiting tools and their place in the recruiting process.

Identify the appropriate strategy to align with company hiring goals and challenges

Topics include:

Gain the commitment of hiring managers

Assess and select recruiting resources

Source and recruit technical candidates

Understand how to produce the results expected of top recruiting professionals

Professional Credit:

HRCI®---PHR®, SPHR® and GPHR® general recertification credit: 16.5 hours.

Effective February 22, 2020, this course is valid for 16.5 PDCs for the SHRM-CP® or SHRM-SCP®.

Teaching Beginning ESL Students: Principles and Practices

1.5 Units

How do you begin to teach English to a student who is starting from square one? How can students grasp fundamentals without the benefit of translation? Participants in this course learn the basic principles and central guiding hypotheses of the Natural Approach to second-language acquisition. The course focuses on beginning language learners and highlights strategies for creating comprehensible, multimodal language lessons; modifying speech; fostering a low-stress environment; and giving timely feedback.

After reviewing basic exemplary instructional factors, most of the course time will be spent on demonstrations of and participation in practical classroom strategies.

This course is appropriate for teachers in grades K--12, as well as adult education programs.

Learning Outcomes:

At the end of the course, students should be able to

Describe who the ESL students are and the big picture of that population

Identify strategies for creating comprehensible ESL lessons

Explain the principles to foster a low-stress learning environment

Discuss the challenges of ESL educators in K-12 and adult education classrooms

Teaching Grammar, Level II

2.0 Units

All ESL students, whether they speak other Indo-European languages or languages outside the Indo-European family, bring special grammatical challenges to the learning process. Those challenges require that ESL teachers become fully aware of grammatical detail that we normally don't need to notice. Truly effective ESL teachers must learn new ways to assist students in overcoming these grammatical hurdles. Learning these new teaching patterns is the goal of this course.

Learning Outcomes:

At the end of the course, students should be able to

Develop detailed and thorough knowledge of English grammar

Apply a variety of resources to enhance their teaching

Understand fundamentals of comparative grammar relevant to an ESL classroom

Explain and anticipate common grammatical errors in different ESL classroom environments

Identify useful resources for different teaching contexts

Develop practical teaching techniques, activities, and approaches

Teaching Writing

2.0 Units

This course addresses several methods for helping ESL students improve their writing in English. Course activities emphasize adapting and developing writing tasks to fit the learners' needs as well as developing effective techniques for responding to students' writing.

Topics include: process vs. product approach to writing, teaching beginners, creating writing tasks for different purposes, planning a writing lesson, responding to students' writing (including content, organization, and grammar), and evaluating student writing (e.g., using rubrics, checklists).

Using an interactive and a reflective approach, participants will explore these topics as they engage in experiential tasks and assigned readings. Besides responding to what their peers have said in class, participants will collaborate on assignments as well as complete an independent project.

Learning Outcomes:

At the end of the course, students should be able to

Distinguish between process and product writing

Create writing tasks for beginning, intermediate, and advanced ESL learners

Evaluate student writing

Integrate language skills (listening, reading, writing, speaking) into writing tasks as appropriate

Using an interactive and a reflective approach, participants will explore these topics as they engage in experiential tasks and assigned readings. Besides responding to what their peers have said in class, participants will collaborate on a Web research assignment as well as complete an independent study project.

Technical Communication: An Introduction to the Profession

1.5 Units

An introduction to the profession for beginners and newcomers, this course will help you determine how your skills fit the field of technical communication. In the first half of the course, you will explore the profession:

Learn about the top 10 indicators of success Take a quick look back at 2,000 years of technical communication Examine the roles of technical communicators today

Through exercises, problem solving, case studies, and lecture, participants discover the roles that technical communicators play in work settings such as Fortune 500 industries, start-ups and government labs, as well as freelance consulting.

In the second half of the workshop, you will explore the process by which technical communicators accomplish their work, including information design and development processes, in particular user-centered processes. Through in-class exercises, discussions, and lectures, participants discover how the work of a technical communicator fits into a product life cycle or research cycle. Broadly experiencing the entire process, you will practice interviewing subject-matter experts and users, define the pieces of an information set, and measure the work. After successfully completing this course, participants should be able to identify key roles, tasks, tools, and career paths for a technical communicator; identify job types, locations, and skills that fit their interests; write parts of typical documentation; describe the way that technical communication fits into the larger organization; list a dozen tasks a technical communicator typically performs; and list the phases of a user-centered-product or information-design-and-development process.

Technical Writers' Workshop

1.5 Units

In this workshop, you'll learn how to improve the style and structure of technical information. You'll work on your own style, and you'll evaluate the style of others. In addition, you'll learn how to spot and organize potential topics when creating tasks, concepts, and reference topics, while improving the overall quality of your own work and the work of your team.

Quality initiatives are common in business and government, and these campaigns have even begun to affect technical communication groups. Managers must now prepare plans for improving and measuring quality and proving that their teams have met or exceeded performance measures.

In this workshop, you'll learn how to use and create several tools for improving the quality of technical information, including:

Style guides

Checklists

Heuristic evaluations

Reviews, tests, and edits

By the end of this course, you will be able to do the following: Speak articulately about style

Distinguish between different concepts of "style"

Define the purpose of a style guide

Describe the process for developing a style guide

List the major components of a style guide

Identify at least half a dozen style guidelines

Develop a personal approach to improving your own style

Recall and apply guidelines for quality Spot the cues that indicate what a passage lacks

List and explain at least half a dozen guidelines for clarity, task orientation, completeness, organization, and retrievability

Write and revise Concept topic

Task topic

Reviews of other writers' work

Menus, lists, headings

Your own quality checklist

Technical Writing Certificate Completion Fee

Once all of the certificate requirements have been met and your final grades are posted, please access your Student Portal to enroll in the "Certificate Completion Fee" to begin the review process. Please allow 4-6 weeks to receive your certificate.

Techniques of Educational Therapy: Affective, Cognitive and Perceptual Elements

3.0 Units

This course explores the fundamental cognitive processes that are necessary for learning to occur at maximum capacity. These include motor, auditory, visual, visual motor integration and verbal processing areas. The course will also include how to increase the functionality of these areas as well as attending skills. The "affect" of learning or how the student feels about himself in terms of academic performance will also be addressed. We review possible scenarios of client experiences and how to support their learning.

Technology Impacts in the Supply Chain

1.5 Units

Supply chain leaders throughout the world agree that technology is advancing more rapidly than ever. This course discusses the technology cycle and how it has impacted the supply chain in recent decades. This includes the use of ERPs for inventory management, procurement, and customer relationship management. In the future, technology will continue to increase efficiency through the use of tools like RFID, warehouse robotics, and even drone delivery. Knowledge of available technology is imperative for supply chain managers.

It is highly recommended that students take "Evolving Role of Supply Chain Manager" as the first course prior to taking this course.

Learning Objectives Discuss the impact of the rapid advancement of technology in the supply chain

Identify various IT systems used throughout the supply chain

Evaluate leading technologies and their potential impact to an organization

Topics Covered Introduction to technology in the supply chain

The technology cycle

Integrating technology into the supply chain

Applied technologies, Internet of Things

Evaluation of emerging technologies

Assessing risks in technology

Technology in the future

Technology in Schools, Introduction (SB 2042 Standard 11)

2.0 Units

This course introduces K-12 teacher candidates to current technologies that enhance the classroom and learning experience. You will learn to leverage new modalities to communicate with students, parents, colleagues, and administration; design technology-integrated instructional activities; gain insight into related legal and ethical issues; and practice with various technologies for instruction and assessment. By the end of the course, you'll have a toolkit of technology resources and strategies to benefit your classroom. This course meets the SB 2042 Level 1 technology requirement (Standard 11) for teacher preparation.

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Terminating and Managing Problem Employees

0.5 Units

Termination of problem employees can lead to lawsuits against an organization. To prevent litigation, human resource professionals must investigate and document the termination process. In this course, participants examine practices that minimize the risk of litigation by problem employees. Topics include pre-hire procedures, steps during employment, and a termination process that ensures "rightful discharge."

Learning Outcomes:

At the conclusion of the course, you should be able to:

Discuss the level of appropriate corrective action or discipline for a type of misconduct.

Explain steps that should be taken, when appropriate, before terminating an employee.

Describe appropriate documentation processes and techniques for performance and misconduct.

Identify laws or legal theories that influence the discipline process and decisions.

Professional Credit:

HRCI®---PHR®, SPHR® and GPHR® general recertification credit: 6.5 hours.

Effective February 22, 2020, this course is valid for 6.5 PDCs for the SHRM-CP® or SHRM-SCP®.

TESOL Certificate Completion Fee

Once all of the certificate requirements have been met and your final grades are posted, please access your Student Portal to enroll in the "Certificate Completion Fee" to begin the review process. Please allow 4-6 weeks to receive your certificate.

TESOL Practicum

5.0 Units

This practicum provides an opportunity to apply theory and methodology to the ESL classroom through supervised student teaching. Certificate candidates meet with their instructor for 10 hours, work with a master teacher and teach 25 hours in a classroom setting. Candidates prepare a lesson plan, including teaching objectives, learner outcomes, methodologies, and assessment tools. Observation and feedback sessions with the instructor are arranged individually. Candidates organize a portfolio of their coursework, sample student work, and evidence of professional achievement in the TESOL program. Portfolio review is part of the certificate evaluation.

Learning Outcomes:

At the end of the course, students should be able to

Gain teaching insights through classroom observations

Develop or enhance teaching skills, using current TESOL methodologies

Build self confidence and independence as a professional ESL/EFL teacher

Collaborate with fellow colleagues in problem solving and enhancing teaching techniques

Gain experience planning lessons and teaching under the guidance of experienced instructors and peers

Create the groundwork for continued professional growth as an ESL/EFL instructor

The Business of AI

1.5 CEU's

The demand for artificial intelligence (AI) technologies in industry has grown 270 percent in just four years creating huge job opportunities for the people who understand the technology as well as the developing business impact of such disruption. This course is not just for software engineers. In a hands-on, workshop-style environment, students will explore the future of AI and its potential on organizational levels. You will focus on:

Understanding the business and managerial implications of AI

Becoming better at using AI technologies

Learning to successfully integrate AI into your organization.

We will start by demystifying AI with an introduction to the technology, including an overview of machine learning (ML), deep learning (DL), neuro-linguistic programming (NLP), and autonomous systems. We will review definitions and buzzwords; the hype vs. reality; and the evolution of key AI

technologies.

A survey of how enterprises are using AI will help you identify opportunities in your own companies. You will gain exposure to AI applications across functional areas, including:

The workflow of an AI project—from proof of concept to production

The importance of data

The skills needed for AI

A map of AI tools, infrastructure, and frameworks

Topics also include the economics of AI technologies and business models, as well as risks and regulatory compliance. You will explore an AI transformation playbook and learn how AI can be integrated into business functions through rich case studies and an AI-first strategy. Ethical, legal, and economic implications will be covered for business strategy and society as well as AI's impact on work and trends in the labor market.

Finally, the future of work will be discussed, its changing nature, the balance between people and machines and the training, reskilling, and retention of needed talent.

By the end of this course, you will be able to create a business roadmap for implementation of AI in your specific domain areas.

Learning Outcomes

At the conclusion of the course, you should be able to: Discuss AI hype vs reality

Implement a machine learning program to gain an operational view of an AI project

Identify opportunities to apply AI in your own business

Leverage AI on business strategy to unlock new opportunities, differentiate or innovate

Navigate ethical and societal implications of AI

The Internet of Things: Big Data Processing and Analytics

3.0 Units

How are you harnessing the immense amount of data embedded inside The Internet of Things (IoT)? This phenomenon promises many new technological innovations and business benefits. The prospect of connecting potentially millions or even billions of embedded devices, sensors, appliances and other data-collecting gear to the cloud is daunting yet exciting. It requires new processes and tools for collecting and processing IoT big data and analyzing the device information to glean insights embedded within vast amounts of data. This course introduces the data and analytic flows with a specific focus on IoT. The course first defines IoT and why IoT data processing is very different from typical big data analytics, with its unique requirements for data security, device identity, huge data volume, and real-time processing. The course reviews the challenges and current architectures of IoT data collection to the cloud. Using a hands-on approach in Amazon Web Services (AWS) with simulated data, you will learn to build a messaging and data streaming system with Apache Spark, Storm and Kafka. You will learn to perform a real-time pattern analysis with IoT data, utilizing the Hadoop ecosystem and gaining further predictive insights to set up

actionable triggers for business and data mining applications. You will use AWS accounts to work on assignments that let you design and analyze your own IoT device data and explore valuable insights. The course demonstrates data flow and offers hands-on experience gaining business intelligence from IoT big data. The instructor will share industrial practices of IoT big data processing and analytics. The course focuses on how to use tools and provides a basic overview; in-depth of the data processing tools and frameworks are covered in other courses. Some programming will be needed to customize the data flow at the Hbase layer in Spark.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Describe characteristics and requirements of IoT specific data

Demonstrate how to build a data flow to connect an IoT system or device data to the cloud in specific formats

Explain how to use big data tools to process IoT data in distributed computing

Employ algorithms (including Kafka data stream processing and machine learning) to analyze IoT data patterns and extract intelligence

Skills Needed: Software installation and some programming experience in C, Java or Python (one of the three) is required.

The Internet of Things: Sensors, Platforms, Communications, and Applications

3.0 Units

Internet of Things (IoT) is a fast-emerging area in the technology industry today, which has applications in a wide variety of domains including home automation, wearables, personal fitness, smart grid, smart irrigation, and smart parking. The total number of IoT devices is estimated to exceed 20 billion in the next several years. This course is intended for students who want to learn how to design and prototype IoT applications. It focuses on hardware choices, including sensors, actuators, and IoT platforms, the software required to interact with these sensors and actuators, the communication bearers available for moving the data to/from the sensors and the platform and getting it to a cloud platform. Upon completion of the course, one will be able to design and implement a complete end-to-end IoT solution from sensors through getting data into the cloud. The course consists of two parts. In the first part, the course offers an overview of IoT and covers the basics of designing and developing IoT applications, including the building blocks of IoT, characteristics of IoT systems, and IoT design patterns. Sensors, actuators, IoT hardware platforms, and communications capabilities will all be explored. The second part covers how to design and prototype IoT applications with a focus on end-to-end solutions. Taking the knowledge gained in the first part of the course, one will implement several end-to-end solutions, gaining important practical experience.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Describe the different technologies that enable building IoT systems

Design methodologies and best practices for IoT

Discuss different sensor technologies

Design end-point IoT devices and server-side IoT technologies

Interact with sensors, I/O interfaces, and GUIs (graphical user interfaces) on popular IoT hardware platforms

Explain the basics of sending and receiving data to and from cloud services

Note(s): This course is project based and requires the purchase of several sensors and IoT hardware platforms (about $120, not included in the tuition). Detailed board information will be provided at the first class. Students are required to bring laptops to class.

Skills Needed: Knowledge of embedded system hardware and programming experience with C. Some practical electronics or electrical engineering experience is beneficial, but not required.

Timing Closure in IC Design

3.0 Units

As integrated circuit designs such as ASIC, FPGA and SoC become increasingly complex, the timing closure of designs becomes more challenging. It involves all stages of physical design, and even RTL changes. The standard industry practice is to perform a Static Timing Analysis (STA) on the design before signing off to manufacturing. Primetime is one of the most popular EDA tools used for this process. This course begins with the basic timing concepts and STA methodology. It introduces students to setup/hold timing and explains how to fix violations in the design. You will learn what needs to be timed and how to setup a run for STA. The course exposes students to constraints, exceptions and "what if" analysis. It also explains how to address timing violations in ECO mode. Nano-technology topics including noise analysis, prevention and on-chip variations are covered. The instructor shares practical experiences meeting timing closure, budgeting and debugging.

The instructor will provide tool instructions and test cases for practice. Design engineers completing this course will be able to perform Static Timing Analysis using Primetime or any other STA tool in multiple phases of the integrated circuit design process.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Discuss in-depth knowledge of static timing analysis

Write and debug constraints

Drive timing closure for block or chip

Write ECO's

Explain how to fix critical timing paths

Define miscellaneous terms such as PVT's, OCV, CRPR, Noise, etc.

Skills Needed: Linux/Unix skills are required for lab exercises.

Toxics Laws Legislative and Regulatory Update

0.5 Units

This one-day workshop covers new and pending changes in environmental health and safety (EHS) legislation, regulations, and judicial developments. A number of EHS policy initiatives have emerged from recent state legislative actions. Notable developments include bills that impact air quality, hazardous materials and hazardous waste, water quality, solid waste, cleanup, green chemistry, climate change, and health and safety. You'll learn about these and other new EHS laws and regulations, as well as their compliance implications. This workshop is intended for EHS professionals and managers in government and industry, as well as attorneys, elected officials, and policy makers. Professional Credit: CSPs, CPEAs, can claim COC points 0.6. MCLE--Minimum Continuing Legal Education State Board of CA--6.0 hours.

Understanding Learning Differences

3.0 Units

This course helps professional educators, counselors, educational therapists, and parents understand learning differences. Current theories on neurological processing, attention and memory are presented. Through case studies, discussion, video and lecture, participants learn to identify the signs of autism, Asperger's Syndrome, nonverbal learning disorder, learning disability and attention deficit disorder, as they relate to learning tasks.

Learning Outcomes:

At the conclusion of the course, you should be able to

Identify characteristics and symptoms of various learning differences with emphasis on Dyslexia, ADHD, Mathematics learning difficulties, and the Autism Spectrum

Learn about common Processing Disorders such as Visual and Auditory Perception among others

Describe the essential components of Special Education Law as it relates to Accommodations and Modifications in the classroom

Identify Evaluation and Assessment tools used for providing Resource services

Usability Testing Documentation

1.5 Units

Product development organizations recognize that usability is an important criterion for successful products. To ensure that your products are usable, your organization must incorporate the principles of user-centered design---a process that relies on a deep understanding of and response to the users of your products, including their needs and goals. This introductory course describes the user-centered design process, from analysis through design and validation, with emphasis on where and how usability testing fits into the development cycle. You'll gain hands-on experience planning and designing a usability test to validate documents, and you'll get to conduct your

usability tests in small groups. Once your test is complete, you will compile and analyze the test results and present findings and recommendations to the class. Upon completion of the course, you will be able to: Describe the basic concepts, terminology, and goals of quality, usability, audience and audience analysis Plan and conduct at least one analysis for understanding users, including their goals, tasks, and environment Describe the relationship between audience analysis data and design decisions Describe the basic concepts, terminology, goals, and limitations of usability testing Plan and conduct a usability test, compile and analyze the test results, develop recommendations, and report those recommendations

Prerequisite(s): "Developing Technical Information from Plan to Completion" or (with instructor's approval) equivalent course work or experience.

User Experience and Web Design Certificate Completion Fee

Once all of the certificate requirements have been met and your final grades are posted, please access your Student Portal to enroll in the "Certificate Completion Fee" to begin the review process. Please allow 4-6 weeks to receive your certificate.

User Experience Design, Advanced

3.0 Units

This follow-up to "User Experience Design Fundamentals" covers new design methods and offers hands-on practice. In addition to understanding the UX design principles and processes at a greater depth, advanced practitioners also have to engage users for research, use tools to communicate design, as well as carry out the design in a collaborative product development environment. If you want to take your design skills to the next level and practice advanced techniques in user experience design, this is the course for you. The course focuses on application of the design methodologies and design strategies, from concept development to prototyping, including user research and design presentations. The goal of this course is to get you ready to take real-world UX design challenges and master industry practices in interaction design, visual design and information design, including DOs and DON'Ts. You will also learn how to apply human cognitive principles in design. The course will expose you to design & prototyping tools to create effective and pleasing user experiences. The course includes techniques for team collaboration, UX design presentation, documentation, and effective codification, as commonly practiced with clients and in corporations.

You will work on individual and team projects while sharpening your UX design skills and knowledge, while receiving feedback from the class. Projects may include websites, software applications, or product interfaces. The course will also provide guidance in establishing a UX design portfolio.

Skills Needed: Students should have completed the prerequisite course, or have at least two years of work experience in the field. In addition, a working knowledge of an image processing and/or drawing application (e.g. Adobe Illustrator, Google Drawings, OmniGraffle, Sketch, or a similar program) is required. The drawing is to communicate product design in high fidelity graphics.

User Experience Design Fundamentals

3.0 Units

User experience design is a major factor in creating winning industry products. Design-driven businesses and products have a higher chance of succeeding in the marketplace. This course focuses on using user-centered design strategies and methods to create highly effective, pleasurable, and usable products while meeting business goals and objectives. The knowledge gained in this course directly applies to creating great user experiences for Web sites, Web applications, software as well as user-interfaces of many other products. The course will also expose you to the multi-disciplinary nature of the user experience design process, design thinking, and the steps you can take to succeed. The course covers methods and strategies of six overlapping phases: problem identification, information collection, idea generation, prototyping, evaluation/testing, and implementation.

You will practice with assignments and through team discussions. Some assignments require high-fidelity design of Web applications.

Skills Needed: "Adobe Illustrator, Introduction" (can be taken concurrently), or access to and experience using a drawing application (e.g. Adobe Illustrator, Fireworks, Google Drawings, OmiGraffle, Sketch, or a similar program). Knowledge of image processing applications such as Adobe Photoshop and ability to draw flowcharts and basic visual elements are highly recommended. The drawing is to communicate product design in high fidelity graphics.

Validating Software for Medical Devices and Emerging Technologies

2.0 Units

With the increasing number of medical devices running on software, there is an enormous demand for quality assurance and regulatory affairs professionals who can address the validation, documentation, compliance and submission requirements unique to software-controlled devices. This how-to course covers the requirements for validation for all types of software, including Class II and III embedded medical device software, digital health apps, software as a medical device, medical device data systems, manufacturing software, automated test software, process software, quality system software, and spreadsheets. Student engage in interactive classroom discussions and an in-depth survey of the regulations, guidance documents and standards specific to medical device software and validation.

Learning Outcomes:

At the end of the course, students should be able to

Identify the different types of software regulated by the FDA and interpret the latest FDA regulations, guidelines and International standards applicable to medical device software

Discuss software level of concern and use it to focus validation activities and develop an appropriate validation strategy

Explain the different requirements for validation of device, manufacturing & quality system software and discuss how to differentiate between verification and validation in software testing

Create a software validation plan, test procedure and software validation report that documents software validation activities and complies with regulatory requirements

Students work on a project designed to determine software level of concern, define a software validation strategy, write a software validation plan, create software validation test procedures and test cases, and write a software validation report. They learn effective documentation and the regulatory requirements and expectations for software used in the medical device industry.

Value-Added Quality Audits

1.5 Units

In today's dynamic business environment, every aspect of an organization needs to perform value-added activities that have a positive impact on the bottom line. Regulatory and quality units in more and more biomedical industry corporations are relying on quality audits as a means to improve operations. By auditing domestic and international quality system regulations (GXP, QSR and ISO), these organizations are assessing and improving the effectiveness of their internal systems and those of their suppliers and corporate partners. This hands-on course introduces participants to fundamental auditing principles and techniques including planning, conducting, analyzing, and communicating audit results in terms that are meaningful to senior managers. By understanding the psychology of audits and practicing questioning techniques, participants will take their organization's quality audit program to another level.

Learning Outcomes:

At the end of the course, students should be able to

Explain how audits can help an organization achieve its strategic business objectives

Provide a brief overview of the audit process

Understand the psychology of audits

Learn different ways of using questioning techniques to make the audits "value added"

Understand, communicate and present non-conformances to 21 CFR 820 in a simulated audit setting

Understand the MDSAP audit model

Verbal Identity: Creating Your Strategic Brand

1.2 CEU's

Entrepreneurs seeking to brand or rebrand their companies and professionals tasked with creating or maintaining brand verbal identity will learn how brands can serve new companies to carve a unique niche in industry and gain attention.

In this course, we will focus on verbal identity, using case studies and participants' own companies,

to illustrate how to create a well-defined and consistent brand.

Takeaways

Understand the role of brand in a company's success

Analyze branding and positioning strategy in your industry

Identify branding and positioning opportunities for new companies

Create simple and effective brand ideas for your company or product

Position a new company or product effectively against competitors in a crowded market

Create a brand strategy roadmap and guidelines for your company's verbal identity and messaging

Understand elements of brand naming—meaning of names, properties of name types, competitive name analyses, and naming pitfalls

Navigate naming logistics—global market issues, trademark issues, and domain strategy

Develop an effective company/product name

You'll leave the course with a toolbox for creating verbal brand strategy for products and companies, including messaging and naming.

Victim Advocacy Certificate Course

4.5 CEU's

This intensive online program is designed to train and qualify students to provide assistance to crime victims. The course provides an overview of criminal procedure and discusses the devastating effects crime can have on its victims. Successful graduates of our training program will be eligible at minimum for the NACP Provisional Credential and possibly for the Basic, Intermediate or Advanced Credential based upon their experience in the field. Please refer to the NACP link for additional information: www.thenacp.org .

Enrollment and Course Materials

Students are required to enroll directly through The Center for Legal Studies. You can learn more about curriculum details and enroll at Victim Advocacy Certificate Course , or by contacting CLS at (800) 522-7737 or info@legalstudies.com .

Refund Policy Students enrolling in the Center for Legal Studies programs and courses are accountable to the Center for Legal Studies refund policy and the associated fees. Learn more by visiting the Center for Legal Studies Course Policies.

Viruses, Vaccines and Antiviral Therapy

1.5 Units

Not since the great Spanish flu pandemic at the end of World War I, estimated to have taken the lives of 50–100 million people, have humans experienced an infectious disease threat like the current coronavirus pandemic. In the last decade we have seen outbreaks of Zika and Ebola viruses, as well as an increased frequency in other dangerous viral infections.

In this comprehensive virology course, designed to prepare people for career advancement in both clinical and biopharmaceutical roles, students will have the opportunity to study coronavirus biology and learn about the status of drugs and vaccines being developed to target SARS-CoV-2. We will learn about past viral pandemics, such as influenza, smallpox, and polio and examine how viruses replicate in human hosts, spread in human populations, and alter human history.

Other key topics include:

Recent developments in molecular biology and genetics that have been instrumental in developing viral vaccines and antiviral drugs.

How viruses cause disease (pathogenesis).

The relationship between viruses and cancer.

Host defense mechanisms.

The influence of climate change on emerging viral diseases.

The role viruses play in gene therapy and gene editing as well as treating cancer and bacterial infection.

The problem of antiviral drug resistance.

How to effectively use antiviral drugs to treat viral disease.

Emerging viruses.

The risks and benefits of viral vaccines.

The polio eradication campaign.

The epidemiology of influenza virus.

The challenges of developing an HIV-1 vaccine.

Although some knowledge of molecular biology is desirable, a desire to appreciate the significance of viruses in real-world settings is sufficient for this course. Professional Credit: CA BRN/LVN Credit--Provider #CEP13114, 15.0 hours.

Visual Design for Digital Media

3.0 Units

In this course, we look at the role of the visual designer as a vital member of the creative team responsible for the look and feel of digital assets. We will study graphic design fundamentals such as color theory and typography, layout techniques, branding design, web graphic optimization, motion graphics, and production techniques for web and mobile. You will explore the corporate

design system, its purpose, and how tech industries rely on it to dominate their market. You'll experience the function of visual design as a collaborative process. Guest speakers may include visual designers, UX designers, and researchers from major Silicon Valley tech companies. By the end of the course, you will have created a professional-quality portfolio and a mobile app prototype.

This course will benefit graphic designers, web professionals, product managers, web developers, and anyone interested in learning the fundamental visual design skills to create professional-looking UI for digital media.

Topics

Graphic Design fundamentals

The fundamentals of design: Color theory and typography

Page layout principles and techniques

Building brand assets, logos, and style guides

Visual design essentials for digital media

HTML and CSS basics: Coding for non-developers

Capturing your thoughts with sketches and wireframes

Block design technique and scale of importance

Mobile app design principles

Building a professional-quality personal portfolio

Introduction to design systems and design languages

Course Outcomes

Create wireframes and prototypes for web and mobile apps

Create user-centered user interfaces for digital media

Understand visual design principles and design systems used in industry

Understand the user experience design process and the role of a visual designer

Collaborate with other stakeholders in the team at work

Prerequisite Courses: Adobe Illustrator, Introduction; UX Design Fundamentals

VLSI Engineering Certificate Completion Fee

Once all of the certificate requirements have been met and your final grades are posted, please access your Student Portal to enroll in the "Certificate Completion Fee" to begin the review process. Please allow 4-6 weeks to receive your certificate.

Web and Mobile Analytics

2.0 Units

With the explosive growth of online business transactions, Web and mobile analytics play an important role in understanding and optimizing customer reach and growth. Unlike off-line business models, to compete in the digital global economy, organizations need to employ agile digital marketing techniques that can continuously adapt to customer needs. This is a hands-on class full of real-life examples to work through.

Learning Outcomes

At the conclusion of the course, you should be able to:

Define metrics that help capture customer experience in Web and mobile environments

Learn how to work with big customer profiling data using cutting edge machine learning turn-key solutions (R packages, Python libraries - no programming needed)

Use tools such as Google Analytics, Tableau, Gephi, and others to derive patterns and predict possible outcomes

Create reports and infographics that help understand micro and macro levers that can be used to iteratively improve your marketing campaign

Web Application Development Using React, Redux and TypeScript

2.0 CEU's

As Web and mobile applications become ever more complex in data and user interactions, this causes more challenges in developer productivity and code quality. To address such concerns, Facebook introduced and released two recent innovations, React and Flux, which have been adopted by an increasing number of Web developers. React is a UI engine that builds composable rich user interfaces from smaller components. It uses an asynchronous data approach and in-memory Document Object Model (DOM) to make UI rendering fast and efficient. Flux is an architectural pattern to build scalable Web apps that complement React. Given the problems of bidirectional data flow, Flux architecture is introduced to enforce one-way data flow among its four entities: actions, dispatchers, stores, and views. It employs one-way data flow to simplify application complexity. And Redux is the most popular and the simplest framework that implements Flux architectural pattern. TypeScript is a superset of JavaScript that makes JavaScript scalable. It adds static typing and class-based OOP to JavaScript. TypeScript makes the potential bugs introduced in the code easy to location through compiling errors and dramatically facilitates code refactoring and code debugging. This course covers React, Flux, Redux and TypeScript in detail for developing highly interactive Web apps in robust and scalable ways. The course provides a brief overview of the MEAN stack, focusing on the novel way React uses virtual DOM to do selective updates, as well as React's approach to handling state changes and events of its components. You will learn to create components, build complex components, update and mount to DOM, and learn to test React applications with Jest. You will learn to handle complex user interactions and to communicate with the server using RESTful API in Flux/Redux applications. You'll learn through examples that show how this approach allows you to add new functionalities without exploding the complexity.

You will be expected to do a significant amount of coding in class. Comprehensive familiarity with JavaScript and AJAX is required. In addition to weekly assignments, you will practice the principles and techniques learned in class through a final development project. Students are required to bring laptops to class.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Implement interactive web applications using React.js

Understand prop and state and the one-way data flow from between components

Implement complicated interactive web applications with the backend support using React.js and Redux

Implement scalable web applications using TypeScript

Skills Needed: Students should have programming experience with client-side JavaScript, AJAX, and basic understanding of HTML and CSS.

Web Applications Testing, Comprehensive

3.0 Units

The proliferation of Web-based applications presents challenges for testing and quality. Distributed software architecture, diverse and dynamic execution environments (OSes, browsers, networks, run-time code generation), multiple programming languages or models, and a large user base all make Web testing more complex. Even non-Web-based apps today typically use Web services behind the scene, ranging from simple software updates to a "desktop shell" that hosts Web applications. These apps also require Web testing. This course provides the essential knowledge and skills needed to test Web apps and services. It covers Web testing from end to end but with more focus on the client-side testing. The course begins with an introduction to Web architecture and the basic protocols for Web services. Using an example of a feature in a large Web application, you will learn to develop a test plan and test cases that can be executed automatically. The course covers three aspects of Web testing: UI, Web services, and load/performance. The Selenium tool is used to interact with browsers and to automate UI testing. The concepts of hermetic versus deterministic testing will be explained. You will learn to use Selenium design patterns to manage large numbers of automated tests. The course covers the use of Java or JavaScript in WebDriver tests and how to perform unit level, functional and behavioral tests as well as test coverage, with common testing tools used in the trade. The course also covers setting up test environments, using open source tools for testing the performance of Web applications.

The course employs open source tools to practice the various aspects of Web testing. Students are required to bring laptops to class and install tools on their own computers. Java programming experience is strongly recommended. JavaScript knowledge is also recommended and Python can be used as an option. Students should also understand basic testing terminologies, as they will not be reviewed in this course. The techniques learned in class can be useful for Web interface automation even though this is not the focus of the course.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Understand how the web works and what are the challenges in testing web based software

Develop test plans for a feature or entire web site

Use selenium webdriver to develop automated tests

Develop tests targeting JavaScript applications

Understand and test REST based web services

Implement performance and load testing for web sites

Web Framework Using JavaScript: The MEAN Stack

3.0 CEU's

JavaScript is the standard for client-side scripting today. Its features and performance have been improved significantly over the years to enable the use on the server-side. The MEAN stack (MongoDB, ExpressJS, AngularJS, and Node.js) is an emerging Web framework that uses JavaScript and is designed to build Web applications from front to back. It uses a single language to offer development productivity and efficiency. The inclusion of these components represents a breakthrough in event-driven and asynchronous architecture, producing the optimal user experience. This course is an introduction to the popular open-sourced Web framework. The MEAN stack consists of client, server and database skills. The course explains the four components and the role each has in building a modern, sophisticated Web application, and then covers the configuration, implementation and programming details. You will learn to build the Node.js server, include Express in the app, interface with the document-oriented database MongoDB, and use Angular directives and services on the client side. The course will also discuss the interactions with JSON, Model-View-Controller, Web services and HTML in this framework. Class assignments and projects will give you hands-on experience.

Prior to enrolling, students should be familiar with JavaScript and understand database, Web services and client-server needs. The course covers only the essential parts of the MEAN stack. Students are encouraged to bring laptops to class. The instructor will provide software installation guides.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Describe the whole application stack end to end

Discuss the various SQL no SQL databases and work with them

Explain the benefits of Node.js Asynchrony

Describe the Angular 4 framework

Topics Include:

Introduction to the MEAN stack

Building the Node.js server

Interacting with MongoDB using Mongoose

Configuring and using Express in a Web app

Implementing Express in Node.js

Understanding AngularJS directives

Implementing AngularJS services

Connecting MongoDB and Node.js

Accessing and manipulating databases

Wireless Communications and Mobile Antenna Design, Introduction

3.0 Units

Today over half of all network traffic is wireless. In addition to telecommunication, wireless dominates in computing, industrial and IoT applications. This course presents a fundamental approach to understanding wireless communications and standards, in particular 5G. It also covers antenna and transceiver design principles and practices in mobile devices.

The course briefly reviews amplitude modulation (AM) and frequency modulation (FM), which are essential in understanding IQ modulation used in virtually all modern radios (WiFi, OFDM, CDMA, TDMA, 4g, 5g, etc.). Building on these fundamentals, the course examines the industry's digital wireless standards, including but not limited to IS-136, IS-95, Bluetooth, 4G, 5G, 802.11(a, g, n), and long term evolution (LTE).

It is equally important to understand antennas in any radio system. You will learn about trade-off considerations of antennas for cellphones, Bluetooth, and WiFi. The course discusses trade-offs of antenna size versus range on various configurations, including dipoles, dish, beams, phase arrays, and slotted antennas. The course will cover practical designs used in the Apple iPhone and Samsung Galaxy and analyze these designs. Instruction emphasizes an intuitive understanding of the fundamentals, rather than complex mathematics.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Describe legacy receiver and transmitter architectures

Explain classical AM and FM modulation both from a receiver and transmitter

Discuss contemporary digital modulation techniques such as QAM, TDMA, CDMA, GSM, and OFDM

Demonstrate Phase Lock Loops: how they work and how they are used in today's radios

Describe in detail modern antennas used in cell phones, wifi etc. design of multi band single feed antennas

Evaluate transmission standards

Skills Needed: A general background in electrical engineering and networking.

Workplace Investigations

0.5 Units

This fast-paced workshop covers the process and tools necessary to complete a workplace investigation. Legal implications and practical recommendations for conducting pre-employment background investigations are reviewed. The workshop includes brainstorming sessions and other group exercises to develop practical recommendations every HR professional can use when conducting investigations.

Learning Outcomes:

At the conclusion of the course, you should be able to:

Understand Legal Theories That Impact on Workplace Investigations

Understand Precautions That Can Be Implemented to Prevent an Incident or Minimize the Negative Impact of an Incident

Understand the Varying Steps and Responses That May Be Required in an Investigation of a Particular Type of Misconduct

Understand the Options Available to the Employer After Concluding the Investigation

Topics Include:

workplace-violence, substance-abuse and intoxication, harassment, computer and other white-collar crimes, and employee theft.

Risks and liabilities associated with inadequate or unlawful investigations, failing to investigate and the use of outside investigators will be analyzed.

Interviewing, investigation techniques and documentation of the facts learned during the investigation are covered.

Professional Credit:

HRCI®---PHR®, SPHR® and GPHR® general recertification credit: 6.5 hours.

Effective February 22, 2020, this course is valid for 6.5 PDCs for the SHRM-CP® or SHRM-SCP®.

Writing Successful Instructions, Procedures and Policies

1.5 Units

When your team is doing iterative development, you may be called on to describe the vision, document the requirements in use cases, and write test cases to determine whether the product really meets the user's needs. You're focusing on what the stakeholder should be able to do concrete actions, described from the point of view of a real user. And when you document the final product in a user guide or help system, your procedures are key. You have to be alert to the doubts, uncertainties, and inarticulate needs of the user, from moment to moment. You have to rewrite and test and revise again, to produce step-by-step instructions that users can really follow.

Of course, if you come to the attention of the boss, you may be asked to write up corporate policies, and their accompanying procedures. You'll probably get conflicting pressures from the executives and the lawyers, and you may be the only representative of the employees who must carry out these policies, so your prose must cut through the bureaucratic fog. Your steps must be clear enough to follow, while acknowledging the messages coming from the board room. Now that takes

some fancy footwork!

In all these areas, there are some fundamental principles that will help you help your readers. In this online course, we'll focus on writing in each of these contexts. Each week, you'll download some lecture notes, join a discussion with other students, take a quiz, and write in one of these procedural genres.

By the end of this course, you will be able to:

Understand the role of the writer in eliciting software requirements, supporting iterative development, and doing user testing

Create a vision statement and use-case model

Create scenarios, fully realized use cases, and activity diagrams

Create test cases to ensure that the code does what users expect

Create step-by-step instructions suitable for user guides or help systems

Write policies, requirements, processes, and procedures for corporate governance

For Online Sections of this course: Online courses are largely self-study with instructor support through threaded discussion groups, email and sometimes scheduled online chats. Some instructors may allow students to pace themselves following the published syllabus, enabling them to accelerate through the material and finish early. However, all students must complete and submit all assignments by the schedule end date. Grades are issued for the entire class approximately two weeks after the scheduled end date.