UCSC EXTENSION - SUMMER 2023 COURSE CATALOG

This catalog was generated on November 28, 2023 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

BIOINFORMATICS

Cost: Starting at $5,480.
Required Credits: 6–7 courses (minimum 18 quarter units). Take 4 required courses (12 quarter units) and 2–3 elective courses (minimum 6 quarter 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.

Accompanying lecture slides

Courses

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

Bioinformatics Tools, Databases and Methods | BINF.X400, 3.0 Units
Experimental Methods in Molecular Biology | BINF.X401, 3.0 Units
Next-Gen Sequence Analysis Tools - A Hands-On Approach | BINF.X405, 3.0 Units
Python for Data Analysis | DBDA.X420, 3.0 Units

2. Electives: Total of Six Units

Advanced Statistical Analysis for Bioinformatics Applications | BINF.X403
Data Analysis, Introduction | DBDA.X404, 3.0 Units
Gene Expression and Pathways | BINF.X402, 2.0 Units
Genomics and Next Generation DNA Sequencing: Methods and Applications | BTEC.X407, 3.0 Units

3. Completion Review:

Bioinformatics Certificate Completion Fee | O-CE0060

4. Related Course(s) (Not Part of Certificate Program)

Personal Development Seminar: Concepts in Next-Gen Sequence Analysis | BINF.800

Requisite Knowledge

Please review the course descriptions to ensure that you have taken the necessary prerequisites or meet the requirements through job experience or previous education. You can learn more about each course in **the Syllabus Library** . 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: Starting at $5,610.
Required Credits: 7 courses (19 quarter units). Take 3 core courses (10 quarter units) and 4 elective courses (9 quarter units). End with a certificate of completion review.
Duration: A full-time student can complete the certificate in 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 | BINF.X401, 3.0 Units

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

Biochemistry: An Introduction | BTEC.X400, 3.0 Units
Immunology, Principles | BTEC.X409, 3.0 Units
Principles of Drug Discovery and Development | BTEC.X415, 4.0 Units

3. Electives: Nine Units Required

Biology of Cancer | BTEC.X402, 2.0 Units

Gene Therapy: Hacking the Genome | BTEC.X416, 1.5 Units
Genomics and Next Generation DNA Sequencing: Methods and Applications | BTEC.X407, 3.0 Units
Human Physiology in Health and Disease | BTEC.X408, 3.0 Units
Viruses, Vaccines and Antiviral Therapy | BTEC.X413, 1.5 Units

4. Completion Review:

Biotechnology Certificate Completion Fee | O-CE0061

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

Clinical Trials Essentials: An Intensive One-Week Course | CTDM.801, 3.5 CEU's
Data Privacy and Security for Healthcare and Biosciences | CTDM.X407, 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. You can learn more about each course in **the Syllabus Library** .

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: Starting at $5,125.
Required Credits: 7–10 courses (minimum 19 quarter units). Take 5 required courses (13 quarter units) and 2–5 elective courses (6 quarter units). End with certificate of completion review.
Duration: A full-time student can complete the certificate in 9–12 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

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Management/Human Development certificate program objectives

Marketing/Business Development 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 | BUSM.X409, 3.0 Units
Finance I, Fundamentals | BUSM.X405, 3.0 Units
Organizational Development and Change | HRMT.X401, 2.0 Units
Principles of Marketing | MKTG.X400, 2.0 Units
Supply Chain Operations Management | SCMT.X406, 3.0 Units

2. Electives: Business Essentials

Effective Negotiations: Principles, Strategies, and Techniques | BUSM.X416, 1.5 Units
International Business and the Global Economy | BUSM.X402, 3.0 Units
Principles of Business Analysis | BUSM.X400, 3.0 Units

3. Electives: Financial Analysis/Accounting

Finance for the Business Professional | BUSM.X403, 1.0 Units
Introduction to Accounting I: Financial Accounting | BUSM.X418, 4.0 Units

4. Electives: Management Development

Business Communications | BUSM.X404, 2.0 Units
Human Resource Management | HRMT.X400, 1.5 Units
Principle Based Leadership for Project Managers | PPMT.X422, 1.5 Units

5. Electives: Marketing Business Development

Power of Market Research | MKTG.X401, 2.0 Units
Product Marketing and Management | MKTG.X406, 2.0 Units
Strategic Marketing Operations | MKTG.X404, 2.0 Units

6. Completion Review:

Business Administration Certificate Completion Fee | O-CE0405

Recommend Course Sequence

Flexible course sequence

Courses may be taken in any order provided the prerequisites are met. You can learn more about each course in **the Syllabus Library** .

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.

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: Starting at $4,680.
Required Credits: 6–7 courses (minimum 16 quarter units). Take 4 courses (11.5 quarter core units) and 2–4 elective courses (minimum 4.5 quarter units). 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;

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 | CTDM.X403, 2.0 Units
Good Clinical Practices | CTDM.X411, 3.0 Units
Principles of Drug Discovery and Development | BTEC.X415, 4.0 Units
Science of Clinical Trials Design | CTDM.X415, 2.5 Units

2. Electives: At Least 4.5 Units

Clinical Data Management | CTDM.X400, 2.0 Units
Clinical Project Management | CTDM.X401, 2.0 Units
Clinical Research: The Study Site Perspective | CTDM.X402, 1.5 Units
Data Privacy and Security for Healthcare and Biosciences | CTDM.X407, 1.5 Units
Document Preparation: Protocols, Reports, Summaries | CTDM.X408, 1.5 Units
Drug Safety and Adverse Events Reporting | CTDM.X409, 1.5 Units
Electronic Data Capture for Clinical Trials | CTDM.X410, 1.0 Units
Good Manufacturing Practices | REGL.X400, 3.0 Units
Healthcare Equity: Improving Access | CTDM.X416, 1.5 Units
Medical Devices: Regulatory Strategies and Marketing Pathways | CTDM.X412, 1.5 Units
Medical Writing | CTDM.X413, 2.0 Units
Preparing for FDA Inspections and Conducting Sponsor Audits | CTDM.X414, 1.5 Units

3. Completion Review:

Clinical Trials Design and Management Certificate Completion Fee | O-CE0113

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

Biology of Cancer | BTEC.X402, 2.0 Units
Clinical Trials Essentials: An Intensive One-Week Course | CTDM.801, 3.5 CEU's
Viruses, Vaccines and Antiviral Therapy | BTEC.X413, 1.5 Units

Requisite Knowledge

Familiarity with medical terminology is required. 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. You can learn more

about each course in **the Syllabus Library** .

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: Starts at $4,530.
Required Credits: 5–7 courses (minimum 14 quarter units). Take 2 required courses (6 quarter units) and 3–5 electives (minimum 8 quarter units). End with certificate of completion review.
Duration: A full-time student can complete the certificate in 9–12 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 | SEQA.X401, 3.0 Units

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

C Programming II | CMPR.X401, 3.0 Units

4. Electives: C++ Programming

C++ Programming | CMPR.X404, 3.0 Units
Data Structures and Algorithms Using C++ | CMPR.X406, 3.0 Units

5. Electives: Java Programming

Data Structures and Algorithms Using Java | CMPR.X407, 3.0 Units
Java Programming I | CMPR.X412, 2.0 Units
Java Programming II | CMPR.X413, 3.0 Units
Java Threads | CMPR.X423, 3.0 Units
JUnit Test Framework | SEQA.X400, 1.5 Units

6. Electives: Scripting Languages

Data Structures and Algorithms Using Python | CMPR.X425, 3.0 Units
Python for Programmers | CMPR.X416, 3.0 Units
Python: Object-Oriented Programming | CMPR.X420, 2.0 Units
Python Programming for Beginners | CMPR.X415, 1.5 Units

7. Electives: Windows Programming

C# Programming | CMPR.X403, 3.0 Units

8. Electives: Mobile Device Programming

Mobile Application Development - Android and iOS, Advanced | CMPR.X422, 3.0 Units
Mobile Application Development - Android and iOS, Introduction | CMPR.X421, 3.0 Units

9. Electives: Adv. Programming and Concepts

Computational Intelligence | CMPR.X405, 1.5 Units
Data Engineering with Hadoop | DBDA.X424, 3.0 Units
Go Programming | CMPR.X418, 3.0 Units
Hands-On Data Engineering | DBDA.X424
Introduction to Machine Learning | DBDA.X408, 3.0 Units

Completion Review:

Computer Programming Certificate Completion Fee | O-CE0114

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. You can learn more about each course in **the Syllabus Library** .

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 .

DATA SCIENCE AND DATA ANALYTICS

Cost: Track 1 starts at $5,750. | Track 2 starts at $5,230.
Required Credits: 6 courses (16 quarter units). Take 2 required courses (6 quarter units) and 4 elective courses (minimum 10 quarter units). End with certificate of completion review.
Duration: A full-time student can complete the certificate in 9–12 months.

Certificate Description

— LinkedIn Workforce Confidence Survey , May 2023

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 Data Science and Data Analytics offers training for data scientists, analysts, administrators, and managers who want to apply analytics to business decision-making.

Courses

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

Big Data, Introduction | DBDA.X401, 3.0 Units
Data Analysis, Introduction | DBDA.X404, 3.0 Units

2. Electives: Track 1 - Data Science

Business Intelligence Solutions | DBDA.X402, 3.0 Units
Dashboards and Data Visualization | DBDA.X419, 3.0 Units
Data Modeling, Introduction | DBDA.X421, 2.0 Units
Deep Learning and Artificial Intelligence | DBDA.X425, 3.0 Units
Introduction to Machine Learning | DBDA.X408, 3.0 Units
Python for Data Analysis | DBDA.X420, 3.0 Units
Python for Machine Learning | DBDA.X427
Python for Machine Learning and Artificial Intelligence, Essentials | DBDA.X427, 3.0 Units
Relational Database Design and SQL Programming | DBDA.X415, 3.0 Units

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

Big Data, Introduction | DBDA.X401, 3.0 Units
Relational Database Design and SQL Programming | DBDA.X415, 3.0 Units

4. Electives: Track 2 - Data Engineering

Data Analysis, Introduction | DBDA.X404, 3.0 Units
Data Engineering with Hadoop | DBDA.X424, 3.0 Units
Hands-On Data Engineering | DBDA.X424
MySQL and Oracle Database for Developers and Designers | DBDA.X409, 2.0 Units
NoSQL Databases, Introduction | DBDA.X410, 3.0 Units
Python for Data Analysis | DBDA.X420, 3.0 Units
The Internet of Things: Big Data Processing and Analytics | EMBD.X412, 3.0 Units

5. Completion Review:

Database and Data Analytics Certificate Completion Fee | O-CE0122
Data Science and Data Analytics Certificate Completion Fee | O-CE0122

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. You can learn more about each course in **the Syllabus Library** .

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 Certificate Completion Review.

Data Science and Data Analytics Certificate Completion Review

EARLY CHILDHOOD EDUCATION: ASSOCIATE TEACHER

Cost: Starts at $2,880.
Required Credits: 5 courses (20 quarter units).
Duration: A full-time student can complete the certificate in 9–12 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 the physical, cognitive, social, and emotional needs of children.

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

ECE 4: The Young Child in the Family and Community | ECED.X304, 4.0 Units
ECE 8: Child Health, Safety and Nutrition | ECED.X308, 5.0 Units

2. Completion Review:

Early Childhood Education Associate Teacher Certificate Completion Fee | O-CE0411

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

Attention Deficit Hyperactivity Disorder (ADHD) in the Classroom | ECED.X318, 3.0 Units
ECE: Brain Development in Early Childhood | ECED.X310, 3.0 Units
ECE: Creative Arts for the Young Child (Preschool Through Grade 3) | ECED.X312, 3.0 Units
ECE: Infant/Toddler Growth and Development | ECED.X313, 3.0 Units
ECE: Principles of Infant/Toddler Caregiving | ECED.X314, 3.0 Units
Math Development in Young Children | ECED.X316, 2.0 Units
Science Play: Inquiry-Based Learning Made Easy | ECED.X317, 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: Starting at $2,760.
Required Credits: 4 courses (20 quarter units). 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

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 | ECEA.X320, 5.0 Units
ECE 11: Supervision and Administration of Early Childhood Centers, Part A | ECEA.X321, 5.0 Units
ECE 12: Supervision and Administration of Early Childhood Centers, Part B | ECEA.X322, 5.0 Units
ECE 13: Adult Supervision and Mentoring | ECEA.X323, 5.0 Units

2. Completion Review:

Early Childhood Education: Site Supervisor Certificate Completion Fee | O-CE0095

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

Attention Deficit Hyperactivity Disorder (ADHD) in the Classroom | ECED.X318, 3.0 Units
ECE: Brain Development in Early Childhood | ECED.X310, 3.0 Units
ECE: Creative Arts for the Young Child (Preschool Through Grade 3) | ECED.X312, 3.0 Units
ECE: Infant/Toddler Growth and Development | ECED.X313, 3.0 Units
ECE: Principles of Infant/Toddler Caregiving | ECED.X314, 3.0 Units
Math Development in Young Children | ECED.X316, 2.0 Units
Science Play: Inquiry-Based Learning Made Easy | ECED.X317, 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

EDUCATIONAL THERAPY

Cost: Starts at $6,090. Does not include potential practicum or internship costs.
Required Credits: 10–11 courses (minimum 30 quarter units). Take 8 required courses (26 quarter units) and 2–3 elective courses (minimum 4 quarter units). End 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. The material also supports you in setting up your own clinical practice.

Our curriculum guides you to combine educational and therapeutic strategies—for evaluation, remediation, advocacy, and case management—on behalf of individuals with learning differences.

Educational therapists work one-on-one through using socio-emotional, psycho-educational, and neuropsychological paradigms to develop individualized learning and treatment plans. They alleviate learning difficulties by using individuals' strengths to overcome challenges.

This program is designed for all educators, psychologists, marriage and family therapists, and other allied professionals at all levels as well as individuals interested in learning enrichment.

Educational Therapy certificate program objectives

Understand challenges faced by students with dyslexia, dyscalculia, ADHD, autism spectrum, and other learning differences.

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

Learn how dyscalculia impacts learning and apply strategies for helping students understand computation and problem-solving in mathematics.

Employ ethical principles in the field, and develop a business plan for managing a clinical practice.

Use and understand assessment tools and procedures frequently used in educational therapy settings.

Gain a deeper understanding of the priorities of learners, their needs, and the process of building a remediation plan.

Suitability for practice

The UCSC Silicon Valley Extension Educational Therapy program is committed to candidates' development of ethical practice, establishment of professional boundaries, client confidentiality, and their awareness of internship competence and personal limitations.

At any time during a candidate's progress through the internship, should a significant concern regarding the candidate's suitability for the profession occur, in accordance with the AET Code of Conduct and based on the candidate's apparent behavior, a committee of program director, program manager, program chair and mentor shall convene to review the candidate's conduct and performance. The committee shall interview the student and person(s) who raised the concern and consult with administration. After careful deliberation, the committee will determine, whether or not there is a basis for concern and, if there is a basis for concern, will determine a course of action, which could include possible immediate program disqualification or substantive remediation that can involve course or clinical placement or repetition. Should a candidate wish to appeal the review committee's decision, the same procedures would be followed for appealing an academic decision as described in the UCSC Extension policies.

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.

Courses

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

Educational Assessments I | EDTH.X303, 3.0 Units
Educational Assessments II | EDTH.X304, 3.0 Units
Educational Therapy: Structured Literacy I | EDTH.X301, 3.0 Units
Educational Therapy: Structured Literacy II | EDTH.X313, 3.0 Units
Principles of Educational Therapy | EDTH.X300, 3.0 Units
Strategies for Learning Differences in Mathematics | EDTH.X302, 3.0 Units
Techniques of Educational Therapy: Affective, Cognitive and Perceptual Elements | EDTH.X305, 3.0 Units

2. Electives:

Assistive Technology for Learning Differences | EDTH.X310, 3.0 Units
Attention Deficit Hyperactivity Disorder (ADHD) in the Classroom | ECED.X318, 3.0 Units
ECE: Brain Development in Early Childhood | ECED.X310, 3.0 Units
Management of Clinical Practice | EDTH.X306, 3.0 Units
Neurodivergent Learners | EDTH.X312, 1.0 Units
Psychology of Human Learning | EDTH.X308, 3.0 Units
Understanding Learning Differences | EDTH.X309, 3.0 Units

3. Capstone Course:

Educational Therapy Practicum | EDTH.X390, 5.0 Units

4. Completion Review:

Educational Therapy Certificate Completion Fee | O-CE0412

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: Starts at $3,810.
Required Credits: 5–6 courses (14 quarter units). Take 3 required courses (8 quarter units) and 2–3 elective credit courses (6 quarter 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

The UCSC Silicon Valley Extension Embedded Systems professional certificate program prepares students with the core design skills needed to work at some of the top companies in the Valley.

Our hardware professional students learn to design function-specific computer and communication systems, including:

mobile devices,

the Internet of Things,

networking equipment,

industrial controllers, and

consumer and automotive electronics.

Learn on industry-standard hardware

Students get invaluable hands-on experience with quick prototyping using FGPAs from Xilinx. 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 software and hardware design

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

Design and implement prototypes using FPGA

Linux Kernel and Drivers, Advanced | LINX.X413, 3.0 Units
Linux Kernel & Drivers | LINX.X411, 3.0 Units
Python for Machine Learning | DBDA.X427
Python for Machine Learning and Artificial Intelligence, Essentials | DBDA.X427, 3.0 Units
Real-Time Embedded Systems Programming, Introduction | EMBD.X410, 3.0 Units
The Internet of Things: Big Data Processing and Analytics | EMBD.X412, 3.0 Units

3. Electives: Embedded Hardware

Advanced Signaling: Jitter and Noise Analysis | EMBD.X407, 3.0 Units
Comprehensive Signal and Power Integrity for High-Speed Digital Systems | EMBD.X400, 3.0 Units
Digital Logic Design Using Verilog | VLSI.X404, 3.0 Units
FPGA Application in Autonomous Driving Systems, Introduction | VLSI.X416, 3.0 Units
High Efficiency Switch-mode Power Supply, Design Overview | EMBD.X405, 3.0 Units
IO Concepts and Protocols: PCI Express and Ethernet | EMBD.X406, 3.0 Units
IO Design Fundamentals | VLSI.X405, 3.0 Units
Practical Design with Xilinx FPGAs | EMBD.X408, 3.0 Units
Printed Circuit Board Design for Signal Integrity and EMC Compliance | EMBD.X409, 1.5 Units
SystemVerilog Assertions and Formal Verification | VLSI.X411, 3.0 Units
The Internet of Things: Sensors, Platforms, Communications, and Applications | EMBD.X413, 3.0 Units
Wireless Communications and Mobile Antenna Design, Introduction | EMBD.X419, 3.0 Units

5. Completion Review:

Embedded Systems Certificate Completion Fee | O-CE0071

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

We suggest students begin with **Embedded System Hardware Architectures, Introduction .**

The remaining courses may be taken in any order provided prerequisites are met.

Electives are offered in two areas of study.

Embedded Hardware

Embedded Software

Substitutions &T certificate programs unless otherwise noted.

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

Shared credits

To receive your certificate

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

HUMAN RESOURCE MANAGEMENT

Cost: Starting at $6,870.
Required Credits: 11 courses (minimum 15 quarter units). Take 8 required courses (13.5 quarter units) and 3 elective courses (1.5–6 quarter units). End with the certificate review.
Duration: A full-time student can complete the certificate in 9–12 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
(19.25 HRCI credit hours)

Interviewing for Success: Using Structured Interviewing Techniques (6.50 HRCI credit hours)
Evaluate performance management approaches and techniques

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

Workplace Investigations (6.50 HRCI credit hours)

Terminating and Managing Problem Employees (6.50 HRCI credit hours)

Finance for the Business Professional (9.50 HRCI credit hours)

* The use of this official seal confirms that this Activity has met HR Certification Institute's® (HRCI®) criteria for recertification credit pre-approval.

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 | HRMT.X407, 2.0 Units
Compensation Management | HRMT.X404, 2.0 Units
Effective Employee Relations | HRMT.X414, 1.5 Units
Finance for the Business Professional | BUSM.X403, 1.0 Units
Human Resource Management | HRMT.X400, 1.5 Units
Law and Human Resource Management | HRMT.X405, 2.0 Units
Managing the HR Staffing Function | HRMT.X409, 1.5 Units
Organizational Development and Change | HRMT.X401, 2.0 Units

2. Electives: Recruiting and Staffing

Effective Performance Management | HRMT.X402, 2.0 Units
Interviewing for Success: Using Structured Interviewing Techniques | HRMT.X410, 0.5 Units
Talent Acquisition | HRMT.X408, 1.5 Units

3. Electives: Leadership Development

Business Communications | BUSM.X404, 2.0 Units
Facilitation Skills | HRMT.X406, 2.0 Units
Leading People Through Change | HRMT.X412, 1.0 Units
People Analytics - Delivering Measurable Business Impact | HRMT.X418, 1.5 Units
Strategic DEI Initiatives for HR Professionals | HRMT.X420, 1.5 Units

4. Electives: Employee Relations

Terminating and Managing Problem Employees | HRMT.X413, 0.5 Units
Workplace Conflict Resolution and Mediation | HRMT.X419, 3.0 Units
Workplace Investigations | HRMT.X415, 0.5 Units

5. Electives: HR Business Partners/General

Human Resources Business Partner (HRBP) Excellence | HRMT.X416, 1.0 Units

6. Completion Review:

Human Resource Management Certificate Completion Fee | O-CE0133

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

It is highly recommended that students new to the field of human resources 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 .

LINUX PROGRAMMING AND ADMINISTRATION

Cost: Track 1 starts at $3,595. | Track 2 starts at $3,800.
Required Credits: 5-6 courses (14 quarter units). Take 1 required course (3 quarter units), 1 core course (2-3 quarter units) and 2-3 elective courses (8 quarter units). [Only 1 programming course may be applied to the certificate.] End with Certificate 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 System and Network Administration | LINX.X406, 3.0 Units

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

C++ Programming | CMPR.X404, 3.0 Units
C Programming I | CMPR.X400, 2.0 Units
C Programming II | CMPR.X401, 3.0 Units
Go Programming | CMPR.X418, 3.0 Units
Introduction to Web Programming: JavaScript and PHP | UEWD.X421, 2.0 Units
Java Programming I | CMPR.X412, 2.0 Units
Java Programming II | CMPR.X413, 3.0 Units
Python for Programmers | CMPR.X416, 3.0 Units
Python: Object-Oriented Programming | CMPR.X420, 2.0 Units

Linux, Introduction | LINX.X400, 2.5 Units
Linux Kernel and Drivers, Advanced | LINX.X413, 3.0 Units
Linux Kernel & Drivers | LINX.X411, 3.0 Units
Linux System Performance in the Cloud and Data Center | LINX.X407, 3.0 Units
Linux Systems Programming | LINX.X408, 3.0 Units
Networking Fundamentals | LINX.X415, 3.0 Units
System Virtualization Fundamentals | LINX.X417, 2.5 Units

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

Linux Systems Programming | LINX.X408, 3.0 Units

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

C++ Programming | CMPR.X404, 3.0 Units
C Programming II | CMPR.X401, 3.0 Units
Java Programming II | CMPR.X413, 3.0 Units

6. Electives: Track 2 - Linux System Development (8 units required)

Embedded Linux Design and Programming | LINX.X409, 3.0 Units
Linux, Introduction | LINX.X400, 2.5 Units
Linux Kernel and Drivers, Advanced | LINX.X413, 3.0 Units
Linux Kernel & Drivers | LINX.X411, 3.0 Units
Linux System and Network Administration | LINX.X406, 3.0 Units

7. Completion Review:

Linux Programming and Administration Certificate Completion Fee | O-CE0184

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

overall.

Substitutions

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

Shared credits

&T certificate programs unless otherwise noted.

To receive your certificate
Some Engineering and Technology courses may be listed in more than one program. However, only one course may be shared between two E may request your Linux Programming and Administration Certificate Completion Review .

MARKETING MANAGEMENT

Cost: Starting at $4,825.
Required Credits: 7 courses (15 quarter units): Take 4 required courses (9 quarter units) and 3 elective courses (6 quarter units). End with Certificate of Completion Review.
Duration: A full-time student can complete the certificate in 9–12 months.

Certificate Description

Silicon Valley-style customer-driven marketing

In this hyper-personalized and buyer-centric era, isolated sales and marketing are a thing of the past. Today's marketer needs to master new tools and strategies to succeed in sales and marketing alignment; the fusion of sales, marketing, and social selling; and programmatic marketing and sales. Discover the transformative power of artificial intelligence in crafting personalized customer experiences.

Choose among two tracks and a specialized program

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

Align sales and marketing strategies

Courses

1. Required Course(s):

Implementing Marketing and Sales Strategies | MKTG.X403, 2.0 Units
Integrated Marketing Communication | MKTG.X408, 3.0 Units
Principles of Marketing | MKTG.X400, 2.0 Units

Web and Mobile Analytics | MKTG.X412, 2.0 Units

3. Electives: Marketing Management

Consumer Insights: Data Analysis and Interpretation | MKTG.X413, 2.0 Units
Power of Market Research | MKTG.X401, 2.0 Units
Product Marketing and Management | MKTG.X406, 2.0 Units
Public and Analyst Relations | MKTG.X402, 2.0 Units
Strategic Marketing Operations | MKTG.X404, 2.0 Units

4. Capstone Course:

Marketing in Practice | MKTG.X491, 2.0 Units

5. Completion Review:

Marketing Management Certificate Completion Fee | O-CE0406

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: Starting at $4,845 • Track 2: Starting at $4,860.
Required Credits: 6 courses (14 quarter units). Select one track of study.
Duration: A full-time student can complete the certificate in 9–12 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

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 | MEDD.X401, 2.0 Units
Medical Device Process Validation | MEDD.X411, 2.0 Units
Quality Management Systems for Medical Devices: ISO 13485 and FDA Requirements | MEDD.X407, 3.0 Units
Regulation of in vitro Diagnostics in Europe and the US | MEDD.X408, 2.5 Units
Risk Management for Regulated Industries | MEDD.X409, 3.0 Units
Value-Added Quality Audits | REGL.X407, 1.5 Units

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

Design Control for Medical Devices | MEDD.X400, 2.0 Units
European Medical Device Regulation: Clinical Evaluation and Post-Market Surveillance | REGL.X408, 3.0 Units
Mobile Health, SaMD, and AI/ML Devices | MEDD.X404, 1.0 Units
Quality Management Systems for Medical Devices: ISO 13485 and FDA Requirements | MEDD.X407, 3.0 Units
Risk Management for Regulated Industries | MEDD.X409, 3.0 Units
Validating Software for Medical Devices and Emerging Technologies | MEDD.X410, 2.0 Units

3. Completion Review:

Medical Device Quality and Design Certificate Completion Fee | O-CE0403

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

Clinical Trials Essentials: An Intensive One-Week Course | CTDM.801, 3.5 CEU's
Post-Market Regulatory Obligations for Medical Devices | MEDD.X406, 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: Starting at $6,020.
Required Credits: 8 courses (29.5 units)
Duration: A full-time student can complete the certificate in 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

Courses

1. Required Course(s): Foundation Courses

Applied Mathematics for Financial Planning | FPLN.X409, 3.0 Units
Personal Financial Planning, Survey | FPLN.X400, 4.0 Units

2. Required Course(s):

Employment Benefits and Retirement Planning in Personal Financial Planning | FPLN.X411, 3.5 Units
Estate Planning | FPLN.X402, 3.5 Units
Income Taxation in Personal Financial Planning | FPLN.X410, 3.5 Units
Investments in Personal Financial Planning: Principles and Methods | FPLN.X401, 4.0 Units
Risk Management in Personal Financial Planning | FPLN.X405, 3.5 Units

3. Capstone Course:

Personal Financial Planning, Practicum | FPLN.X490, 4.5 Units

4. Completion Review:

Personal Financial Planning Certificate Completion Fee | O-CE0163

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

Courses completed more than five years prior to date certificate is issued cannot be used to fulfill requirements.
*Student Discount on Texts
To receive your certificate.

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

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: Starting at $5,550
Required Credits: 8 courses (16 quarter units). Take 6 core courses (13.5 quarter units) and 2 elective credit courses (2.5 quarter units).
Duration: A full-time student can complete the certificate in 9–12 months.

Certificate Description

Leadership in strategic, sustainable procurement

The supply chain network was changed significantly by the pandemic, which highlighted security and public safety issues, bottlenecks, and numerous cybersecurity flaws. Organizations are strapped to get the resources they need to meet these challenges and they are demanding more. The new supply chain network reality requires a paradigm shift and the embrace of advanced technologies such as artificial intelligence.

In the UCSC Silicon Valley Extension Procurement and Supply Chain program, you learn a wide spectrum of business skills—from procuring finished goods and raw materials to equipment and services. Our students explore emerging strategies and advanced technologies at play in every organization's bottom line.

By learning best practices in proactive collaboration, negotiation, using data analytics to support your decisions, and practicing continuous process improvement for a path of profitability, you will help your organization accomplish its key missions and objectives.

Certificate program learning outcomes

Courses

1. Required Course(s):

Effective Procurement Strategies | SCMT.X401, 3.0 Units
Evolving Role of Supply Chain Management | SCMT.X400, 1.5 Units
Logistics and Transportation Management | SCMT.X402, 3.0 Units
Supply Chain Operations Management | SCMT.X406, 3.0 Units
Sustainable Supply Chain Strategies | SCMT.X403, 1.5 Units
Technology Impacts in the Supply Chain | SCMT.X404, 1.5 Units

2. Electives:

International Business and the Global Economy | BUSM.X402, 3.0 Units
Managing Global Supply Chains | SCMT.X405, 1.5 Units
Outsourcing and Contract Management | PPMT.X414, 1.5 Units
Safeguarding the Supply Chain: Best Practices in Cybersecurity | SCMT.X409, 2.0 Units
Supply Chain Decisions and Data Analytics | SCMT.X407, 2.0 Units

3. Completion Review:

Procurement and Supply Chain Management Certificate Completion Fee | O-CE0506

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: Starting at $5,130.
Required Credits: 7 courses (15 quarter units). Take 4 required courses (10.5 quarter units) and 2–3 elective courses (minimum 4.5 quarter units).
Duration: A full-time student can complete the certificate in 9–12 months.

Certificate Description

As practiced by PMI®-certified Silicon Valley leaders

Establish business needs.

Define products.

Estimate costs and schedules.

Manage risk.

Aspiring and seasoned project and program managers learn from industry leaders who are guiding teams in Silicon Valley's largest companies, most innovative startups, and trend-setting organizations.

Our instructors, certified by the Project Management Institute®, bring their deep professional experience into the classroom. They teach the latest principles, practices, processes, and tools to quickly originate project plans, going beyond the PMI Body of Knowledge (PMBOK®) to solve real work challenges. Students learn current industry practices including agile and lean project leadership methodologies such as Scrum, Kanban, Scrumban, and the Adaptive Project Framework.

Create and lead successful teams

Project and Program Management certificate program objectives

Assess and manage project risks

Plan and execute successful projects

Use both traditional waterfall and lean-agile project models

Analyze stakeholders

Make informed and profitable project business decisions

Qualify for the internationally recognized Master Project Manager® credential

Successfully completing one course fulfills the PMI®■ education requirement to apply for either the CAPM®■ (Certified Associate in Project Management) or PMP®■ (Project Management Professional) exams.

Courses

Project Leadership and Communication | PPMT.X415, 3.0 Units
Role of the Project Manager | PPMT.X400, 1.5 Units

2. Electives: Leadership and Management

Clinical Project Management | CTDM.X401, 2.0 Units
Creating the Successful Team | PPMT.X403, 1.5 Units
Managing International Projects | PPMT.X411, 1.5 Units
Managing Software Projects | SEQA.X406, 1.5 Units
Managing the Development of New Products | PPMT.X412, 1.5 Units
Outsourcing and Contract Management | PPMT.X414, 1.5 Units

3. Electives: Tools and Techniques

Decision-Making Tools and Techniques | PPMT.X418, 1.5 Units
Principles of Business Analysis | BUSM.X400, 3.0 Units
Project Scheduling Essentials | PPMT.X416, 1.5 Units
Quality Management for Enterprises, Products, and Programs | PPMT.X421, 2.0 Units
Schedule Optimization Techniques for Managers | PPMT.X413, 1.5 Units

4. Electives: Agile Project Management

Achieving Organizational Agility using the Scaled Agile Framework, SAFe© | PPMT.X420, 1.5 Units
Agile Product Life-Cycle Management (APLM) | PPMT.X409, 1.5 Units
Agile Project Management Using Scrum | PPMT.X408, 1.5 Units
Extreme-Agile Project Management | PPMT.X405, 1.5 Units
Foundations of Disciplined Agile for Project Managers | PPMT.X424, 1.5 Units
Lean-Agile Project Management: Achieving Business Value | PPMT.X407, 1.5 Units
Principle Based Leadership for Project Managers | PPMT.X422, 1.5 Units

5. Capstone Course:

Applied Project Management | PPMT.X417, 3.0 Units

6. Completion Review:

Project and Program Management Certificate Completion Fee | O-CE0165

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: Starting at $4,810 | Track 2: Starting at $5,515
Required Credits: Track I: 6–7 courses (minimum 15 quarter units). Track II: 7 courses (minimum 14 quarter units). 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 | REGL.X402, 1.5 Units
Drug Safety and Adverse Events Reporting | CTDM.X409, 1.5 Units
Foundations in U.S. FDA Regulations of Drugs & Biologics and Regulatory Submissions | REGL.X409, 2.0 Units

Good Manufacturing Practices | REGL.X400, 3.0 Units
Principles of Drug Discovery and Development | BTEC.X415, 4.0 Units
Regulation of Drugs & Biologics: Strategic Biopharmaceutical Product Development | REGL.X411,
3.0 Units

1. Required Courses: Take seven (7) courses, minimum 14 quarter units.

Communicating and Negotiating with the FDA | REGL.X402, 1.5 Units
Design Control for Medical Devices | MEDD.X400, 2.0 Units
European Medical Device Regulation: Clinical Evaluation and Post-Market Surveillance |
REGL.X408, 3.0 Units
Foundations in Medical Devices: Developing Premarket U.S. Regulatory Strategies and Working in
a Regulated Environment | REGL.X410, 2.0 Units
Global Medical Device Submissions and Strategy | REGL.X401, 1.5 Units
Good Manufacturing Practices | REGL.X400, 3.0 Units
Post-Market Regulatory Obligations for Medical Devices | MEDD.X406, 1.5 Units
Quality Management Systems for Medical Devices: ISO 13485 and FDA Requirements |
MEDD.X407, 3.0 Units
Regulatory Submissions: Devices and Diagnostics | REGL.X405, 2.5 Units

2. Certificate Review:

Regulatory Affairs Certificate Completion Fee | O-CE0364

3. Related Course(s): These course(s) are not part of the certificate program

Clinical Trials Essentials: An Intensive One-Week Course | CTDM.801, 3.5 CEU's
Data Privacy and Security for Healthcare and Biosciences | CTDM.X407, 1.5 Units
European Medical Device Regulation: Clinical Evaluation and Post-Market Surveillance |
REGL.X408, 3.0 Units
Regulation of Drugs and Biologics | REGL.X403, 3.0 Units
Regulation of Medical Devices and Diagnostics | REGL.X404, 3.0 Units
Value-Added Quality Audits | REGL.X407, 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

Clinical Trials Essentials: An Intensive One-Week Course , 3.5 units

SOFTWARE ENGINEERING AND QUALITY

Cost: Starts at $4,625.
Required Credits: 5–7 courses (minimum 14 quarter units). Take 3 core courses (6.5 units) and 3–4 electives (minimum 7.5–9 quarter 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. Build a strong SQA team. Save on costs.

Software errors cost companies millions of dollars. The longer it takes to discover bugs, 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 minimize defects early in the life cycle and influence product development to improve the customer experience.

Our rigorous approach to quality assurance complements the latest and established practices in software engineering and user experience design with proven techniques 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 Quality Assurance and Testing | SEQA.X403, 2.0 Units

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

Advanced DevOps Technologies | SEQA.X409, 3.0 Units
Data Structures and Algorithms Using C++ | CMPR.X406, 3.0 Units
Data Structures and Algorithms Using Java | CMPR.X407, 3.0 Units
Data Structures and Algorithms Using Python | CMPR.X425, 3.0 Units
Designing, Building and Integrating RESTful API | SEQA.X407, 2.0 Units
DevOps Technologies | SEQA.X408, 3.0 Units

3. Electives: Quality and Testing

Agile Software Development using TDD/BDD and Python | SEQA.X404, 3.0 Units
JUnit Test Framework | SEQA.X400, 1.5 Units
Quality Management for Enterprises, Products, and Programs | PPMT.X421, 2.0 Units
Web Applications Testing, Comprehensive | SEQA.X405, 3.0 Units

4. Electives: User Experience Design

Designing User Experience for AR, Smart Things, Virtual Reality, and Wearable Technology | UEWD.X405, 3.0 Units
Mobile Interface Design | UEWD.X412, 3.0 Units
User Experience Design, Advanced | UEWD.X415, 3.0 Units
User Experience Design Fundamentals | UEWD.X414, 3.0 Units

5. Completion Review:

Software Engineering and Quality Certificate Completion Fee | O-CE0383

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.
&T certificate programs unless otherwise noted.
Shared credits
To receive your certificate

Upon completion of the course sequence you may request your Software Engineering and Quality
Some Engineering and Technology courses may be listed in more than one program. However, only one course may be shared between two E

TESOL

Cost: Starting at $5,425.
Required Credits: 9–11 courses (minimum 27 quarter units). Take 7 required courses (23 quarter units) and 2-4 elective courses (minimum 4 quarter units). End with 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.

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 | TESL.X305, 2.0 Units
Culture and Cultural Diversity | TESL.X300, 4.0 Units
First and Second Language Development | TESL.X303, 3.0 Units
Fundamentals of English Grammar for ESL Teachers | TESL.X304, 2.0 Units
Language Structure | TESL.X302, 3.0 Units
Methodology of Bilingual and English Language Development | TESL.X301, 4.0 Units

2. Electives:

English As a Second Language Through Music and Movement | TESL.X306, 2.0 Units
Instructional Design and Delivery, Introduction | INDE.X400, 1.0 Units
Teaching Beginning ESL Students: Principles and Practices | TESL.X307, 1.5 Units
Teaching Grammar, Level II | TESL.X309, 2.0 Units
Teaching Writing | TESL.X310, 2.0 Units

3. Capstone Course:

TESOL Practicum | TESL.X390, 5.0 Units

4. Completion Review:

TESOL Certificate Completion Fee | O-CE0409

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: Starting at $5,550.
Required Credits: 6–7 courses (minimum 17 quarter units). Take 5 core courses (13 quarter units) and 2–3 elective courses (minimum 4 quarter units). End with a 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

User Experience Design Fundamentals | UEWD.X414, 3.0 Units

3. Electives:

Adobe Creative Suite | UEWD.X420, 3.0 Units
Adobe Illustrator, Introduction | UEWD.X400, 1.5 Units
Adobe Photoshop | UEWD.X419, 3.0 Units
Designing a UX or Visual Design Portfolio | UEWD.X422, 2.0 Units
Designing User Experience for AR, Smart Things, Virtual Reality, and Wearable Technology | UEWD.X405, 3.0 Units
Designing with Cascading Style Sheets: Fundamentals | UEWD.X406, 2.0 Units
HTML5 Fundamentals | UEWD.X410, 2.0 Units
Introduction to Web Programming: JavaScript and PHP | UEWD.X421, 2.0 Units
Mobile Interface Design | UEWD.X412, 3.0 Units
User Experience Design, Advanced | UEWD.X415, 3.0 Units
User Experience Design Fundamentals | UEWD.X414, 3.0 Units

4. Capstone Course: Required

Capstone User Experience Project | UEWD.X490, 2.0 Units

5. Completion Review:

User Experience and Web Design Certificate Completion Fee | O-CE0613

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

To receive your certificate

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

VLSI AND SEMICONDUCTOR ENGINEERING

Cost: Track 1 starts at $4,350. | Track 2 starts at $4,620.
Required Credits: 5 courses (minimum 14 quarter units). Take 3 required courses (9 quarter units) and 2 elective courses (minimum 6 quarter units). End with certificate of completion review.
Duration: A full-time student can complete the certificate in 9–12 months.

Certificate Description

Learn next-level VLSI design skills for top Silicon Valley companies

UCSC Silicon Valley Extension VLSI and Semiconductor Engineering professional certificate program provides students with the core design skills they need to work at top companies in the Valley. Both established and aspiring engineers develop new skills, gain insight into digital and analog design techniques and methodologies, and learn from our expert faculty.

Integrated circuit curriculum

'll explore ASIC, semiconductor, EDA, device, and integrated circuits. In our VLSI lab, our 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.

Logic designers, design for test professionals, verification engineers, and project leaders receive next-level training for career growth so they can meet the latest demands of top Silicon Valley employers.

Two tailored elective tracks

Track 1: Front-end Design
For professionals pursuing careers in application-specific integrated circuits (ASIC) architectural definitions and logic designs for its implementation.

Track 2: Back-end Design
For professionals interested in the physical implementations of ASIC designs from synthesis to silicon.

Courses

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

Advanced Signaling: Jitter and Noise Analysis | EMBD.X407, 3.0 Units
Advanced Verification with SystemVerilog OOP Testbench | VLSI.X400, 3.0 Units
FPGA Application in Autonomous Driving Systems, Introduction | VLSI.X416, 3.0 Units
Practical DFT Concepts for ASICs, SoC and SiP | VLSI.X409, 3.0 Units
System and Functional Verification Using UVM (Universal Verification Methodology) | VLSI.X410, 3.0 Units
SystemVerilog Assertions and Formal Verification | VLSI.X411, 3.0 Units

2. Electives: Front-End

Analog IC Design, Introduction | VLSI.X401, 3.0 Units
Digital Logic Design Using Verilog | VLSI.X404, 3.0 Units
Embedded System Hardware Architectures, Introduction | EMBD.X415, 3.0 Units
High-Performance Computer Architecture | VLSI.X415

IO Concepts and Protocols: PCI Express and Ethernet | EMBD.X406, 3.0 Units
IO Design Fundamentals | VLSI.X405, 3.0 Units
Wireless Communications and Mobile Antenna Design, Introduction | EMBD.X419, 3.0 Units

3. Electives: Back-End

3D IC Packaging and Physical Verification | VLSI.X418
ASIC Physical Design, Advanced | VLSI.X402, 3.0 Units
Comprehensive Signal and Power Integrity for High-Speed Digital Systems | EMBD.X400, 3.0 Units
Introduction to VLSI and ASIC Design | VLSI.X403, 3.0 Units
IO Design Fundamentals | VLSI.X405, 3.0 Units
Physical Design Flow From Netlist to GDSII | VLSI.X408, 3.0 Units
Practical Design and Implementation of VLSI Memory Devices | VLSI.X417, 3.0 Units
Practical Design with Xilinx FPGAs | EMBD.X408, 3.0 Units
Timing Closure in Silicon IC Design | VLSI.X414, 3.0 Units

4. Completion Review:

VLSI Engineering Certificate Completion Fee | O-CE0186

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. Other courses can be taken based on your interests and professional levels.

Related Electives

Embedded System Hardware Architectures, Introduction (3.0)

System Design for Low Power Management (1.0)

Substitutions

&T certificate programs unless otherwise noted.

You may take one elective outside the certificate curriculum if you receive prior approval from the Academic Services Department.
Upon completion of the course sequence you may request your Semiconductor Engineering Certificate Completion Review .

Some Engineering and Technology courses may be listed in more than one program. However, only one course may be shared between two E

EARLY CHILDHOOD EDUCATION: ADVANCED TEACHER

Cost: Starting at $2,655.
Required Credits: 5–7 courses (minimum 17 quarter units). Take 4 required courses (14 quarter units) and 1–2 elective courses (minimum of 3 quarter units).
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.

ECE 7: Practicum in Early Childhood Education | ECED.X307, 5.0 Units
ECE 9: Language and Literacy for the Young Child | ECED.X309, 3.0 Units

2. Electives: At Least 3 Units

Attention Deficit Hyperactivity Disorder (ADHD) in the Classroom | ECED.X318, 3.0 Units
ECE: Brain Development in Early Childhood | ECED.X310, 3.0 Units
ECE: Creative Arts for the Young Child (Preschool Through Grade 3) | ECED.X312, 3.0 Units
ECE: Infant/Toddler Growth and Development | ECED.X313, 3.0 Units
ECE: Principles of Infant/Toddler Caregiving | ECED.X314, 3.0 Units
Math Development in Young Children | ECED.X316, 2.0 Units
Science Play: Inquiry-Based Learning Made Easy | ECED.X317, 1.0 Units

3. Completion Review:

Early Childhood Education Advanced Teacher Certificate Completion Fee | O-CE0421

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 6-9 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 | BUSM.X404, 2.0 Units
Finance for the Business Professional | BUSM.X403, 1.0 Units

2. Electives: Two Required

DEVOPS AND DATA VIRTUALIZATION

Cost: $3,000
Required Credits: 4–5 courses (11 quarter units). Take 2 core courses (5.5 quarter units) and sufficient electives to earn a minimum of 5.5 quarter 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

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

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

1. Prerequisite(s): "Networking Fundamentals" or equivalent work experience
DevOps Technologies:
An introduction to Agile software development practices and IT automation techniques to achieve rapid rates of high quality deployment.
Networking Fundamentals | LINX.X415, 3.0 Units

2. Required Course(s):
*
DevOps Technologies | SEQA.X408, 3.0 Units
System Virtualization Fundamentals | LINX.X417, 2.5 Units

3. Electives: Two Required

Advanced DevOps Technologies | SEQA.X409, 3.0 Units
Advanced Network Architecture and Protocols | ITEC.804, 3.0 CEU's

Cloud Storage and Virtualization in Data Centers | LINX.X416, 3.0 Units
Docker Containers In-Depth | ITEC.800, 1.8 CEU's
Introduction to Blockchain, Smart Contracts, and NFTs | ITEC.807, 2.0 CEU's
Kubernetes Container Orchestration Fundamentals | ITEC.801, 3.0 CEU's
Programming for Cloud Computing: AWS and MS Azure | IPDV.801, 3.0 CEU's

4. Completion Review:

Specialization in DevOps and Virtualization Completion Fee | O-CE0518

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.

LEAN-AGILE PROJECT MANAGEMENT

Cost: $3,000
Required Credits: Total required: 4 courses or 6 units. Take 1 core course (1.5 units) and 3 elective credit courses (4.5 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.

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 | PPMT.X400, 1.5 Units

2. Required Course(s): One Required

Agile Project Management Using Scrum | PPMT.X408, 1.5 Units

3. Electives: Three Required

Achieving Organizational Agility using the Scaled Agile Framework, SAFe© | PPMT.X420, 1.5 Units
Agile Product Life-Cycle Management (APLM) | PPMT.X409, 1.5 Units
Extreme-Agile Project Management | PPMT.X405, 1.5 Units
Foundations of Disciplined Agile for Project Managers | PPMT.X424, 1.5 Units
Lean-Agile Project Management: Achieving Business Value | PPMT.X407, 1.5 Units
Principle Based Leadership for Project Managers | PPMT.X422, 1.5 Units

4. Completion Review:

Specialization in Lean-Agile Project Management Completion Fee | O-CE0508

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 | CMPR.X422, 3.0 Units
Mobile Application Development - Android and iOS, Introduction | CMPR.X421, 3.0 Units

2. Electives: (Choose One)

Designing User Experience for AR, Smart Things, Virtual Reality, and Wearable Technology | UEWD.X405, 3.0 Units
Mobile e-Commerce, Fintech and Cryptocurrency | ITEC.806, 3.0 CEU's
Mobile Interface Design | UEWD.X412, 3.0 Units

3. Completion Review:

Specialization in Mobile Application Development Completion Fee | O-CE0500

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:

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

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. **Python Programming for Beginners ,** followed by **Python: Object-Oriented Programming ,** and on to the more advanced **Python for Programmers .**

More details about our 3-course Python specialization program below. Start with a single course! We suggest:
Courses

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

Python for Programmers | CMPR.X416, 3.0 Units
Python: Object-Oriented Programming | CMPR.X420, 2.0 Units
Python Programming for Beginners | CMPR.X415, 1.5 Units

2. Completion Review:

Python Specialization Completion Fee | O-CE0509

SOCIAL MEDIA MARKETING

Cost: $2,700
Required Credits: Total Required: 3 courses (6 units)
Duration: A student can complete this specialization in 12 months (possibly sooner).

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 | MKTG.X416, 2.0 Units
Social Media Marketing Fundamentals | MKTG.X415, 2.0 Units

2. Capstone Course:

Application of Social Media for Business Growth | MKTG.X490, 2.0 Units

3. Completion Review:

Specialization in Social Media Marketing Completion Fee | O-CE0505

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 frontend 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, SPA 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 frontend 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 JavaScript and PHP
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.

For students with more programming experience

JavaScript and AJAX, Comprehensive
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.

Courses

Designing with Cascading Style Sheets: Advanced | UEWD.X407, 2.0 Units
HTML5 Advanced and Javascript APIs | UEWD.X411, 3.0 Units
Web Application Development Using React, Redux and TypeScript | IPDV.802, 2.0 CEU's
Web Applications Testing, Comprehensive | SEQA.X405, 3.0 Units
Web Framework Using JavaScript: The MERN Stack | IPDV.803, 3.0 CEU's

3. Completion Review:

Specialization in Web Development Completion Fee | O-CE0519

Recommend Course Sequence

How to be a frontend developer today

  The frontend foundation: HTML and CSS

            HTML5 Advanced and Javascript APIs and **Designing with Cascading Style
Basic knowledge of** HTML/CSS is required for all classes in the Web Development specialization.
Upgrade with
New to this subject? See **HTML5 Fundamentals** and Designing with **Designing with Cascading
Style Sheets: Fundamentals .**

Learn JavaScript from the ground up

Start with the standards, variables, data types, expressions, functions, events, objects, with
Introduction to Web Programming: JavaScript and PHP .

Learn frameworks like React, Redux, and Typescript by building projects in a classroom
environment with **JavaScript and AJAX, Comprehensive** , and **Web Application Development
Using React, Redux and TypeScript** .

Learn web deployment techniques

Learn how to test web applications with **Web Applications Testing, Comprehensive** . And learn
deployment techniques with **Programming for Cloud Computing: Amazon Web Services** .

Other valuable web developer skills

Website creation is a combination of code, visual design, and content. UCSC Silicon Valley offers
other programs that complement frontend developer skills. See **Designing a UX or Visual Design
Portfolio** and other courses in **User Experience and Web Design** .

AI APPLICATION DEVELOPMENT

Cost: $3,385
Required Credits: 9.5 quarter units (CEUs and UC credit)
Duration: 6–9 months to complete the specialization.

Award Description

Building enterprise AI applications of the future

AI-powered intelligent applications are fast becoming the norm. Gain the knowledge and skills you need from experts in the field.

Master introductory deep learning prediction models.

Choose an important field for applying AI.

Launch your own industry-standard applications for the enterprise.

Rapid job growth outlook

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.

Courses

1. Required Course(s):

Deep Learning and Artificial Intelligence | DBDA.X425, 3.0 Units
The Business of AI | AISV.800, 1.5 CEU's

2. Elective Courses: (Choose One)

Artificial Intelligence for Robotics | AISV.807, 3.0 CEU's
Deep Reinforcement Learning | AISV.802, 3.0 CEU's
GANs for Data Synthesis | AISV.809, 3.0 CEU's
Natural Language Processing | AISV.801, 3.0 CEU's

3. Capstone Course:

Building Integrated AI Applications | AISV.805, 2.0 CEU's

4. Completion Review:

Specialization in AI Application Development Completion Fee | O-CE0520

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.

1. Four Required Courses

Cultural Equity for Student Success | DVSV.802, 1.0 CEU's
Learning Theories and Styles | INDE.801
Moving Beyond Our History: Diversity Tools for Today | DVSV.800, 1.0 CEU's
Neurodivergent Learners | EDTH.X312, 1.0 Units

2. Specialization Completion Review

Specialization in DEI for Educators Completion Fee | O-CE0521

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. Three Required Courses

Cultural Equity for Student Success | DVSV 802 1.0 CEU's

JAVA DEVELOPMENT

Cost: $2,625
Required Credits: 8 units
Duration: 4–6 months

Award Description

Meet the growing demand for Java developers

Java, one of the easiest object-oriented programming languages to learn and use, has been the dominant language for decades. No longer just a web development language, it's now used in general-purpose programming. Developers use this platform-independent, open-source programming language for web, mobile, and server-side applications development.

The growth of Android OS, wearables, and appliances in the Internet of Everything (IoE) has contributed to the soaring popularity of Java and it's the language of choice for backend development for high-performance concurrent applications. It also has a simplicity; it doesn't use the complicated concepts of pointers and thereby avoids the challenges of dealing with memory leaks.

In this 8-unit Java Programming specialization, you can start as a novice and, in just four to six months of hands-on practice, master the fundamentals, and start articulating the intricacies of efficient algorithms using Java. Java is ubiquitous. Students of Java find a wide range of community support while they develop this skill.

Giving you a competitive edge

Java Programming I
A mind-expanding, new way of thinking for novices

Java Programmings II
Gain a strong understanding of object-oriented programming (OOP) concepts that provide the structure for most Java applications and the basis of the language itself.

'll practice the core facilities of Java,
Data Structures and Algorithms using Java the ability to analyze algorithms that are most important to first-side data structures. Note 70% of interview questions for developers are focused on this one topic.

Courses

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

Data Structures and Algorithms Using Java | CMPR.X407, 3.0 Units
Java Programming I | CMPR.X412, 2.0 Units
Java Programming II | CMPR.X413, 3.0 Units

2. Completion Review:

Specialization in Java Development Completion Fee | O-CE0528

Recommend Course Sequence

We suggest: **Java Programming I** , followed by **Java Programmings II** , and on to the more advanced **Data Structures and Algorithms using Java .**

DATA ENGINEERING

Cost: $2,610
Required Credits: 3 courses (8 quarter units)
Duration: 6-9 months to complete

Award Description

Courses

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

Data Engineering with Hadoop | DBDA.X424, 3.0 Units
Hands-On Data Engineering | DBDA.X424
MySQL and Oracle Database for Developers and Designers | DBDA.X409, 2.0 Units
Relational Database Design and SQL Programming | DBDA.X415, 3.0 Units

2. Completion Review

Specialization in Data Engineering Completion Fee | O-CE0530

DATA SCIENCE

Cost: $2,920
Required Credits: 3 courses (9 quarter units)
Duration: 6 – 9 months

Award Description

Courses

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

Dashboards and Data Visualization | DBDA.X419, 3.0 Units
Data Analysis, Introduction | DBDA.X404, 3.0 Units
Python for Data Analysis | DBDA.X420, 3.0 Units

2. Completion Review

Specialization in Data Science Completion Fee | O-CE0529

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

Introduction to Accounting I: Financial Accounting | BUSM.X418, 4.0 Units

Business Courses

Business Law and Its Environment | BUSM.X409, 3.0 Units
Finance for the Business Professional | BUSM.X403, 1.0 Units
Finance I, Fundamentals | BUSM.X405, 3.0 Units
Implementing Marketing and Sales Strategies | MKTG.X403, 2.0 Units
Integrated Marketing Communication | MKTG.X408, 3.0 Units
Organizational Development and Change | HRMT.X401, 2.0 Units
Power of Market Research | MKTG.X401, 2.0 Units
Principles of Marketing | MKTG.X400, 2.0 Units
Project Leadership and Communication | PPMT.X415, 3.0 Units
Role of the Project Manager | PPMT.X400, 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: $1,982. Save $518 (Regular price: $2,500)
Required Credits: 8 quarter CEUs
Duration: 10 weeks

Series Description

Learn the science, strategies, and skills for digital marketing success.

A 10-week online mentored certificate course

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

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.

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.

Earn industry-recognized certifications and qualifications.

Google Ads Search Certification

Google Analytics Individual Qualification

HubSpot Email Marketing Certification

Plus 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

Paying upfront isn't always realistic. To help put a Digital Marketing Science certificate through UCSC Silicon Valley in your reach, we offer a three-part payment plan. For more information or questions regarding payment options, please contact admissions@greenfig.com.

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.

Courses

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.

Introductory DEI courses

Courses

Diversity Equity Inclusion Courses

Cultural Equity for Student Success | DVSV.802, 1.0 CEU's
Cultural Proficiency | INDE.X401, 2.0 Units
Culture and Cultural Diversity | TESL.X300, 4.0 Units
ECE 6: Culture and Diversity in the Early Childhood Classroom | ECED.X306, 3.0 Units
Learning Theories and Styles | INDE.X402, 1.0 Units
Moving Beyond Our History: Diversity Tools for Today | DVSV.800, 1.0 CEU's
Strategic DEI Initiatives for HR Professionals | HRMT.X420, 1.5 Units
Sustainable Supply Chain Strategies | SCMT.X403, 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 | EDUC.XSC265, 5.0 Units
Technology in Schools, Introduction (SB 2042 Standard 11) | EDUC.XSC209, 2.0 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, and victim advocacy—to give you a practical understanding of your consulting role in the legal realm.

Whether you are an advocate for crime victims or an entrepreneur exploring a medical professional, this curriculum is tailored to your professional development.

Online and live-hybrid sessions starting soon.

Live hybrid sessions will begin in July.

info@legalstudies.com as soon as possible.
The next online sessions for all courses begin Monday, Aug. 21.

eDiscovery for Paralegals
Requests to add the live hybrid option should be emailed to

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

eDiscovery preparation basics

Best practices for electronically stored information collection

'll learn about the National Labor Relations Act, the Railway Labor Act, and other
3tatutescdealmgresth 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.

MoStoreBeatieDiscoGSCtopicon Valley Extension) is recognized by SHRM to offer professional development credits for the SHRM-CPSM and SHRM-SCPSM.

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

Employment Law Certificate Course   Page #91

A multitude of statutes cover the complex relationships between employers and employees. In this course, you

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.

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.

Legal Nurse Consultant Training Course   **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.
Nurses (PAs and RNs) in the seven-week

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

CLS by BARBRI, a legal education company (formerly Center for Legal Studies) that is focused on providing affordable, up-to-date, These effective legal courses a Student employment plans available through CLS by BARBRI.

Courses

PARALEGAL STUDIES

Cost: Paralegal starts at $1,895. Adv. Paralegal starts at $3,300 or $550 a topic.
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

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.

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.

Online and live-hybrid sessions starting soon.

info@legalstudies.com as soon as possible.
Requests to add the live hybrid option should be emailed to

Courses

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: $1,850 (Save $650 off the regular price of $2,500)
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.

Maximizing your team's sales performance

'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 pipelines, 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.

Optional online class meetings

During each session, students are invited to join in on optional online weekly meetings. Check out our upcoming start dates .

Paying upfront isn't always realistic. To help put a Sales Operations Science certificate through UCSC Silicon Valley in your reach, we offer a three-part payment plan. For more information or questions regarding payment options, please contact admissions@greenfig.com.

Courses

ARTIFICIAL INTELLIGENCE

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

Series Description

AI curriculum for today's workforce

Hands-on, practical technical skills

Strategic business acumen

Skills for a skyrocketing demand

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.

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 opens doors—AI for All

In this fast-growing multi-billion dollar market, we are casting a wide net to ensure the future is created by many for many. AI is reshaping our workforce, costing jobs in many sectors, and creating 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.

GANs for Data Synthesis | AISV.809, 3.0 CEU's
Generative AI Fundamentals | AISV.814
Introduction to Machine Learning | DBDA.X408, 3.0 Units
Natural Language Processing | AISV.801, 3.0 CEU's
Python for Machine Learning | DBDA.X427
Python for Machine Learning and Artificial Intelligence, Essentials | DBDA.X427, 3.0 Units
The Business of AI | AISV.800, 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

AI Ethics

AI for Healthcare

DEI for AI   'll let you know when any course is open for enrollment.

Please fill out the inquiry form above and we

SALES DEVELOPMENT SCIENCE

Cost: $1,850 (Save $650 off the regular price of $2,500)
Required Credits: 7 CEUs
Duration: 10 weeks

Series Description

Launch a career in sales, the top in-demand job in 2022

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.

In-demand skills

Salesforce credentials

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

Optional online class meetings

During each sessidh, atuedantsrader istainethip join nkery steps ybwoeald y tradite ance et npdisl Caheck out successfruliiog-statmtpdatessaYésu can enroll up to one week after the start date.

Eayjeeg Pharoityisn't always realistic. To help put a **Sales Development Science** certificate through UCSC Silicon Valley in your reach, we now offer a three-part payment plan. For more information or questions regarding payment options, please contact admissions@greenfig.com.

We'll break down roles within the sales organization and discuss potential paths for advancement in the discipline. You

Courses

BUSINESS ANALYTICS SCIENCE

Cost: $2,152 (Save $348 off regular price of $2,500)
Required Credits: 8 CEUs
Duration: 10 weeks

Series Description

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.

Topics of study

Data Modeling
Understand application workflows, design tables, determine primary keys and use the right data types effectively.

SQL, The Language of Data
Develop SQL queries and learn techniques such as filtering, working with joins and using aggregate functions.

Data Visualization Tools
Design research questions and select tools, techniques and visualization types to highlight insights. Get hands-on with Tableau.

KPIs
Develop business objectives and articulate their relationship to business performance.

Optional online class meetings

Students are invited to join in on optional online meetings each week Check out our upcoming start dates . You can enroll up to one week after the start date **Business Analytics Science** certificate through UCSC Silicon Valley in your reach, we offer a three-part payment plan. For more information regarding payment options, please contact admissions@greenfig.com.

Paying upfront isn't always realistic. To help put a
Courses

Course Descriptions

3D IC Packaging and Physical Verification | VLSI.X418

This course provides an in-depth exploration of the principles, techniques, and applications of three-dimensional integrated circuit (3D IC) packaging. 3D IC packaging is a cutting-edge technology that enables the stacking of multiple integrated circuits (ICs) within a single package, offering numerous advantages in terms of performance, power efficiency, and form factor. The course begins with an introduction to the fundamentals of IC packaging, including various packaging technologies and their evolution. It then delves into the concepts and challenges associated with 3D IC packaging. Students will gain a comprehensive understanding of the design considerations, fabrication processes, and assembly techniques employed in 3D IC packaging. The course also covers topics like EMIR and has comprehensive physical verification in the areas of chip stacking.

Learning Outcomes

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

Describe the fundamentals of 3D IC packaging and analyze the benefits and challenges of 3D IC packaging

Identify different 3D IC packaging architectures and understand advanced packaging materials and processes

Discuss emerging trends and future directions in 3D IC packaging

Collaborate effectively in a multidisciplinary team(s)

Apply theoretical knowledge to practical applications

Skills Needed

Some familiarity with material science principles and a fundamental knowledge of semiconductor manufacturing processes

Achieving Organizational Agility using the Scaled Agile Framework, SAFe© | PPMT.X420

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

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

Skills Needed:

Experience working in a team or project, in any role.

Adobe Creative Suite | UEWD.X420

3.0 Units

Adobe Creative Suite is the industry standard for the production of professional graphics used by graphic, web and interface designers, administrative professionals, photographers, artists, editors, social media marketers, and creative hobbyists. In this class, we will navigate the dense interface of menus, tools, options, panels, keyboard helpers, and fundamental concepts as your graphics reach a new level of creativity.

Implementing the design process in this class provides opportunity for creative development of a unique identity. Students are introduced to software skills via demonstration, participation and hands-on exercises. Create a logo using vector-based graphics with Adobe Illustrator. Engage in photography and photo editing with Adobe Photoshop. Develop a page layout with Adobe InDesign that tells your story. Students will see how these three powerful applications work seamlessly together in a symphony of visual communication.

Learning Outcomes

At the conclusion of the course, you should be able to Manage a project's workflow by integrating Illustrator, Photoshop and InDesign.

communication with words and images.

Topics Include

Illustrator: Vector shapes, layers, transformations, color swatches, fill and stroke, type and outlined type.

Photoshop: Size and resolution, cropping, color and tonal edits, layers, synchronized color.

InDesign: Basic typography, layout and page structure, placing graphics, text wrap.

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Additional Information

Please review section notes to view the full schedule.

Familiar with Macintosh.

Adobe Photoshop, Illustrator and InDesign installed on your computer.

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.

Learning Outcomes

At the conclusion of the course, you should be able to Use Adobe Illustrator vector drawing tools to create vector paths

Use Pathfinder and Shape Builder tools to build complex shapes

Apply appearances and effects to create digital illustrations and interface design prototypes

Work with Illustrator's Type tool and Type Objects to apply best practices for typography design

Export assets for print projects, websites and mobile apps

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

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Mac and/or Windows operating system including the fundamentals of file management and navigation.

Additional Information

Please review section notes to view the full schedule.

At this time, students will be required to purchase Adobe Creative Suite individually for this course. Adobe Creative Cloud offers a discount for Students. Your tuition bill is considered proof of enrollment and can be used as your proof of eligibility to receive the student discount. If you have any questions, please let us know so we can assist you.

Adobe Photoshop | UEWD.X419

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.

Learning Outcomes

At the conclusion of the course, you should be able to Manage a project's workflow

Manipulate image size and resolution for print and web

Understand common file formats and when to use them

Address tonal and color adjustments

Utilize Photoshop Layers

Combine images and selections to create composite images

Work non-destructively with adjustment layers and layer masks

Use the type tool

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.

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Additional Information

Please review section notes to view the full schedule.

Familiarity with Macintosh OS

Adobe Photoshop installed on your computer.

Access to a camera.

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

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 automated user Bash scripting in Python machines and containers

Advanced Network Architecture and Protocols | ITEC 804

Implement multi-mode cluster setups and cloud-based deployments

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.

Skills Needed:

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

3.0 Units

As the data rate of parallel and serial transmission increases, analysis and characterization of voltage noise and timing jitter are becoming critical to determine the system performance. The available voltage margin is rapidly diminishing and the voltage noise is taking significant portion of the voltage margin. Engineers working in high-speed links as well as in measurement of current high-speed links needs to develop a strong foundation in link design and analysis as well as advanced modulation and error correction.

In this course, we'll cover advanced modulation techniques and how error correction is being applied to reduce the channel loss and improve the signal to noise ratio (SNR). We'll discuss how the unit timing interval is shrinking and how managing the effects of jitter can advance system performance.

We'll dive into critical skills such as mitigation techniques of noise and jitter in modern links; how to directly relate the modulation and error correction as well as noise and jitter to system performance in terms of bit error rate (BER). We'll learn the design and analysis of short and long-reach channels including the latest modeling and simulation approaches using IBIS-AMI modeling including the fundamentals of noise and jitter as applied to a wide range of single-ended and differential links

Learning Outcomes

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

Understand basic jitter and noise terminology, sources, and mitigation techniques

Identify the types of jitter and noise important to various applications

Describe how jitter and noise propagates through a high-speed serial links

Compare modulation techniques: PAM4, PAM8, Doubinary, and others

Visualize jitter and noise in several ways, to reveal underlying sources

Relate total jitter and well to BER and timing budget of high-speed links

Select the right test equipment to measure jitter, timing budget and BER

Topics Include

Review of jitter and noise in high-speed links

Review of Jitter and noise duality and analysis in frequency and time domains

Noise and jitter propagation and amplification in high-speed links

Familiarity with semiconductor devices (digital, analog component, system engineering) and signal and power integrity basic concepts.

Skills Needed:

Advanced Social Media Marketing | MKTG.X416

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

Advanced Statistical Analysis for Bioinformatics Applications | BINF.X403

This course reviews basic probability and statistics including events, conditional probabilities, Bayes theorem, random variables, probability distributions, and hypothesis testing. In addition to these fundamental topics, this course delves into more advanced areas relevant to bioinformatics research.

You will explore the intricacies of Markov chains, hidden Markov models, Bayesian statistics, and Bayesian networks. Throughout the course, you will learn the basics of the R programming language in R-based labs using applications of the theory. In addition, you will participate in lab exercises that 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.

By the end of the course, you will not only learn the principles behind these statistical methods but also understand their significance in the analysis of biological sequences and data. This course will equip you with valuable knowledge and practical skills that are indispensable for conducting bioinformatics research.

Learning Outcomes

At the conclusion of the course, you should be able to Analyze the statistical methods in bioinformatics research

Apply Markov chains to solve bioinformatics problems

Apply Hidden Markov Models (HMMs) to solve bioinformatics problems

Apply Bayesian statistics and Bayesian networks to solve bioinformatics problems

Conduct basic statistical analysis using R

Topics Include

T-tests and confidence intervals

Analysis of variance (ANOVA)

T-test versus ANOVA analysis of microarray data

Basics of the R programming language

Basic probability laws

Probability Distributions

Applications of Markov chains to biology and bioinformatics

Estimating the frequency of gene alleles

RNA-Seq gene expression estimation

Bayesian networks in bioinformatics

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

R software

Additional Information

Please review section notes to view the full schedule.

Have access to R software and/or have R software installed

Advanced Verification with SystemVerilog OOP Testbench | VLSI.X400

3.0 Units

SystemVerilog is the industry 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

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-drivenA 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.

Skills Needed:
Agile Product Life-Cycle Management (APLM) | PPMT.X409

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

Topics Include

PO roles and responsibilities

Product Delivery

Product Ownership

Agile PPM

Scrum PPM

Value-driven product release roadmaps and schedules

Agile Project Management Using Scrum | PPMT.X408

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

Scrum roles and their significance

Scrum ceremonies

Scrum artifacts

Scrum example scenarios

Scrum culture

How to adopt Scrum in an organization

Agile Software Development using TDD/BDD and Python | SEQA.X404

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
                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 class.be all the common software testing categories and their general usages

AI, Empathy, and Ethics | AISV.806 DD/BDD, automation of unit, functional, and
web-based testing

Explain code coverage, continuous integration and continuous testing/deployment processes
Now available through Coursera!

Identify strategies to apply unit testing very early in the development process

Skills Needed:

This exciting new course is now being offered in a self-paced, online format via the Coursera learning platform. You are invited to enroll in it today!

"Enroll in AI, Empathy, and Ethics with AI architect Kelvin Lwin."

More about this course:

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

Chatsonic, DALL-E, and other AI systems, and have the opportunity to interact directly with the technology to experience its potential and limitations. This course is ideal for anyone who wants to gain an understanding of emerging AI technology and its industry applications. It prepares you to pursue our developing AI program series as a user or developer, and is suitable for individuals who are considering a career in data science, machine learning, or AI.

Learning Outcomes

At the conclusion of the course, you should be able to: Discuss the fundamental characteristics of AI systems and the technologies used in AI-powered applications.

Describe applications of AI in the real world.

Demonstrate basic skills interacting with generative AI applications.

Discuss the current state of AI development, its promise, the potential dangers, and ethical considerations.

Topics Include

Overview of AI, machine learning, deep learning, and generative AI

Applications of AI

The development and deployment processes of AI applications

Limitations, pitfalls, and dangers

Future directions in AI

Career opportunities and basic requirements to qualify for these jobs

AI for Sustainability - Using Satellite Data | AISV.810

1.5 CEU's

Large companies and small startups—from Apple and Alphabet to Hasbro, Tesla, and Netflix—are looking for people who have Python skills and the practical knowledge to apply AI solutions that are grounded in sustainability. In this course, students with prior artificial intelligence and software development skills learn to analyze freely available datasets.

You'll learn how AI has the potential to accelerate global efforts to protect the environment and conserve resources by detecting energy emission reductions and CO_2 removal, as well as develop green transportation networks, monitor deforestation efforts, and predict extreme weather conditions.

Present a capstone project to the class

In addition to building a stronger, more impactful AI portfolio, by the end of the course, you will be prepared for Deep Learning and Artificial Intelligence with TensorFlow and Keras and any course that involves deep learning, Keras, sustainability, and MLOps.

Learning Outcomes

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

Appraise the variety of machine learning methods based on the way they work and the tasks they accomplish, including the type of data needed

Perform operations and data analyses using Python

Obtain, interpret, and explain results in the sustainability context

Evaluate machine learning methodology in published research

Structure an end-to-end machine learning project in sustainability

Analog IC Design, Introduction | VLSI.X401

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

Basic knowledge of microelectronics circuits, semiconductor devices and physics. At the conclusion of the course, you should be able to

Identify basic building blocks in analog integrated circuits

Experience with UNIX/Linux systems and commands is required for the lab.

Application of Social Media for Business Growth | MKTG.X490

2.0 Units

This course builds on top of the courses "Social Media Marketing Fundamentals" and "Advanced Social Media Marketing," 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" 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

MKTG.X415 Social Media Marketing Fundamentals and MKTG.X416 Advanced Social Media Marketing 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.

Applied Digital Media Planning and Platforms | MKTG.X419

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 | FPLN.X409

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.

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.

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.

Note(s) A HP-12C financial calculator is required.

Applied Project Management | PPMT.X417

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

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

Artificial Intelligence for Robotics | AISV.807

3.0 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.

SLAM

Computer vision

Crack detection

Mobile picking robots

Natural language processing

Collaborative robots

Demonstrations and project presentations

Deep learning applications

Skills Needed

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 | VLSI.X402

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

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

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.

Detailed route analysis and optimization

Assessment, Evaluation and Placement | TESL.X305

Sign-off optimization
2.0 Units

The expert teacher understands the value of assessment, applies authentic and systematic
Hierarchical multi-vt/multi-vdd flow
methods of evaluating learning outcomes and supports a rational student placement system. In this course, participants review the purpose, methods and limitations of assessment, evaluation and placement along with state mandates that apply to preschool through high school students.
Skills Needed: Activities include hands-on practice writing, analyzing and evaluating a variety of test types in TESOL and bilingual education with special attention to validity and reliability.

Learning Outcomes

At the conclusion of the course, you should be able to Create two quality assessments for their own classroom.

Create a step by step lesson plan for an ESL classroom.

Create assessments to address the needs of all learners.

Describe the various ways to make a lesson successful and memorable.

Find useful assessment tools on the internet.

Topics Include

Formal vs Informal assessments

5 Keys to Assessment

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Microsoft Windows XP or Vista as a user

Basic internet research skills

Additional Information

Please review section notes to view the full schedule. Netiquette

In an online course, the majority of our communication takes place in the course forums. However, when we have a need for communication that is private, whether personal, interpersonal, or professional, we will use individual email or telephone. Our primary means of communication is

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.

Learning Outcomes

At the conclusion of the course, you should be able to Provide a working definition of assistive technology (AT) devices and services in the context of accommodations for learning.

Explain the principles of Universal Design for Learning (UDL), and provide examples of how technology can facilitate practicing UDL in the classroom and why accessible education materials (AEM) are important to students using AT.

Demonstrate understanding of how specific technology features address the functional limitations that students with learning differences encounter with a wide range of essential academic tasks.

Apply a process for analyzing an individual's AT needs and creating a plan to implement selected tools and strategies.

Name and differentiate between the main laws that govern AT in education and describe their implications for students with learning differences.

Topics Include

Components of an effective AT solution

Basics of Universal Design for Learning (UDL) and Accessible Educational Materials (AEM)

Tools and associated strategies for various academic tasks

Applying a process for tool selection, implementation, and evaluating effectiveness

Working knowledge of:

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.

Additional Information

Please review section notes to view the full schedule.

Instruction is primarily online and asynchronous (self-paced) and includes comprehensive reading material with diagrams, videos, photos, tables, and links to additional web-based resources, plus self-guided activities. Live weekly Zoom sessions supplement the online instruction with class discussion and technology assistance. Recognizing that everyone's interests, background, technology skills, and professional focus are different, individualized online guidance is also available as needed.

Exploration of certain technologies is an essential part of this course. For these activities, students will need access to certain minimum tools, as listed below:

A computer: A PC with Windows 10 or above, a Mac with macOS 10.15 (Catalina) or above, or a Chromebook with the latest Chrome OS.

The Google Chrome browser or Microsoft Edge browser.

A personal Google account. (recommended: new Google account specifically created for use with this course).

Need the ability (permissions) to download and install free and trial software onto their device, especially Chrome extensions. Specific titles to be provided in class.

Attention Deficit Hyperactivity Disorder (ADHD) in the Classroom | ECED.X318

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 conclusion of the course, you 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.

Topics Include

25 Things to Love About ADHD

Sensory Integration Disorder and Its Connection to ADHD

Sensory Strategies for the Classroom

Special Resources for Non-Compliant Children

Working knowledge of:

Google Workspace or Microsoft Office to submit assignments

Canvas navigation links, modules, and using the inbox to communicate with the instructor

Additional Information

Please review section notes to view the full schedule.

Practical, effective instructional strategies are offered. Because low self-esteem and weak social

(4317)

Benefits Management: A Comprehensive Study of Employee Benefit Programs | HRMT.X407

2.0 Units

The unprecedented nature of the COVID-19 pandemic and its aftermath have had a tremendous impact on companies and the human resource professionals who are navigating new competitive benefit programs, paid leaves, and mental health strategies. The crisis has not only significantly shifted how we look at and craft our new benefits. It has changed the way we communicate about their offerings.

This course presents a comprehensive view of this new benefits landscape, 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.

It is highly recommended that students new to Human Resources begin with "Human Resource Management." After that, courses may be taken in any order.

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 the administration of employee benefits programs.

Describe principles of risk and how this relates to the 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.

Professional Credit

SHRM-CP® or SHRM-SCP® 19.25 PDCs.

Big Data, Introduction | DBDA.X401

3.0 Units

In the new paradigm of Big Data where we trust distributed systems to process information across server clusters, we increasingly rely on technologies to manage the massive amounts of information generated by social media, online transactions, web logs, and sensors. These technologies include handling unstructured, semi-structured, and structured data, as well as processing, real-time analytics, and visualization. They are especially useful for reporting in circumstances where a relational database approach is not effective or is too costly. In this comprehensive introductory course for managers, analysts, architects and developers, you will 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 Big Data technologies and frameworks such as HDFS, MapReduce, Spark, Kafka and Hive. The second half of the course will cover writing programs in Spark and Hive and how to design Big Data applications.

The course consists of interactive lectures, in-class labs, and take-home practice exercises. You'll complete this course with a deep understanding of the tools to build Big Data applications using MapReduce, Spark, and Hive.

Learning Outcomes

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

Describe big data concepts, characteristics, data management and warehouse

Explain the significance of big data and industry use case references

Compare and contrast NoSQL with Hadoop, leverage Hadoop ecosystem for analyzing big data and use Hive/NoSQL for data analysis

Write programs and applications in Spark and Hive

Topics Include

Evolution of Big Data

Big Data use cases

Introduction to HBase (Hadoop NoSQL database)

Introduction to Apache Kafka

Developing MapReduce applications

Introduction to Spark and SparkSQL

Developing Spark/SparkSQL applications

Moderate level of programming knowledge in Python and SQL

Managing tables and query development in Hive

Biochemistry: An Introduction | BTEC.X400
Introduction to data pipelines

3.0 Units

Skills Needed:
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

To be successful in this class all students should have working knowledge of Google's G Suite or Microsoft Office, proper email etiquette, and essential understanding of Canvas.

A college-level chemistry course. Some knowledge of organic chemistry is required.

Learning Outcomes

At the conclusion of the course, you 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

Topics Include

Preface to the world according to Carbon

Structure and nomenclature of common functional groups of organic compounds

Carbohydrate chemistry

Chemical structure and properties

Bioenergetics, ATP, free energy and coupled reactions

Nucleotides, chemical and physical structure of DNA and RNA

Basic metabolism of lipids, amino acids and carbohydrates

Notes

Bioinformatics Certificate Completion Fee | O-CE0060

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.
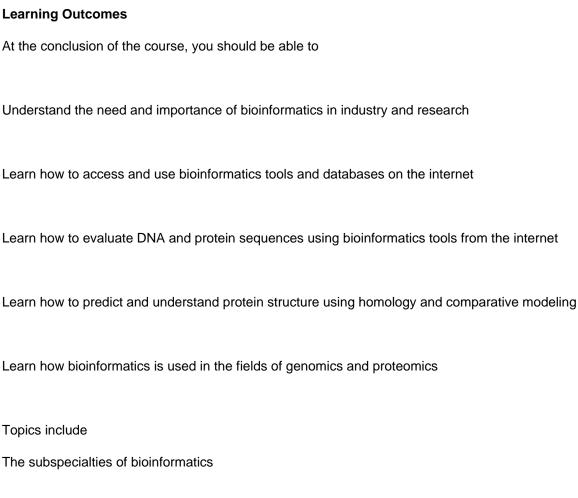
sequences or structures in public and private sectors are knowledgeable about these databases and tools.

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

Topics include

The subspecialties of bioinformatics

Sequence alignment

The basics of molecular biology

Single nucleotide polymorphisms and genome-wide association studies

Additional Information

Please review section notes to view the full schedule.

We will download the Sars-CoV-2 reference genome from the National Center for Biotechnology Information (NCBI) database; do BLAST to compare sequence similarity with bat RaTG13 CoV; use Clustal Omega, MUSCLE and T-COFFEE for multiple sequence alignment

Biology of Cancer | BTEC.X402

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.

Learning Outcomes

At the conclusion of the course, you should be able to Describe the cellular and molecular basis of cancer and tumor progression

Discuss therapeutic strategies for the treatment or prevention of cancer.

Demonstrate research skills and be able to search current Internet resources and databases for genes involved in cancer.

Topics Include

Cellular and molecular biology of cancer

Developing independent research and designing therapeutic strategies.

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Please review section notes to view the full schedule. Professional Credit

CA BRN/LVN Credit--Provider #CEP13114.

Biotechnology Certificate Completion Fee | O-CE0061

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 | AISV.805

2.0 CEU's

This course provides developers a practical, industry-oriented training on how to develop integrated artificial intelligence (AI) applications for enterprises. Leveraging knowledge acquired through various elective courses, you will learn to apply your skills to cutting-edge AI applications during hands-on classroom sessions using machine learning frameworks. In the classroom, we'll focus on convolutional neural networks and how they work, and perform training and inference using Tensorflow/Keras for image detection, recognition and segmentation. You'll learn various aspects of designing and deploying applications in the real world and work on a final project encompassing the new technologies you've learned.

Learning Outcomes

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

Describe the technical and non-technical aspects of planning, designing and deploying an AI-based enterprise application

Train and fine-tune a deep learning model on the cloud with existing datasets

End-to-end application services design and considerations, deployment, and support

Develop and deploy an enterprise cloud based application

Explain what federated learning and continuous learning are and why they are needed

Describe and demonstrate AI techniques

Topics Include

DNN and how it fits in AI and traditional ML techniques

Concepts of supervised deep learning models

Skills Needed

A working knowledge of AWS.

Prerequisites:

One of the following courses or equivalent coursework or industry experience: "Deep Reinforcement Learning," "GANs for Data Synthesis," "Natural Language Processing," or "Artificial Intelligence for Robotics."

Building Online Learning Communities | INDE.X405

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 | O-CE0405

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 Communications | BUSM.X404

2.0 Units

This course is designed to develop the essential communication skills required for success in the world of business. 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.

Through interactive activities, role-play, and problem-solving team assignments, students will develop the confidence and competence to communicate effectively in a business setting. You'll have the opportunity to deliver impromptu and prepared speeches, improve your listening skills, enhance your credibility, and learn new modes of business communication. In addition, you will learn how to facilitate meetings with ease, while being creative, flexible, and adaptable in real-time.

This course will include assignments that involve reading, researching, and creating content to share during class. By the end of the course, you will have a well-rounded communication skill set to help you succeed in your career.

Learning Outcomes

Practice speaking techniques to communicate effectively.

Design, author and deliver powerful presentations of different types.

Understand the role of influence, persuasion and power to inform relationships and how you can enhance your effectiveness in the workplace.

Develop and implement the power of story in your speeches, training, coaching, and one-on-one work with others.

Improve your listening skills in various settings, including one-on-one interactions, group environments, in-person and virtual meetings, and phone conversations.

Apply results-oriented techniques for planning and implementing effective meetings.

Topics Include

Interpersonal communication skills

Persuasive communication techniques

Storytelling

Meeting management

Group communication

Skills Needed

For best success, it's suggested you possess the following capabilities:

Professional Credit

HRCI®---PHR®, SPHR® and GPHR® general recertification credit: 19.25 hours.

Business Intelligence Solutions | DBDA.X402

3.0 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 | BUSM.X409

3.0 Units

The business environment has become more complex and litigious; therefore, knowledge of general principles of business law is more important than ever.

In this course we'll review the American legal process, business law and its development, and organizational structures in the context of the managerial challenges in today's highly litigious environment.

and skills necessary to identify and analyze legal issues, assess the legal implications of business decisions, and develop strategies to mitigate legal risks.

Learning Outcomes

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

Understand the U.S. court system and basic legal terms and doctrines

Describe legal issues and laws that impact businesses.

Explain strategies to minimize legal risks to businesses and employers.

Identify legal risks and strategies for more effective business administration and decisions.

Topics include

An overview of the American legal system

Contracts

Negligence

Product liability

Federal and state civil procedure

Torts

Business entities, including limited liability companies

Real property and leases

Bankruptcy issues

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.

Within the first two sessions of the class you will submit your project proposal and give a short presentation about your project scope, highlighting the key objectives, the platform, expectations etc. Once you receive your approval on your project you may proceed to the next step. There are many phases of a design project as you learned during your certificate program, including user research, understanding the specific domain, potential technical challenges, the actual design work, user testing, implementation, and deployment. During all these phases you are also expected to work with your client on a regular basis, and engage in a collaborative dialog.

Your implementation phase may include HTML5, CSS3, and JavaScript as needed, as well as other development languages such as Swift for iOS, Java for Android. You may also use content management system tools such as WordPress or Drupal, if required. Some of these tools require advanced skills and you must provide a well-defined need for it in your proposal, and obtain instructor approval before proceeding. Learning Outcomes

At the conclusion of the course, you should be able to Demonstrate independent work, responsibility and UX project management skills

Complete a design project from a concept to production.

Understand how to work with clients

Creating a website or an application that solves a real-world problem

Utilizing design methods and strategies in a real-world problem

Include a significant design project in their portfolio

Topics Include

How to produce a requirements document

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Designing Web pages or executing user experience design processes. 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.

Additional Information

Please review section notes to view the full schedule.

All prerequisite courses listed must be completed before students can enroll in the course.

Students should have server space available for posting their projects.

Write a data transfer specification for collecting lab data.

Write a quality specification and query message for cleaning Case Report Form (CRF) data.

Define the deliverables and responsibilities when working with Contract Research Organizations (CRO).

Write a data management plan.

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

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Additional Information

Please review section notes to view the full schedule.

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)

Identify pathways and resources needed for successful clinical research trials, and tools of project management

Topics Include

Project development and management

Building a Quality Management Plan

How/Why Clinical Trial fails?

Using Metrics to improve trial management

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Organizational skills. Able to handle multiple tasks and work well with others

Students should have a broad educational background with courses in computers and public health science management.

Completion of a general course in the content area of Clinical Research, or 2 years of experience in the Clinical Research workplace.

Professional Credit

CA BRN/LVN Credit--Provider #CEP13114, 20.0 Hours.

Clinical Research: The Study Site Perspective | CTDM.X402

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

Clinical Statistics for Non-Statisticians | CTDM.X403

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.

Learning Outcomes

At the conclusion of the course, you should be able to Identify quantitative methods for torturing data

Recognize concepts such as variability, confidence intervals, hypothesis testing, and p-values

Distinguish various study designs and identify techniques to avoid bias in current and new studies

Knowledgeably review the medical literature

Comfortably communicate with a professional biostatistician

Topics Include

Estimation vs hypothesis testing

Parametric vs nonparametric tests

Clinical trial designs

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Please review section notes to view the full schedule.

Professional Credit

CA BRN/LVN Credit--Provider #CEP13114

Clinical Trials Design and Management Certificate Completion Fee | O-CE0113

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 | CTDM.801

3.5 CEU's

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

GMP and the Transition to Full Scale Manufacturing

Business of Clinical Research

Globalization of Clinical Research

Professional Credit: CA BRN/LVN Credit--Provider #CEP13114.

(5433)

Cloud Storage and Virtualization in Data Centers | LINX.X416

3.0 Units

The data center is 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. Among mentioning the legacy storage technologies like DAS, NAS & SAN in today's data centers, the main focus is on network attached storage. It demystifies today's storage technologies in flash, cloud, mobility, converged storage, software-defined storage, SDDC, and Internet Infrastructure. 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

Evaluate the hybrid storage solution by integrating diverse storage technologies to optimize performance, capacity, and cost.

Classify various networking technologies including DAS, SAN, NAS, and hyper-converged technologies.

Explain the internet infrastructure within modern data centers, encompassing storage and network storage protocols such as FC, IP, and NVMe.

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.

Communicating and Negotiating with the FDA | REGL.X402

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 | HRMT.X404

2.0 Units

The world of work is changing due to four forces: digitization; flexible work designs; the evolved nature of employee expectations and attitudes; and black swan events that require adaptations to work delivery systems. These existential challenges are impacting compensation systems. The era of total rewards management is here to stay.

We will take a wholistic view of total reward systems, looking critically at the compensation systems

and how they are impacted by changes in our society and economy.

It is highly recommended that students new to Human Resources begin with "Human Resource Management." After that, courses may be taken in any order.

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 knowledge, skills and abilities, 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.

Topics Include

The pay model—from compensation to total rewards

Motivation theories and the basis of pay decisions

Strategic perspectives

The changing nature of work

Current trends in reward systems

Pay and the changing workforce

Review of the evidence

Professional Credit

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 in applied signal/power integrity gives students a set of skills for problem solving and strategies that bridge the gap between theory and real world applications by going through case studies from real designs. 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 impact of transmission loss and jitter on the performance of high-speed systems.

Apply equalization, modulation, and advanced signaling techniques to increase system bandwidth

Computational Intelligence | CMPR.X405

1.5 Units

Identify and relate various high-speed link components and parameters to system performance and make trade off decisions.

Computing professionals are required to solve increasingly complex problems using new algorithms, systems or programming paradigms. Fortunately, black box computational intelligence techniques can be configured and applied to problems without revealing intimate knowledge of low-level details to a user. This course is for 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.

Students will discover the industrial applications found in software algorithm development, electronic design automation, data mining, medical diagnosis, and pattern matching.

You will learn the strengths and weaknesses of various computational and artificial intelligence (AI) techniques using supplied software. There is also a brief introduction to spiking neural networks, which uses more sophisticated, and more capable, neuronal models and networks to address problems usually attempted by traditional neural networks.

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

Evaluate the performance of different computational intelligence techniques in solving real-world problems and choose the most appropriate technique for a given problem

Develop solutions for optimization problems using common algorithms and techniques used in computational and artificial intelligence

Topics Include:

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

Experience with a computer programming language and basic algebra skills.

Support vector machines: a demonstration using a popular tool for simple classification

Computer Programming Certificate Completion Fee | O-CE0114

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.
Fuzzy logic, including a solution of the traveling salesman problem
Please allow 4-6 weeks to receive your certificate.

Consumer Insights: Data Analysis and Interpretation | MKTG.X413
Spiking neural network introduction

You will learn to solve AI problems using software provided as an ISO file which can be loaded into VirtualBox, enabling you to 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

2.0 Units

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 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 v. pricing

Market size estimation

C# Programming | CMPR X400

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

Learning Outcomes

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

Exceptions, Threading and Security

Apply object oriented concepts to software development problems using modern C++

File input/output

Case Study for Windows Application

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 using unique and smart pointers

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

Students must have access to a 2017 or above C++ compiler.

Memory management and dynamic array declarations

Skills Needed Experience with a high level programming language such as C/Java/Python.

Create class/function templates and understand STL

C Programming I | CMPR.X400

2.0 Units
Use static member variables and static member functions
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
Declare friend functions and friend classes
development using the C language. The course begins with programming and tools overview. It

Function overloading and operator overloading

Polymorphism concept using virtual function

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

Technical aptitude and experience with a computer operating system or equivalent knowledge.
Functions, data types

C Programming II | CMPR.X401

3.0 Units
Input and Output, character strings
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 Arrays

Operators and precedence

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
                Students should have a good understanding of programming using data types such as pointers, control flow, structures and functions.

Data types, variables, operators, and operator precedence

Creating the Successful Team | PPMT.X403

Arrays in general, including two-dimensional and multi-dimensional configurations

Dynamic memory allocation

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

CRM: Customer Relationship Management | MKTG.X407

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

Topics 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 | DVSV.802

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

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 | INDE.X401

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: Defining and teamwork; Feedback and clarification; Appraisal and motivation; Optimal use of time; Coaching employees through cultural transitions; Strategic use of cultural resources 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 | TESL.X300

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.

Learning Outcomes

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

Topics Include

Human Development and Culture

Language, Thought, and Culture

Culturally Relevant Pedagogy

Culture in the Classroom

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Additional Information

Please review section notes to view the full schedule.

Must be able to access Canvas for online submissions and videos.

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

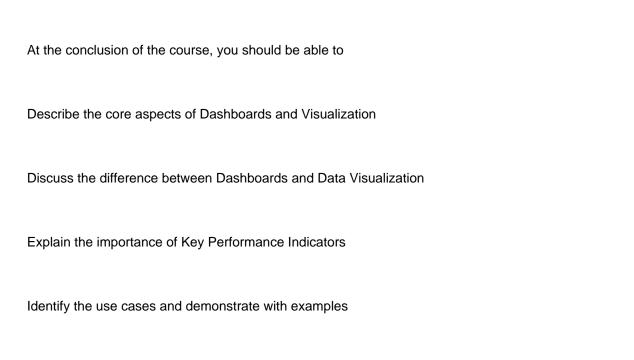Advertising

Packaging

Promotions

Distribution strategy

Pricing

Online and offline marketing

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)

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 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.

Data visualization principles

Skills Needed: Knowledge of database concepts and any business experience related to decision-making.
Advanced data visualization techniques

Dashboard planning, design and implementation

Data Analysis, Introduction | DBDA.X404

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 necessary to approach Data Analysis problems

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

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).

Database and Data Analytics Certificate Completion Fee | O-CE0122

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 | DBDA.X424

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

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

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.

Introduction to data pipelines

Data Modeling, Introduction | DBDA.X421

Note(s): This course uses EMR Hadoop distribution. Students are required to have computers—with 64bit CPU and a minimum of 8GB of memory.

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.

Skills Needed:

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

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 | CTDM.X407
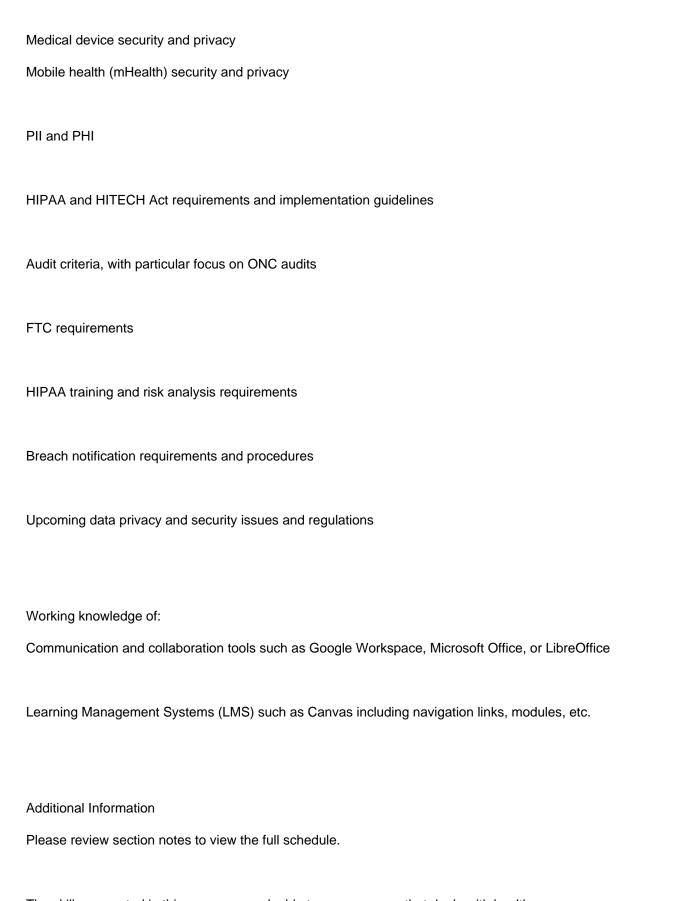
1.5 Units

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.

Learning Outcomes

At the conclusion of the course, you should be able to Identify the data security and privacy issues associated with the industries using health data, such as those in healthcare, drug development, device development, and health research.

Determine when companies are subject to state, federal and international data security and privacy regulations, and understand how to comply with those regulations.

Develop a compliance plan for appropriate privacy and security regulations.

Topics Include

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

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Additional Information

Please review section notes to view the full schedule.

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.

Please allow 4-6 weeks to receive your certificate.

Data Structures and Algorithms Using C++ | CMPR.X406

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 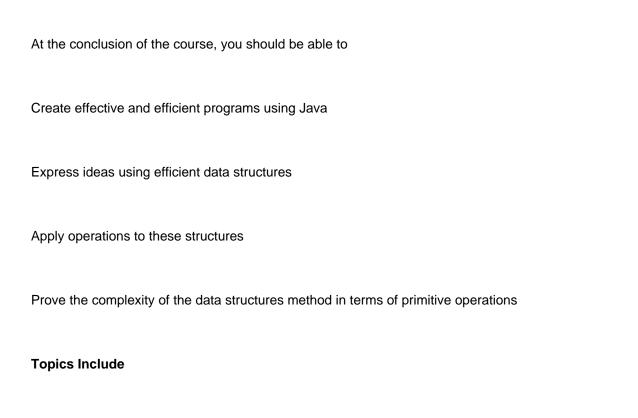review of C++, moving on to the analysis of complexity of algorithms. Emphasis is placed on common problems, implementation details, examples, and testing throughout the course. Each class session will include lecture and discussion of code. This course prepares students to achieve the skill level of 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

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
            Working knowledge of Java or C/C++.

Need for algorithms
Data Structures and Algorithms Using Python | CMPR.X425

3.0 Units

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

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.

Decision-Making Tools and Techniques / PPMT X418

Solve interview problems efficiently on the LeetCode and HackerRank interview websites.

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.

Prerequisite(s):

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

Deep Learning and Artificial Intelligence | DBDA.X425

3.0 Units

Formerly: Deep Learning and Artificial Intelligence with TensorFlow and Keras

Deep learning, a branch of artificial intelligence and machine learning, uses multilayered neural networks to create highly accurate prediction models for image recognition, object detection, language translation, speech recognition, and other tasks. In this course, students will use open source and industry-standard machine learning libraries 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

Use common deep learning architectures such as CNN and RNN

Discuss the significance of hyperparameters in the architectures

Prepare data for deep learning using Pandas and NumPy, the de facto standard for data prep in Python

Write scalable code and develop machine learning models 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 with standard machine learning frameworks including TensorFlow, Keras and Pytorch

Multilayer perceptrons

Advanced multilayer perceptrons

Convolutional neural networks

Students are required to bring laptops for the classroom and work with Python3/ Jupyter Notebook environment.
Image processing CNN architectures

Recurrent neural networks

RNN - prediction with multilayer perceptron

RNN - prediction with long short term memory networks

Skills Needed: Moderate level of computer programming ability in Python, comfortable with an **Note(s)** familiarity with command-line operations on a laptop, and a basic understanding of Machine Learning models.

Deep Reinforcement Learning | AISV.802
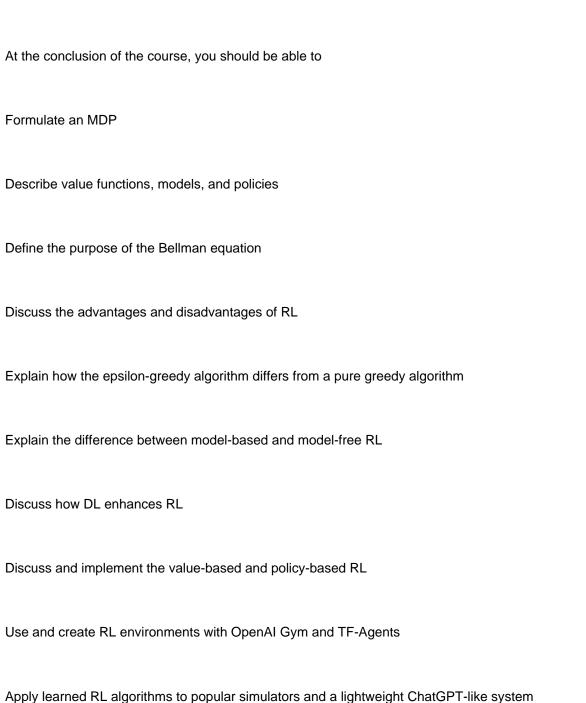
3.0 CEU's

Reinforcement Learning from Human Feedback (RLHF) is a critical component of ChatGPT to improve rewards on the generated text. This course will introduce students to RLHF and how ChatGPT leverages PPO, a policy gradient-based reinforcement learning algorithm, in order to

Dota, as well as control systems, natural language, self-driving cars, and robotics. After a quick review of deep learning building blocks, and RL and DRL fundamentals, we will dive into available promising DRL algorithms, illustrating them with concrete examples and simulation environments. Students will learn to solve everyday tasks in RL, including well-known simulations such as CartPole, MountainCar, and MuJoCo.

You will learn Markov decision process (MDP) formulation and an extensive collection of DRL algorithms: deep q-learning (DQN, DDQN, PER), policy gradients methods (A2C, A3C, TRPO, PPO, ACER, ACKTR, SAC), deterministic policy gradients methods (DPG, DDPG, TD3), and inverse reinforcement learning. To implement these DRL algorithms, students will code in Python 3, OpenAI Gym, tf2.keras, and TensorFlow-Agents. We will also review other popular DRL libraries, such as Google Dopamine, Keras-RL, and Facebook Horizon.

Learning Outcomes

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

Formulate an MDP

Describe value functions, models, and policies

Define the purpose of the Bellman equation

Discuss the advantages and disadvantages of RL

Explain how the epsilon-greedy algorithm differs from a pure greedy algorithm

Explain the difference between model-based and model-free RL

Discuss how DL enhances RL

Discuss and implement the value-based and policy-based RL

Use and create RL environments with OpenAI Gym and TF-Agents

Apply learned RL algorithms to popular simulators and a lightweight ChatGPT-like system

Topics Include

Note: For this course there will be a term project related to ChatGPT

Design Control for Medical Devices | MEDD.X400

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.

Learning Outcomes

At the conclusion of the course, you should be able to Identify the key elements of the quality system (including Design Control) and ISO 13485.

Explain the purpose of using Design Control from a regulatory and industry perspective.

Discuss the nine elements of Design Control and its practical implementation.

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

Additional Information

Please review section notes to view the full schedule.

Students are expected to read the FDA Guidance on Design Control prior to the first class session.

FDA Guidance on Design Control (Links to an external site.) https://www.fda.gov/regulatory-information/search-fda-guidance-documents/design-control-guidance-medical-device-manufacturers (Links to an external site.)

Designing a UX or Visual Design Portfolio | UEWD.X422

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 conclusion of the course, you 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

Installing Wordpress and themes

Customizing Wordpress plugins and widgets

Designing page layouts and content organization

Integrating animated SVGs and HTML5 animation to your portfolio

Setting up Podcast Generator and submitting podcast to iTune

Setting up blog and social integration

Adding search engine optimization

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Basic HTML and CSS knowledge

Notes

Please review section notes to view the full schedule.

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

Python programming experience is required for the exercises and the project.

Apply RESTful API design best practices to real-world software solution including integration

Designing Online Instruction | INDE.X406

2.0 Units
Demonstrate API design skills using real-world use cases and review of APIs
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 Skills Needed
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 | INDE.X407

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 | UEWD.X405
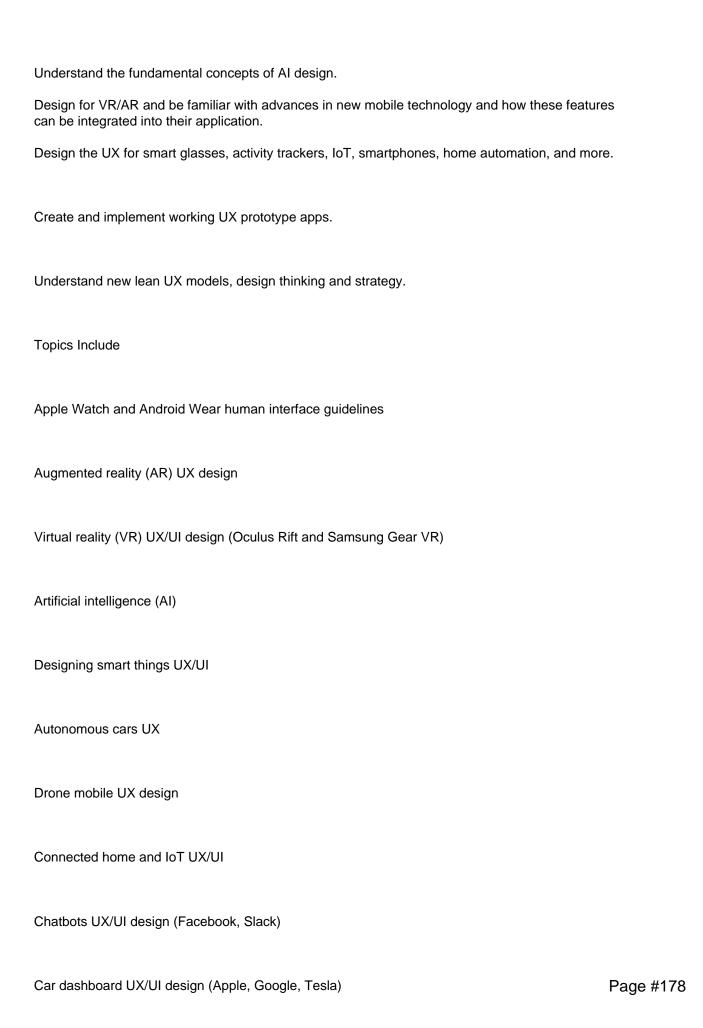
3.0 Units

Consumers have entered a multi-device environment where they engage in multiple connected experiences, such as smart watches, augmented reality (AR), virtual reality (VR), smart glasses, activity trackers, Internet of Things (IoT), smartphones, and home automation. As these experiences evolve, so does the process of designing mobile UX/UI and using artificial intelligence (AI).

This course teaches you how to create real apps and design UX/UI features for all these connected experiences. Using a hands-on approach to the design guidelines for devices and the principles, you will gain practical experience by learning and using rapid prototyping tools.

Throughout the course, you will also learn new UX models, design thinking and strategy that will help you cultivate new design processes and solve problems. In addition, this course covers flat design and parallax design. At the end of this course, you will have a rockstar design portfolio with a prototype that you can showcase to employers.

Understand the fundamental concepts of AI design.

Design for VR/AR and be familiar with advances in new mobile technology and how these features can be integrated into their application.

Design the UX for smart glasses, activity trackers, IoT, smartphones, home automation, and more.

Create and implement working UX prototype apps.

Understand new lean UX models, design thinking and strategy.

Topics Include

Apple Watch and Android Wear human interface guidelines

Augmented reality (AR) UX design

Virtual reality (VR) UX/UI design (Oculus Rift and Samsung Gear VR)

Artificial intelligence (AI)

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)

Drawing tools (e.g. Adobe Illustrator, Photoshop, Fireworks or Sketch.) - Required to complete class exercises.

Additional Information

Please review section notes to view the full schedule.

Designing with Cascading Style Sheets: Advanced | UEWD.X407
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, styling forms, fonts and structural pseudo-classes. You will also learn how to handle browser compatibility issues.

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. Learning Outcomes

At the conclusion of the course, you should be able to Design Web pages that respond to media types (mobile phones, tablets, desktops).

Use child, sibling and structural pseudo-class selectors.

Style forms.

Create drop-down menus.

Use Flex Box

CSS Grid Layout

Understand browser compatibility issues.

Apply CSS3 properties

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

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

It is required that students take the prerequisite courses or have equivalent experience. HTML and CSS basics will not be repeated in this course.

Additional Information

Please review section notes to view the full schedule.

Designing with Cascading Style Sheets: Fundamentals | UEWD.X406

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. Page #180 Inheritance and specificity are also 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. 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.

At the conclusion of the course, you should be able to Separate a page's content from the visual presentation of the page.

Create external, embedded, and inline styles.

Understand and make use of CSS selectors such as classes, IDs, attributes, and pseudo classes.

Apply CSS properties for font and text formatting, lists, and backgrounds.

Understand the basics of Inheritance and Specificity.

Understand the basics of the box model.

Design horizontal and vertical navigation.

Create two and three column layouts using CSS.

Use absolute, relative and fixed positioning properties.

Write valid CSS code.

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

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

"HTML Fundamentals" or equivalent experience.

Additional Information

Please review section notes to view the full schedule.

Free Text editor is required (details will be explained in Module lecture)

Developing Technical Information from Plan to Completion | TEWR.X404

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 | SEQA.X408

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 Microservi&tedents must have basic programming experience using a high level programming language like Java, Python, C#, or a scripting environment like Bash.

Digital Logic Design Using Verilog | VLSI.X404
Hybrid Microservice Architectures

Containers and Docker

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
Knowledge of basic logic design and familiarity with a high-level programming language (e.g., C) and use of a text editor.

Explain how to implement and test complex combinational logic, sequential logic, arithmetic circuit, memory, DSP and finite state machine

Docker Containers In-Depth | JTEC.800

1.8 CEU's
Identify, debug and find a solution to an existing hardware problem
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 & Microsoft
Skills Needed:
Azure, 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 an image registry (Docker Hub).

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 EKS—as well running & invoking containers from a container Docker-in-Docker—and the orchestration of clusters of containers—Kubernetes—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

Note: For the 2nd assignment, students' laptops running Apple MacOS or MicroSoft Windows operating systems will need to install a Linux virtual machine image (Ubuntu 20.04 or 22.04) using the free open source VirtualBox application.

Skills Needed

Skills needed: A good understanding of Linux system and network administration.

Document Preparation: Protocols, Reports, Summaries | CTDM.X408

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.

Identify documents that are essential for the conduct of a clinical trial

Describe the main steps in document preparation process

Identify key elements of a study protocol

Recognize and describe required elements of informed consent

Explain the importance of version control

Explain the reasons behind the importance of a well written informed consent form, SAE narrative, or monitoring trip report

Write sections of a brief Clinical Study Protocol and Report Synopsis

Topics Include

Regulatory requirements – CTD and eCTD – IND, NDA, BLA

Protocol development

Informed Consent (ICF), Health Insurance Portability and Accountability Act

Detailed Clinical Study Reports (ICH E3)

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Additional Information

Please review section notes to view the full schedule.

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. Skills Needed

To be successful in this class all students should have working knowledge of Google's G Suite or Microsoft Office, proper email etiquette, and essential understanding of Canvas.

Learning Outcomes

At the conclusion of the course, you should be able to Describe fundamental concepts essential to drug safety and adverse events reporting

Assess adverse events for causation, expectedness and seriousness

Identify reporting requirements related to Study Drugs

Apply drug safety concepts to clinical situations

Topics Include

Background of Drug Safety in US

Drug safety during pre-clinical and clinical trials

Post-marketing drug safety surveillance

Reporting issues related to drug safety

Notes

Professional Credit: CA BRN/LVN Credit--Provider #CEP13114.

Early Childhood Education Associate Teacher Certificate Completion Fee | O-CE0411

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 | O-CE0095

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 | ECEA.X320

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

Topics Include

Parent Profiles

Family-Teacher Partnerships

Communication with Families

Classroom & Curriculum

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Additional Information

Please review section notes to view the full schedule.

Together we will explore effective and productive ways of engaging parents and families in partnering with day care, preschool, and other school professionals on their children's education. Current research and best practices in the field of early childhood will be presented.

Effective partnering with parents begins with our understanding of what families do at home and in the community to support their children's learning and development. It also means providing systems of ongoing communication that engage families of diverse linguistic and cultural backgrounds.

The National Association for the Education of Young Children (NAEYC) identifies effective family engagement as an important and necessary practice of early childhood educators.

ECE 11: Supervision and Administration of Early Childhood Centers, Part A | ECEA.X321

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 an early childhood program for quality using the Environmental Rating Scale. 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

Working knowledge of:

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.

Topics Include

Health, safety, and hygiene issues.

Anti-bias programming and special education topics.

Staff issues, including supervision, professional growth, conflict management probation, and termination.

Family - School relationships

Additional Information

Please review section notes to view the full schedule.

ECE 13: Adult Supervision and Mentoring | ECEA.X323

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

Topics Include

Introduction to Developing Coaching & Mentoring Relationships

Relationship-Based Professional Development

Building Professional Relationships with Adults

Communicating to Support Teacher Awareness

Adult Learning and Planning for Teacher Development

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Additional Information

Please review section notes to view the full schedule.

ECE 1: Development in Early Childhood | ECED.X301

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

Topics Include

Examining the relationships of the child to their family, community, and culture.

Learning about expected behavior and growth patterns of infants through adolescence.

To study the social, emotional, intellectual, and physical development of the child from conception through adolescence.

Observing, recording, analyzing and comparing children's behavior and relating it to course materials on development.

Recognize and appraise the influence of various social contexts on development including family, school, childcare, the media, and culture.

Examine the significance of various statuses and characteristics such as gender, disabilities and socioeconomic status on children's development.

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Additional Information

Please review section notes to view the full schedule.

Students must have the required textbook for the first class meeting.

ECE 2: Introduction to Teaching Young Children | ECED.X302

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

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

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Additional Information

Please review section notes to view the full schedule.

ECE 3: Curriculum Development in Early Childhood Programs | ECED.X303

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

Topics Include

NAEYC Curriculum standards and 8 areas

Model fingerplays and picture books

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Additional Information

Please review section notes to view the full schedule.

ECE 4: The Young Child in the Family and Community | ECED.X304
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.

Learning Outcomes

At the conclusion of the course, you should be able to Identify ways to support families around issues of attachment and trust

Describe social influence on children and families

Identify strategies to understand families' goals values and culture

Identify strategies for supporting families through community resources and networks

Explain RERUN procedures for problem solving.

Explain how social policy issues affect children and how to advocate for children

Societal influences on children and families

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Additional Information

Please review section notes to view the full schedule.

ECE 5: Positive Guidance and Discipline for the Young Child | ECED.X305

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

Topics Include

Approaches for problem solving when working with children

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Additional Information

Please review section notes to view the full schedule.

Be ready for some lectures, individual presentations, group discussions, class and group projects, and a "hands-on" project or PowerPoint slide presentation to be made as a final project.

ECE 6: Culture and Diversity in the Early Childhood Classroom | ECED.X306

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

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

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

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: Child Development Permits- Worksheet

Learning Outcomes

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   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 providing guidance and support for both students and mentors.

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

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 | ECED.X308

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.

Learning Outcomes

At the conclusion of the course, you should be able to Understand health care policies and procedures in the child care setting.

Identify safe and healthy environments for young children.

Discuss prevention of disease transmission and injuries.

Identify appropriate care and intervention for the sick or injured child.

Describe Emergency preparedness.

Describe child abuse and neglect.

Understand emotional health.

Discuss preventive health practices.

Understand Nutrition and feeding issues.

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Additional Information

Please review section notes to view the full schedule.

Students are encouraged to obtain CPR certification

ECE 9: Language and Literacy for the Young Child | ECED.X309

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

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

Topics Include

Predictable Routines

Strategies for lesson planning

The Essentials of early Literacy

Developing a literacy Environment

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Additional Information

Please review section notes to view the full schedule.

In order to satisfy course requirements, class participants must participate in discussions, complete

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

Topics Include

Introduction to Brain Research

Diagrams and other helpful information on brain research

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Additional Information

Please review section notes to view the full schedule.

Be ready for some lectures, individual presentations, group discussions, class and group inquiries, and a "hands-on" project or PowerPoint slide presentation to be made as a final project by each person in class.

ECE: Creative Arts for the Young Child (Preschool Through Grade 3) | ECED.X312

3.0 Units

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 curriculum---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

Topics Include

What is creative art?

How teachers can encourage creativity

Relating art activities to other curriculum areas (integrated curriculum)

Relating art to all four areas of development

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Creative Arts for the Young Child is designed to meet the needs of teachers planning curriculum for preschool through third grade. This course includes practice in using age-appropriate methods with commonly available creative art media for children of various developmental stages, infancy through eight years old. This hands-on course will focus on the importance of individual expression of creativity, including problem solving, planning, and play through art activities. Students will learn to make, collect, and use various materials to develop an understanding of how art expression and skills change as children mature.

ECE: Infant/Toddler Growth and Development | ECED.X313

3.0 Units

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

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Notes

Having had a child or taking care of a young child is beneficial when sharing in class discussions.

Please order your book ASAP

ECE: Principles of Infant/Toddler Caregiving | ECED.X314

3.0 Units

This course satisfies part of the State Licensing requirement for the application of infant/toddler caregiving principles. We encourage students to visit the cdss.ca.gov website for more information on the requirements. 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

building brains together

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Additional Information

Please review section notes to view the full schedule.

This course is great for all interested in this age group even if they have not had children of their own yet. It is also informative for those who have had children as they can relate to many of the things the book focuses on.

In this course, you will study the theories, philosophies, and practices that are best for working with infants and toddlers two and under. This class is necessary and mandatory for all caregivers working with this age frame.

Educational Assessments I | EDTH.X303

3.0 Units

Assessment is critical for determining what we've learned, how we learn, and how to best target and bolster instructional approaches as we move ahead. This course introduces the assessment tools and procedures frequently used in educational therapy settings. Participants will gain experience using specific assessment instruments. They will have access to a limited number of assessment instruments which they may use for practice. Testing is limited to educational assessment tools, which are widely used by educational therapists and do not require 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 and how to interpret psycho-educational evaluation reports.

Learning Outcomes

assessment

Read, understand, and summarize educational testing reports

Administer a standardized assessment correctly

Recognize common tests of phonological awareness, visual motor integration, expressive and receptive language, reading, writing, 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

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Additional Information

Please review section notes to view the full schedule.

Please note that this course is designed for educational therapist candidates, general and special education teachers, school administrators, and allied professionals.

Educational Assessments II | EDTH.X304

3.0 Units

This course introduces the formal educational assessment process from start to finish. Discussion is limited to educational assessment tools which are widely used by educational therapists and do not require credentialing as a school psychologist or licensing as a clinical or educational

NOTE Participants will be required to find a volunteer school-aged student for the purposes of learning how to complete an educational assessment. Learning Outcomes

At the conclusion of the course, you should be able to Use 3 or more standardized assessment tools

Obtain a developmental history

Record test results and interpret them in writing

Topics Include

Obtaining informed consent

Maintaining confidentiality

Selecting, administering, and scoring educational tests

Summarizing testing data

Making educational recommendations

Presenting assessment findings

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Additional Information

Please review section notes to view the full schedule.

Educational Therapy Certificate Completion Fee | O-CE0412

Once all of the certificate requirements have been met and your final grades are posted, please

Develop and implement an intervention plan, based on assessment data and contextual information.

Collaborate with the client, parents, teachers and allied professionals as part of a multidisciplinary team.

Abide by the AET ethical codes

Reflect upon one's own professional practices as an Educational Therapist and engage in a systematic process of self-analysis.

Topics Include

Preparing for ET Services

Providing ET Services

Terminating ET Services

Potential Career Steps

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Additional Information

Please review section notes to view the full schedule.

Educational Therapy: Structured Literacy I | EDTH.X301

3.0 Units

Structured Literacy I introduces you to the theories, issues, strategies, and materials related to literacy instruction and assessment for both reading and writing. While not focusing on students with learning difficulties, in this literacy course you will learn foundational skills for supporting all your students.

Both courses are required for the certificate in Educational Therapy and are closely aligned to the requirements of the Association of Educational Therapy.

You'll master the skills and knowledge you need to help all the diverse students who will come to you in your practice.

Learning Outcomes

At the conclusion of the course, participants will be able to:

Differentiate brain processes used for oral language from those used for written language
Neurobiology of Literacy Learning

Describe the main components for mastery of literacy

Define key terms—phonological processing, phonemic awareness, and phonics—and explain how each one contributes to the development of literacy

Structured Literacy Define the components of structured literacy and describe their importance

Apply the current science on reading to assess the quality of reading and writing programs

Create and implement effective lessons based on best practices in structured literacy instruction

Speech to Print Compare and contrast speech-to-print and print-to-speech approaches

Evaluate quality programs following each approach

Describe the bidirectional influence of spelling on reading and vice versa

Apply current science behind 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

Evaluate and implement programs and techniques to build comprehension

Assessment Describe and justify the components of a quality assessment for literacy

Topics Include

The neurobiological underpinnings of literacy learning

Structured literacy: what it is and why it is important

Speech to print: an important update in the science of reading

Teaching writing from bottom to top

Scarborough's Reading Rope and comprehension

The stubborn persistence of the reading wars

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Additional Information

Please review section notes to view the full schedule.

Formerly titled "Educational Therapy: Reading I"

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 conclusion of the course, you should be able to Describe the characteristics and elements of structured literacy

Analyze student's individual learning needs and apply best practices to modify structured literacy to their needs

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 and a learning plan that responds to the changing needs of each student

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

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Additional Information

Please review section notes to view the full schedule.

Effective Employee Relations | HRMT.X414

1.5 Units

HR generalists, business partners, and newly promoted human resources specialists will deepen their understanding of employee performance programs in this extensive and practical overview of workplace relations.

We will learn current legal and practical methods for handling employee relations, performance management strategies, and provide a special focus on common workplace issues such as on-the-job behavior which accounts for 80 percent of terminations.

We will also explore topics such as employee communications, handling employee complaints, resolving employee conflicts, and workplace harassment as well as how-to conversations that coaching managers employ to help with employee issues; performance management; voluntary and involuntary terminations, abusive behavior, and the impact of mergers and acquisitions. More importantly, we will also focus on the new world of work and how teams influence new employee behaviors.

It is highly recommended that students new to human resources begin with the introductory "Human Resource Management" course. After that, courses may be taken in any order.

Learning Outcomes

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

Understand the full concept and interpret best practices regarding employee relations.

Coach managers through employee performance, mental health, and other personal issues.

Implement and outline (for managers) a comprehensive performance improvement plan.

Train managers in performance management for ER.

Innovative approaches and research regarding performance management systems in 2022.

Understand the impact of teams regarding employee performance.

Deal with employees during the integration process of change and realignments.

Effective Negotiations: Principles, Strategies, and Techniques | BUSM.X416

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.

Effective Performance Management | HRMT.X402

2.0 Units

Effective performance management systems involve goal setting, coaching and feedback, motivation, measuring performance against goals, no rating systems, employee check-ins, performance appraisals options, employee development and retention strategies.

In this overview course for managers, supervisors as well as human resources business partners

succession planning. We will also review and implement the key elements of a performance improvement plan.

Learning Outcomes

Proper performance management techniques and pitfalls to avoid

Management of employee behavior and job performance

Organizational alignment and results. What about positive feedback?

Employee check-ins and employee development in a performance management process and a performance appraisal system

Performance management implementation in diverse organizational cultures

Leadership development and succession planning

Performance management research, neuroscience, and employee analytics

Professional Credit

SHRM-CP® or SHRM-SCP® 19.25 PDCs.

Effective Procurement Strategies | SCMT.X401

3.0 Units

This 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 Outcomes

Identify and explain the various methods of procurement

Determine value and its application to product and service selection

Topics include 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 | CTDM.X410

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 Firmware Essentials | EMBD.X403

programs that are suitable for hardware bring-up and application development. In this course you will learn practical, in-depth knowledge and coding exercises for firmware development. We'll review embedded system architecture and hardware configurations specifically on the Espressif ESP32 and its CPU core architectures. You will be introduced to C codes, how to enable hardware features, and work with real-time operating systems, task management and interrupts as well as various inter-chip communication interfaces and access to the outside world. We will introduce the wireless functions of these devices.

Most firmware development in industry is done on Linux systems. You should have solid C programming skills and be ready to complete all class projects with GNU tools. You'll gain experience working on several on-hardware projects. This course prepares you for additional embedded software courses covering 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

Students are required to purchase a hardware starter kit, a small board, breadboard, resistors, LED, and wires (estimated $45-$60, not included in the tuition) to do class projects on Design applications These applications that take Advantage of the onboard I2C and SPI sensors available EDG and should be purchased before the first class. For additional sensors or actuators depending on the student's interest, please contact the instructor.

Describe and explain various wireless protocols for IoT devices

Embedded Linux Design and Programming | LINX.X409

3.0 Units
Notes:
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

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 a root projects, student application rooted to have using as GD Debian gink 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. Writing kernel modules and user applications for embedded Linux using C language 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 for the programming project.

Skills Needed: OS Working knowledge of RT Programming application interface/environ operating-system internals. Advanced C programming recommended.

Embedded System Hardware Architectures, Introduction | EMBD.X415
Note(s):

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 familiarity with the hardware components of a computer system is required.

Embedded Systems Certificate Completion Fee | O-CE0071

Hardware design considerations

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.

Design methodology (ASIC, FPGA, COTS)

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

2.5 Units

Memory subsystem and hierarchy, types (SRAM, PSRAM, DRAM, Non-volatile memories)

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.

Microprocessors, microcontrollers

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

Inter-IC communications overview (SPI, I2C, Parallel Bus)

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.

Skills Needed:

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.

Eldercare and special needs planning.

English As a Second Language Through Music and Movement | TESL.X306

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

Learning Outcomes

At the conclusion of the course, you should be able to Enhance student oral and written communication skills through songs

Develop a lesson using popular music lyrics

Read about, create, and view demonstrations of effective strategies and activities used in ESL

Create extension activities that include movements

Explore ESL websites to help in future lesson plans

Share ideas and lessons with classmates in order to develop a "Book of Music lesson Plans"

Describe why music and movement is essential to teaching ESL

Describe the various ways to make a lesson successful and memorable

Create puzzles, worksheets and activities to extend vocabulary & comprehension

Topics Include

10 ESL Activities That Will Bring Music to Your Ears

How to Teach Using Songs

Using Music for English or Foreign Language Learning

Neuroscience of Music

Working knowledge of:

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.

Understand property titling and beneficiary designations and strategies to transfer property.

Compute gift, estate, and GST tax liabilities. Delineate the marital deduction.

Comprehend intra-family and other business transfer techniques.

Plan for divorce, unmarried couples and other special circumstances including special needs.

European Medical Device Regulation: Clinical Evaluation and Post-Market Surveillance | REGL.X408

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.

Learning Outcomes

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.

Topics Include

Supply Chain & Economic Operators

Clinical Data & Evaluation

UDI, EUDAMED, IT requirements

MDR Implementation Program

Additional Information

Please review section notes to view the full schedule.

Prerequisite Courses:

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 | SCMT.X400

1.5 Units

Purchasing is no longer simply about buying requested materials and goods. In Evolving Role of Supply Chain Management, students take a look back in time to study the industry's evolution and areas of high impact such as, transportation, warehousing, and supplier management. They gain an understanding of the latest best practices in this evolving field.

Especially in the post-pandemic era, supply chain management professionals who learn to manage product planning, supplier development, and system implementation have a broad impact on an organization, particularly its bottom line. The evolution of this field has made the supply chain professional a critical role in any successful company.

Learning Outcomes

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

Recognize the career potential of supply chain management

Topics include

Experimental Methods in Molecular Biology | BINF.X401

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.

Learning Outcomes

At the conclusion of the course, you should be able to Explain the principles of basic methods in experimental molecular biology

Describe experimental molecular biology techniques, quantitative methods, and instrumentation used in functional genome research and biotechnology

Apply learned techniques when solving molecular biological problems

Understand the general safety regulations for laboratory work in molecular biology

Interpret experimental data

Critically evaluate and discuss experimental results

Topics include

Gene cloning, manipulation and sequencing

PCR

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

"Molecular Biology, Introduction" or equivalent course.

Additional Information

Please review section notes to view the full schedule.

Extreme-Agile Project Management | PPMT.X405

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

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

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 | BUSM.X403

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

Professional Credit

HRCI®---PHR®, SPHR® and GPHR® general recertification credit: 9.5 hours.

Finance I, Fundamentals | BUSM.X405

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

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

A foundation in basic financial accounting knowledge is recommended.

Cost of capital, time value of money

First and Second Language Development | TESL.X303

3.0 Units
Capital budgeting and investment risk

The fields of linguistics and psychology have rendered theoretical models of first and second language learning and acquisition. Participants in this seminar examine how these theories apply to TESL/TEFL and bilingual education. Participants also examine the critical factors affecting language development by analyzing current research based theories, processes, and stages of language acquisition, including the difference between first and second language acquisitions.
Capital budgeting systems
The course work provides students with a broad and deep understanding of these theories, models, and processes of second language acquisition, and requires candidates to draw upon their own language learning and teaching experiences for examples that relate theory to practice.
Working capital and cash management
The coursework provides students with materials, methods and assignments so that they can demonstrate an understanding of cognitive, linguistic, affective, and sociocultural factors that affect

Skills Needed

second language development. The course requires that students analyze how this knowledge can be directly applied to the instruction of English Learners in order to build upon students' prior knowledge and promote their language development and academic achievement.

Learning Outcomes

At the conclusion of the course, you should be able to Understand principles of modern learning theories.

Understand principles of modern language teaching approaches, methods and techniques.

Understand factors affecting learning and classroom interaction such as linguistics, socio-linguistic, psychological, cultural, and educational.

Understand implications and applications of historical and current learning theories in language learning and teaching.

Understand models for using multiple sources of information to assess student learning.

Use general learning theories to inform classroom process and practice.

Identify strategies to handle individual and group learning styles.

Individualize teaching through strategies that take into account differences between learners (linguistic, psychological, cultural and educational).

Topics Include

Myths of second language acquisition

Overview of the field of first language acquisition (FLA)

Comparing and Contrasting FLA and SLA

Sociocultural Factors

Theoretical Perspectives

Working knowledge of:

presentations and project work.

Foundations in Medical Devices: Developing Premarket U.S. Regulatory Strategies and Working in a Regulated Environment | REGL.X410

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 conclusion of the course, you should be able to Discuss FDA's jurisdiction and the reason for food, drug, and cosmetic laws

Define the various regulatory pathways available for medical devices, including requirements for combination products, IVDs, and stand-alone software

Understand individual roles/responsibilities and how the medical device industry works in general

Topics Include

Regulatory Writing

Federal vs State level requirements: FD&C; Act, FDA's CDRH, and California's FDB

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Additional Information

Please review section notes to view the full schedule.

REGL.x410 replaced REGL.X404 Regulation of Medical Devices and Diagnostics. If you have enrolled into the program using the former requirements, you will not need to take REGL.X410. If you are interested in establishing candidacy & enrolling into the program 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.

The student is responsible for ensuring pertinent emails and Canvas notifications do not go to spam as well as completing all assignments by the due date. There are no late submissions accepted.

&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. Skills Needed

Foundations in U.S. FDA Regulations of Drugs & Biologics and Regulatory Submissions | REGL.X409

2.0 Units

New to the industry? Or maybe you need a basic understanding of the U.S. FD

To be successful in this class all students should have working knowledge of Google's G Suite or Microsoft Office, proper email etiquette, and essential understanding of Canvas.

Learning Outcomes

At the conclusion of the course, you 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

Topics Include

Working in a Regulated Environment

Overview of the Food Drug & Cosmetics Act and the Code of Federal Regulations

Understanding FDA and ICH Guidance Documents

Overview of the Biopharmaceutical Process

Notes

Foundations of Disciplined Agile for Project Managers | PPMT.X424

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.

Note This course is an introductory course, not a certification course.

FPGA Application in Autonomous Driving Systems, Introduction | VLSI.X416

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

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

Define, develop, and model image processing and machine learning basic algorithms

Understand and differentiate computation platforms for AD

Develop basic RTL design for FPGA Some programming knowledge (Python, MATLAB, VHDL, Verilog, SystemVerilog) and digital system design experience is preferred, but not required.

Develop image processing algorithms on FPGA

Fundamentals of English Grammar for ESL Teachers | TESL.X304

2.0 Units

Implement, verify, and simulate a working design on FPGA for AD applications

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 Skills Needed: those challenging aspects of English grammar. The main objective of the course is to explore these points.

Learning Outcomes

At the conclusion of the course, you should be able to Describe the conventional system of punctuation used for written American English and the rationale behind it.

Discuss the major word-formation patterns of English.

Explain distinctive patterns of discourse associated with spoken/written English texts designed for specific audiences.

Identify the basic sentence patterns of English, as well as the expansion, modification, and coordination patterns built upon them

Explain the rationale for lessons that focus on integrated skill areas and different proficiency levels

Develop an effective lesson plan, and design and adapt materials necessary to implement your teaching agenda

Topics Include

Grammar Basics

Morphology

Syntax

12 English tenses

Acquiring vs. learning language

Developmental sequences

Lesson Planning

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

3.0 CEU's

In this course, students explore the theoretical and mathematical framework of GANs and experience hands-on guided workshops and practical applications in the data synthesis space. We focus on image synthesis while learning the fundamental concepts, mathematical formulation, and practical aspects of building and training generative models required to create innovative AI systems. This course will also introduce ChatGPT-like systems.

GANs are one of the most valuable components of modern AI, be it computer vision, anomaly detection, or language models. In language modeling alone, GANs and other neural network techniques have shown remarkable milestones for text generation, text summarization, language translation, question answering, and more. The recent success of DALL-E 2 and ChatGPT highlight these accomplishments.

ChatGPT leverages the GANs framework and facilitates text-based conversation with humans by generating, synthesizing, and allowing interactive responses to questions. ChatGPT engages in communication just like another human and is just the beginning, with many more excellent AI applications on the horizon. This GANs course teaches you the fundamentals required to build such innovative AI systems and lays a path to the future.

Working in a research environment, you'll learn the problems and challenges associated with GANs and overcome them at the production level. Students will perform image translation and synthesis tasks with state-of-the-art networks, such as Pix2Pix and CycleGAN. You'll implement deep learning algorithms from technical papers for deep generative models and focus on building an intuition of efficient training of DL and GAN models.

Learning Outcomes

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

Define the generative models and their use cases

Build the generative adversarial networks (GANs) framework

Train GANs with variants of their cost functions

Explain the generator, discriminator, GAN loss function, and adversarial loss

Build conditional GANs and WGAN

Perform image translation and synthesis tasks with state-of-the-art networks, such as Pix2Pix, CycleGAN

Requisite Knowledge

You need to be familiar with probability theory and linear algebra, programming, and deep learning.

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.

Generative AI Fundamentals | AISV.814

This comprehensive course introduces participants to the world of generative AI and its transformative impact across industries. Suitable for beginners and professionals, this course delves into the practical applications of generative AI, from text and image generation to music composition, and its expanding role in healthcare, finance, and other sectors. Throughout the course, you'll gain a solid understanding of the underlying technology, including deep learning and neural networks, as well as the architecture of ChatGPT, its variants, and the basics of prompt engineering. You will also learn about the tools, resources, and best practices for building generative AI models. Moreover, you'll have the chance to explore emerging trends, ethical considerations, and future opportunities in the field.

Learning Outcomes

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

Explain the fundamental concepts and principles of generative AI.

Describe the practical applications of generative AI across various industries.

Gain hands-on experience in setting up and working with common generative AI packages, allowing for the creation of intelligent and automated systems.

Discuss best practices for training and deploying generative AI models, ensuring optimal performance and efficiency.

Discuss emerging trends and future directions in generative AI, including ethical considerations and challenges associated with its use.

Topics Include

ChatGPT/variants

Prompt engineering

Model training

Dataset preparation

Tools and resources

Best practices

Ethical considerations

Emerging trends

Skills Needed

Python and Machine Learning Basics are recommended but not required.

Gene Therapy: Hacking the Genome | BTEC.X416

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.

Skills Needed

To be successful in this class all students should have working knowledge of Google's G Suite or Microsoft Office, proper email etiquette, and essential understanding of Canvas.

prior molecular biology coursework or background is strongly recommended.

Learning Outcomes

Topics Include

Gene therapy landscape overview

Uses of viruses in gene therapy

RNAi

Car-T gene therapy

CRISPR gene therapy

Notes

This class offers a detailed analysis of the biology underlying each technology and analyzes the advantages,disadvantages, and limitations of each.

Genomics and Next Generation DNA Sequencing: Methods and Applications | BTEC.X407

3.0 Units

Next Generation DNA Sequencing (NGS) has transformed our understanding of genomics. The ability to sequence a human genome at an incredibly low cost has vastly expanded the potential applications of genomics in cancer diagnostics, pathogen identification, forensic human identification and genetic disease diagnosis. For researchers, NGS is a powerful tool that allows you to address questions that were impossible to pursue just a few years ago. This course, taught by a leading expert in the field, begins with the basics of this revolutionary process and then delves into specific applications of NGS in research and clinical settings. You will develop the knowledge needed to perform analyses from sample prep to generating the final data.

The course begins with an introduction to genomics. It then reviews the primary methods used for highly parallel sequencing technologies. The course covers standard workflows from sample prep to final data analysis. This is the only course available in the Bay Area that builds comprehensive knowledge in next generation DNA sequencing.

Learning Outcomes

Primary Approaches to Generating Massive Amounts of DNA Sequence Data

The Four Main Steps to Next Generation DNA Sequencing

The Four Main Research Applications of DNA Sequencing

Clinical Applications

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Additional Information

Please review section notes to view the full schedule.

Completion of "Bioinformatics Tools, Databases and Methods or Experimental Methods in Molecular Biology" is recommended.

Global Medical Device Submissions and Strategy | REGL.X401

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, and China. 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 conclusion of the course, you 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

Topics Include

Submission elements

Developing a strategy

A outline for a strategy document

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Additional Information

Please review section notes to view the full schedule.

Good Clinical Practices | CTDM.X411

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.

Discuss the roles and responsibilities of key players and stakeholders as it relates to Human Subject Protection

Explain the principles of GCP to answer questions arising from everyday clinical research situations

Identify various regulations that directly or indirectly impact GCP

Topics Include

Regulations, Standards and Principles

Sponsors and Protocol

Institutional Review Board and HIPAA

Study Documentation, Source Data and Test Article

Quality Management (Monitoring)

Patient Recruitment, Financial Disclosure and Compliance

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Additional Information

Please review section notes to view the full schedule.

Professional Credit

CA BRN/LVN Credit--Provider #CEP13114

research professionals, as well as anyone who wants to understand which regulatory controls apply to the manufacture of drugs and biopharmaceuticals for human use.

Learning Outcomes

At the conclusion of the course, you should be able to Understand how the GMP and GLP regulations affect the work environment in a pharmaceutical company.

Develop an understanding of how GMP regulations are applied in daily operations, and why the regulations are considered necessary.

While primarily aimed at the manufacturing or quality systems worker, the course should also help the regulatory or clinical affairs worker to understand what controls are expected during the manufacturing of all products for human use.

As a general objective, the course will seek to have the student develop an understanding of why certain practices, attitudes, and environments exist within a mature pharmaceutical company.

Topics Include

History, Regulation, Good Laboratory Practice

General Provisions

Control of Components and Drug Product Containers and Closures

Biologics and Good Tissue Practice

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Additional Information

Please review section notes to view the full schedule.

The course will consist of four 6 hour sessions with a 45 minute lunch break and ~15 minute breaks every 1.5 hours.

therapies. While the instructor may suggest the reading of guidance documents and other material, the GMPs will be the only required reading material. Professional Credit

CA BRN/LVN Credit--Provider #CEP13114, 30 hours.

Go Programming | CMPR.X418

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 appropriately, including proper allocation/deallocation procedures

Topics include

Code compilation

Program structure

Using packages to reuse code

Goroutines and channels

Concurrency

How to use Access in the at GOls compiler.

Skills Needed: Students should have C programming skills. Advanced C is recommended.

Grammar and Style for Technical Communicators | TEWR.X401

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.

Hands-On Data Engineering | DBDA.X424

Formerly: Data Engineering with Hadoop 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 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, Kafka 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, Spark, Kafka,

and Hive as well as some aspects of Python programming. You will learn how to write MapReduce/Spark jobs and how to optimize data processing applications and become familiar with 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 second half of the course covers stream processing capability and developing streaming applications with Apache Spark. 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 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 programs/small applications in Spark and Hive

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

This course uses AWS EMR and Databricks for Spark, Hive and HDFS programming. Students are required to have accounts with AWS and Databricks.

Healthcare Equity: Improving Access | CTDM.X416

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 conclusion of the course, you 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.

Topics Include

The impact of DEI in Healthcare History

Equitable access to healthcare, Research, and Justice

Cross-cultural approaches to DEI in Healthcare

Regulations, Technology and Safety

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Additional Information

Please review section notes to view the full schedule.

Laptop is required (video optional, but preferred)

High Efficiency Switch-mode Power Supply, Design Overview | EMBD.X405

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

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.

High-Performance Computer Architecture | VLSI.X415

Computer architecture focuses on techniques to design high-performance processors and is a prerequisite for both design and verification engineers, in any modern processor design project. This course covers computer architecture essentials, as well as some advanced topics, such as multi-threading, data level parallelism in GPUs and multi-core processors. Through a lecture-based approach, supplemented with practical problem sets, you'll navigate the intricacies of Verilog coding, timing graph walkthrough, and micro-architecture solutions. This course is intended for design and verification engineers interested in working on processor or complex digital system design projects.

Learning Outcomes

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

Identify and resolve pipeline hazards and explain out-of-order execution.

Evaluate tradeoffs between various cache organization and replacement policies.

Understand virtual memory organization.

Design protocol meeting memory coherence and consistency requirements.

Explain data level parallelism.

Topics Include

Processor design

Multi-core processors

Data level parallelism in GPUs

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, new JavaScript and CSS3 implementations, as well as geolocation.

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 project.

Learning Outcomes

At the conclusion of the course, you should be able to Understand and apply the new HTML5 structure and semantics to a web page.

Apply new form elements and attributes.

Add video and audio to a web page.

Apply drag and drop capabilities to a web page.

Apply API's for geolocation and canvas capabilities.

Topics Include

History of HTML

What is HTML5?

New structure and syntax

Web Accessibility

Web forms

Audio and video

"Introduction to Web Programming: JavaScript and PHP" and "Designing with Cascading Style Sheets: Advanced" or equivalent experience is recommended.

Additional Information

Please review section notes to view the full schedule.

HTML5 Fundamentals | UEWD.X410

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 format text, insert images, link to other Web pages and sites, and create forms and data tables. The course discusses different versions of HTML, defines XHTML and demonstrates how it is written. The instructor will address how HTML 5, the latest version of HTML, builds upon HTML 4.01 and XHTML, including what new elements have been introduced and are supported by current browsers. Throughout the course, the code will be taught and written to reflect today.

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.

Learning Outcomes

At the conclusion of the course, you should be able to Understand the structure of basic web page coding with HTML.

Generate well-formed online documentation sets and understand why they are necessary.

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

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

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Using Web browsers, navigating Web pages, downloading files, creating folders, and saving files (file management/organization) either on a Mac or Windows environment. The course recommends using Notepad++ on Windows or BBEdit on the Mac, which are free tools

Additional Information

Please review section notes to view the full schedule.

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.

Learning Outcomes

At the conclusion of the course, you should be able to Define the role of human factors in the medical device design process

Understand appropriate human factors methodologies for the development of medical devices

Identify human factors standards relevant to medical device development.

Review human factors documentation against the standards and process.

Discuss human factors engineering requirements.

Identify usability issues related to product design.

Topics Include

Applicable Standards/Guidance Documents

Task/Workflow Analysis

Formative & Summative Evaluations

62366 Checklist

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

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 | BTEC.X408

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

Learning Outcomes

At the conclusion of the course, you should be able to Understand the organization of the human body

Discuss the physiological processes

Describe integrative/control mechanisms of the body (functional homeostasis)

Discuss what goes wrong in selected disease states (loss of homeostatic control)

Understand current therapeutic approaches/modalities for selected diseases

Topics Include

Basic Chemistry

Cells and Tissues

The Cardiovascular System

Respiratory System

Urinary System

Digestive System

Endocrine System

Nervous System

Lymphatic System and Immune System

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

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

SHRM-CP® or SHRM-SCP® 9.5 PDCs.

Immunology, Principles | BTEC.X409

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. 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.

Topics Include

Innate, humoral and cell-mediated immunity, adaptive 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 and Immunology: Infection, Immunity and origins of Cancer; Immunotherapy approaches in Cancer; CAR T-cells and use in treatment of Cancer

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

General microbiology and basic chemistry. Knowledge of cell biology is recommended.

Additional Information

Please review section notes to view the full schedule. Professional Credit

CA BRN/LVN Credit--Provider #CEP13114.

Implementing Marketing and Sales Strategies | MKTG.X403

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

Skills needed

There are no prior course requirements. However, it would be helpful if students have some marketing related experience or have taken a course such as "Principles of Marketing."

Income Taxation in Personal Financial Planning | FPLN.X410

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.

Help business owners select appropriate forms of ownership and self-employed retirement plans.

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.

Read and understand basic tax information forms 1099, W-2, 1098, etc.

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

Information Architecture and Design Basics | TEWR.X405

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 | INDE.X400

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 | INDE.X490

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 Needs Assessment and Evaluation | INDE.X408

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 | MKTG.X408

3.0 Units

A proper integrated marketing communication plan is the best way to reach your appropriate target markets 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

Develop integrated budgets using the "Task Method"

Develop and implement measurement and feedback processes.

Properly identify Target Markets using PSYCHOGRAPHICS.

Skills Needed It is generally expected that you have had some marketing experience or have taken the "Principles of Marketing" course.

International Business and the Global Economy | BUSM.X402

3.0 Units

This course introduces students to the international business environment within the global economy, especially key changes stemming from the global pandemic. We'll leverage lessons learned from business economics and introduce students to non-economic factors influencing an international business in the global economy.

Drawing business insights from ethics, culture, and political economy, students will discuss international business scenarios through small case analysis.

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.

Skills Needed

Intermediate Algebra. Familiarity with Online eBook (Pearson/MyLab), Microsoft Office, or another office suite, and Canvas.

Interviewing for Success: Using Structured Interviewing Techniques | HRMT.X410

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.

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 or video screening interview of selected candidates.

Apply a structured, flexible interviewing process using a structured interview framework.

Prepare and execute a resumé-based interviewing agenda to elicit candidate decision-making information.

Review and learn behavioral interviewing questioning skills, using the C.A.R. technique (Candidate provides Context, Actions, Results of previous work situation).

Practice using situational, self-assessment, and open-ended interview questions to discover the "missing 10 percent" of candidate information to guide hiring decisions.

Evaluate a candidate's behavioral evidence from interview question responses against the essential job requirements.

Familiarize yourself with federal and California legal guidelines for the interview process using quizzes and role plays.

Professional Credit

HRCI®---PHR®, SPHR® and GPHR® general recertification credit: 6.5 hours.

SHRM-CP® or SHRM-SCP® 6.5 PDCs.

Introduction to Accounting I: Financial Accounting | BUSM.X418

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

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 Blockchain, Smart Contracts, and NFTs | ITEC.807

2.0 CEU's

While most of the hype around blockchain has centered on cryptocurrency, the promise of blockchain technology is much broader. A blockchain is a distributed system with a distributed shared datastore, sometimes called a distributed ledger, supporting cryptographically verifiable transactions. Nodes agree on the distributed ledger state using a distributed consensus algorithm. When paired with smart contracts, blockchains provide a way of creating a distributed web of trust for specific applications where cooperation is needed between participants who may not have reason to trust each other in general. In this course, we'll take an introductory look at blockchains, smart contracts, distributed identity management, and nonfungible tokens (NFTs).

Learning Outcomes

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

Describe the terms blockchain, dapp, Web3 and Layer 2 scaling solutions and interchain

Compare and contrast the "Big Three" major blockchain platforms: Bitcoin, Ethereum, and Hyperledger

Discuss and compare use cases for blockchain technology, decentralized identifiers and verifiable credentials

Categorize fungible and nonfungible tokens.

Explain uniswaps and stable coins, Defi applications and central bank digital currency

Topics Include

The three fundamental technologies underlying blockchain systems: distributed consensus, cryptography and distributed ledger data structures

Identity and access management for blockchains - the difference between permissioned/permissionless, public/private distributed ledgers

Smart contracts, smart contract programming languages and environments, and how smart

Decentralized identifiers and verifiable credentials

Tokens and tokenomics: fungible and nonfungible tokens and how to use tokenization to assign value to assets and liabilities that are difficult to quantify

Financial applications: uniswaps, stablecoins, Defi applications and central bank digital currencies

Prerequisite Skills

Students should have a basic understanding of computer systems security. Some familiarity with blockchain applications and cryptocurrency, at a high level, would also be helpful. Basic blockchain technology will be reviewed at the beginning of the course.

Introduction to Machine Learning | DBDA.X408

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

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 | INDE.X404

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 VLSI and ASIC Design | VLSI.X403

3.0 Units

With shrinking process technologies, today's silicon chips are so complex that few engineers, designers, programmers, and managers fully understand every phase in the IC development cycle. This unique course covers each step in developing an ASIC, explaining in an intuitive and visual manner such key concepts as transistor action, standard cells, RTL synthesis, meeting timing, functional coverage, formal equivalence, physical design, signal integrity, DFT and BIST, tape-out, IC fabrication, and emerging packaging trends.

Through hands-on quick tour labs students become familiar with the roles of synthesis, simulation, formal equivalence, and routing tools. The focus is on mostly-digital ASICs with multiple IP cores, low-power goals, and on-chip analog blocks. A preview of the latest technology, including nanosheets and gate-all-around transistors.

The course is intended for ASIC professionals, both experienced and entry-level who are seeking more in-depth understanding of the chip development flow. Knowledge gained in this course will improve cross-functional communication with other team members and prepare students for more rigorous study in the ASIC or SoC field.

Learning Outcomes

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

Describe the overall design and verification flows for ASICs and FPGAs and identify the EDA tools used at each major stage.

Bring hardware engineers up to speed on the latest ASIC technology and methodology.

Respond appropriately to challenging VLSI ASIC and FPGA interview questions.

Describe the increasingly complex ASIC development flow.

Topics Include

Overview of ASIC architectures

Integration of IP cores: formats, deliverables, and watermarks

Overcome the verification bottleneck: embedded assertions, constrained random tests, equivalence checking and en General understanding of digital logic.

Lab exercises require some knowledge of the chip's hardware

Introduction to Web Programming: JavaScript and PHP | UEWD X421
Create layout for tape-out: metal layers and vias, routing insights, noise avoidance, DFM issues, timing closure

2.0 Units

Business practices with silicon foundries: sort, shuttles, corner lots

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.

Comprehensive coverage of the chip design flow, from spec through tape-out to fabrication and packaging, equipping students to follow on courses in RTL design, verification, DFT, and layout

Skills Needed:

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

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

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.

Understand the characteristics, uses, and taxation of investment vehicles.

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.

Understand and navigate market cycles.

IO Concepts and Protocols: PCI Express and Ethernet | EMBD.X406

3.0 Units

PCI Express has become the dominant intrasystem IO interconnect from the largest servers to mobile phones and embedded devices. In this course for developers and support engineers in hardware, firmware, software, and field-application, students will gain a stronger understanding of the protocol. We will start with an introduction to IO concepts which will then be reinforced as we take the protocols through their application. We will delve into PCI Express including the **recently released 6.0 version** as well as other protocols of how IO protocols behave the way they do. We will then cover how PCI Express and Ethernet and other protocols work together to enable communication.

Through lectures, homework assignments, and a final exam, students will gain a broad idea of how IO works in a modern computer system and be better prepared to work with device drivers and troubleshoot IO problems. Note: The course does not cover chip or board design aspects of 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 and Ethernet.

Topics Include

Modern computer architecture in block diagram format

Flow of an IO request

IO concepts: MMIO, DMA, interrupts

Address spaces, configuration, or IO A introductory course or Practical experience with operating systems internals, an introduction to computer architecture and organization, and systems programming experience.

Device discovery
IO Design Fundamentals | VLSI.X405

3.0 Units

This course is an Introduction to IO interfacing, or PCIe 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.

Changes introduced in PCI Express 6.0
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 Additional areas to explore to increase IO knowledge and skills

Skills Needed:

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

A basic course in circuit design and understanding of basic electromagnetic physics.

Skills Needed:

Java Programming I | CMPR.X412

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

Topics Include

Introduction to programming, JDK and IDE

Generative AI Assisted Programming

Data types, inputs/outputs

Strings, arrays, collection and generics

Java programming logic

This course includes a module on "Introducing Generative AI Assisted Programming."

Object-oriented programming

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.
Graphic programming

Java Programming II | CMPR.X413

3.0 Units
Exception and file handling, debugging
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, **Note:**se 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

* 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

"Java Programming I" is recommended for those new to Java. Experience in a programming language such as C or C++ may also help with learning Java.
Skills Needed:

Java Threads | CMPR.X423

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

JUnit Test Framework | SEQA.X400

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

Skills Needed: The assignment requires coding in Java. The course will not repeat Java programming instructions.

Kubernetes Container Orchestration Fundamentals | ITEC.801

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 | TESL.X302

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

Topics Include

An Introduction to Linguistics and Language Studies

Analyzing the Spoken Language; Phonology

Words and Their Meanings: Morphology and Semantics

Analyzing Text and Discourse; Language Change

Necessary Knowledge

To be successful in this class all students should have working knowledge of Google Workspace or Microsoft Office, proper email etiquette, and an essential understanding of Canvas.

Additional Information

Please review section notes to view the full schedule.

Law and Human Resource Management / HRMT X405

Explain strategies to minimize legal risk and

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

Overtime and other wage and hour regulations

National Labor Relations Act

Collective bargaining and labor unions

Leaves of absence

Noncompetition and trade secrets

Arbitration

Substance use and abuse in the workplace

Independent contractor vs. employee

Workers' compensation

Reductions in workforce

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

SHRM-CP® or SHRM-SCP® 10 PDCs.

Note

Effective the Summer 2021, this course will be offered for 1 credit unit.

Lean-Agile Project Management: Achieving Business Value | PPMT.X407

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

Learning Theories and Styles | INDE.801

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

Discuss learning theories that fall into one of the following major perspectives or paradigms: Behaviorism, Cognitivism, Constructivism, Humanism, & 21st Century Skills

Evaluate different learning styles and identify personal preferences such as: Sensory vs. Intuitive, Visual vs. Verbal, Active vs. Reflective, & Sequential vs. Global

Understand the needs of adult learners and list strategies for flexibly responding to "unexpected" learning preferences.

Develop instructional activities that address multiple learning styles or that can be adapted to meet the needs of many different kinds of learners.

Learning Theories and Styles | INDE.X402

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.

Learning Outcomes:

At the end of the course, students should be able to

Discuss learning theories that fall into one of the following major perspectives or paradigms: Behaviorism, Cognitivism, Constructivism, Humanism, & 21st Century Skills

Evaluate different learning styles and identify personal preferences such as: Sensory vs. Intuitive, Visual vs. Verbal, Active vs. Reflective, & Sequential vs. Global

Understand the needs of adult learners and list strategies for flexibly responding to "unexpected" learning preferences.

Develop instructional activities that address multiple learning styles or that can be adapted to meet the needs of many different kinds of learners.

Leveraging Content and Social Analytics | MKTG.X417

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 | LINX.X400

2.5 Units

This course introduces the Linux operating system. Linux is gaining popularity on personal computers, devices, embedded systems and enterprise servers. This 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.

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 the development for Linux equivalent to the Certificates 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.
Outline how to configure and use Linux network capabilities

Linux Kernel and Drivers, Advanced | LINX.X413

3.0 Units
Note(s):
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

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 | LINX.X411

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

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 | O-CE0184

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 System and Network Administration | LINX.X406

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 are encouraged to have Debian Linux installed on their computer systems. Instructor will provide download and installation instructions in the first class.

Determine how to do data backup under Linux
Skills Needed: A basic knowledge of Linux, networks, or comparable industry experience.

Illustrate how to setup Web, NFS, SAMBA server service and print server
Linux System Performance in the Cloud and Data Center | LINX.X407

3.0 Units

Create shell scripts and adapt them to manage servers

Note(s):

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
Students are required to bring their own laptops to do labs in class.

Identify differences in public cloud and datacenter resource utilization that help companies on cloud migration strategies

Linux Systems Programming | LINX.X408

3.0 Units

In this course, you will explore the vital role of system calls in Linux and other systems, enabling userspace applications to connect with the kernel and perform privileged functions. System calls contribute to application and operating system compatibility and interoperability by offering a defined interface for accessing the kernel that is used for functionality. You will explore system call APIs to learn how to build interactive and service (daemon) applications that control the system and perform operations. We categorize based on the type of operation they perform: process

management and file management. Practical projects include building standard Linux applications, such as ls, cat, etc. as well as some service processes, such as ftp.

Key topics covered include I/O control, file systems, access, and locking; signal handling; process and threads management; IPC using pipes and TCP/UDP sockets. Additionally, the course will address makefiles, man pages and packaging utilities.

By the end of the course, you'll have developed a complete ftp package and mastered the implementation of client-server programs using TCP, UDP, and RPC. This course adheres to the POSIX standard, ensuring a solid foundation, while also incorporating discussions on portability considerations for BSD extensions and SVR4 differences.

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 practice of signal handling interface 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 or an embedded Linux system such as a Raspberry Pi.
Describe Process and threads management

Skills Needed: A basic knowledge of C language programming and a working knowledge of the Linux/UNIX Operating system IPC using pipes and TCP/UDP sockets

Logistics and Transportation Management | SCMT.X402
3.0 Units

Logistics management is the art of moving and storing materials from one point to another on the globe. In this course for people interested in building supply chain expertise, we study various transporting modes for products through road, rail, water, and air. Students will gain an understanding of transportation models and inventory localization which are focal points in network planning strategies. We will review the supply chain operations reference (SCOR) model with its focus on improving supply chain processes. Finally, we will discuss the increased costs of logistics resulting from the worldwide lockdown due to the COVID pandemic, and lessons learned.

Note(s):

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

Discuss makefiles, man pages and rpm/apt packaging utilities

Describe key elements of trade facilitation

Recognize international shipping terms used in the International Commercial Terms (INCOTERMS)

Analyze how global supply chains coordinate the flow of goods and services

Learn methods for network planning and transportation models

Examine the role logistics function in coordinated new product introduction

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

Management of Clinical Practice | EDTH.X306

3.0 Units

In this course educational therapists and learning 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, countertransference, and termination. Establishing and operating a successful private practice is a

interviewing parents;

developing marketing collateral such as business cards, flyers, and essential information forms; and

writing by prompt for self-discovery.

Learning Outcomes

At the conclusion of the course, you should 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

Topics Include

AET Code of Ethics

Developing Business Forms

Allied Professionals, Parents and Clients

Managing Global Supply Chains | SCMT.X405

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. Advanced modern technologies and pandemic-related changes have highlighted global interdependencies and challenges. Linear thinking of supply chain is out of date. The global supply chain is more and more a supply network.

In Managing Global Supply Chains, you'll learn how a product reaches its final destination and how the latest industry trends impact global supply chain network management. We'll cover how to make the best global sourcing decisions, choose alternatives to delivering products to customers, and ensure international supplier performance despite time zones differences.

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

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

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

knowledge of software development fundamentals and the development lifecycle.

Explain the root causes of software project troubles

Professional Credit

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

Managing the Development of New Products | PPMT.X412
Skills Needed

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

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.

Managing the HR Staffing Function | HRMT.X409

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.

It is highly recommended that students new to Human Resources begin with "Human Resource Management." After that, courses may be taken in any order.

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

Managing global requirements

Measuring performance

Professional Credit

SHRM-CP® or SHRM-SCP® 16.5 PDCs.

Marketing in Practice | MKTG.X491

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

Note

It is important that you have already successfully completed the 3 Required courses (7 units) and 3 Elective courses (6 units) 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.

Marketing Management Certificate Completion Fee | O-CE0406

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.

Math Development in Young Children | ECED.X316

2.0 Units

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.

Learning Outcomes

At the conclusion of the course, you should be able to Describe preschool through kindergarten standards for math

Describe patterns in nature and the importance of patterns in math

Discuss the value of hands-on activities for early learners

Explain relationships between math and art

Identify developmentally appropriate methods for teaching math to young children

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

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

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 conclusion of the course, you 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

Topics Include

Differences between verification and validation.

Validation planning and Master Validation Plan

How to Conduct Process Validation

Process Validation Aftermath

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

The FDA quality management system requirements and ISO 13485:2016

Please review section notes to view the full schedule.

This is an intermediate/advanced level class geared towards students and medical device professionals who work in quality engineering, product design and development, manufacturing engineering, quality assurance, quality compliance and regulatory affairs.

Medical Device Quality and Design Certificate Completion Fee | O-CE0403

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 | CTDM.X412

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.

Learning Outcomes

At the conclusion of the course, you should be able to Discuss the U.S. medical device industry and how FDA gained authority to regulate it.

Discuss FDA's jurisdiction in the design, testing, marketing and post-marketing of medical devices.

Explain the risk-based method for classification of devices and understand how to create strategies to gain access to the US market.

Define substantial equivalence, and how it is employed in evaluating medical devices.

Understand how medical devices gain access to the market.

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

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Additional Information

Please review section notes to view the full schedule.

This course will provide students with a general understanding of medical devices and diagnostics. Topics will include a review of FDA and the medical device regulatory framework, agency law, the device classification system, routes to market, pre-market submissions, and post-market requirements and interaction with FDA. The course will also touch on the requirements for human studies of medical devices

Professional Credit

CA BRN/LVN Credit - Provider #CEP13114.

Medical Writing | CTDM.X413

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.

Learning Outcomes

At the conclusion of the course, you should be able to Demonstrate the basics of effective writing, with an emphasis on the English skills required to write clearly, concisely, and effectively.

Streamline the process to go from raw ideas to finished documents.

Develop an understanding of various medical communication and regulatory documents and how they fit into a regulatory submission.

Identify and discuss writing scientific review articles, clinical study protocols, clinical study reports, investigator brochures, scientific posters, and press/news releases.

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

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Additional Information

Please review section notes to view the full schedule.

Professional Credit

CA BRN/LVN Credit--Provider #CEP13114.

Methodology of Bilingual and English Language Development | TESL.X301

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.

Learning Outcomes

At the conclusion of the course, you should be able to Acquire an understanding of the most recent theories regarding second language acquisition

Acquire a deeper understanding of contemporary approaches to language teaching and learning

Acquire an understanding of the fundamentals of lesson planning

Explore applications of research in language teaching and learning

Explore challenges facing English language learners, and develop intercultural understanding by meeting with a speaking partner

Explore the uses of technology in the classroom

Plan different types of lessons and evaluate each other's plans

Practice selecting and developing materials for language classes

Audio-lingual method

Total physical response

Natural approach

Communicative language teaching

Community language learning

Participatory approach

Silent way

Accelerated learning (Suggestopedia)

Blended Learning using online applications

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Additional Information

Please review section notes to view the full schedule.

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 Familiarity with at least one higher-level language such C++, Java, C#, Python, or PHP and Introduction to Mobile Application Development.

Common operating system functionalities

Mobile Application Development - Android and iOS, Introduction | CMPR.X421

3.0 Units

Maps and location services

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 Backend cloud services 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 Cyber security fundamentals

Memory management and performance

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

Familiarity with at least one programming language.

GUI development

Swift and Kotlin overview

Persistent data storage

Mobile e-Commerce, Fintech and Cryptocurrency | ITEC.806

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

Standards, certification, and compliance requirements

Blockchain applications, cryptocurrencies

Future trends

General understanding of e-commerce and some programming experience.

Skills Needed:

Mobile Health, SaMD, and AI/ML Devices | MEDD.X404

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 span 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 conclusion of the course, you should be able to Demonstrate knowledge of current framework for FDA 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

Topics Include

Mobile apps, SaMDs

Devices with AI/ML algorithms

Bench and clinical performance data to support premarket submissions

Elements of an SaMD 510(k)s

Clinical decision support, general wellness, MDDS, cybersecurity

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Additional Information

Please review section notes to view the full schedule.

Instructor will share articles and related material as a PDF or via website links

Formally Titled: Mobile Health: The Evolving Industry and Regulatory Landscape

Mobile Interface Design | UEWD.X412

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 design thinking and strategy principles for creating effective user interfaces for mobile devices incorporating iOS, Android Material Design, Figma, multiple prototyping softwares, AI, design systems/frameworks, user research, design thinking/strategy, cross device UX, micro-interactions, gestures, tactile experiences, sensors, 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.

Learning Outcomes

Implement working prototypes of your designs.

Learn the methods on how to explore new types of gestural touch – and gesture-based user interface that can extend the functionality of your app.

Learn how mobile products can be rapidly developed and released to the market.

Topics Include

Latest iOS and Android Material Design Human Interface Guidelines

Multiple prototyping softwares and user research

Design systems and frameworks

Responsive Design and meaningful mobile experiences

iOS and Android UI patterns

Cross Device UX, Lean Mobile UX and design thinking/strategy

Micro-interactions, flat design, and gesture experiences

Form factor user interface

Low and high fidelity mobile concepts

Storytelling workflow

Augmented reality, wearable devices, and virtual reality

Design portfolio showcasing your app

1.0 CEU's

This course takes an intensive approach to the historical, legislative, and modern-day implications of Diversity, Equity, and Inclusion. Participants will learn about the various types of diversity and their origins; the various components of cultural Equity; strategies for creating Inclusive environments; and how 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

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

Topics Include

Diversity 101

Equity 101

Inclusion 101

Allyship

Working knowledge of:

Google Workspace or Microsoft Office to submit assignments

Canvas navigation links, modules, and using the inbox to communicate with the instructor

Additional Information

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   Page #311

Understanding Oracle and MYSQL optimizer and index merge method

MySQL.

Natural Language Processing | AISV.801

3.0 CEU's

This advanced course introduces students to many aspects of natural language processing (NLP), a subfield of Artificial Intelligence (AI) focused on human language. The course includes hands-on lab work with popular open source frameworks, such as Pandas, Numpy, Keras, Hugging Face Transformers, and Pytorch and covers a wide breadth of material, ranging from traditional methods, to more recent advancements in NLP, for example ChatGPT. Students will explore natural language understanding (NLU), natural language generation (NLG), and discuss frameworks, algorithms and supervised learning.

The course will cover deep learning (DL), how DL and NLP can be combined, modern NLP architectures and language models in the BERT family. In addition, students will learn about the amazing GPT family of language models, for example GPT, GPT3, Instruct GPT, ChatGPT, and GPT4, as well as other recent advancements in generative Large Language Models (LLMs).

Students will leave the course with a wide-breadth of experience and understanding of the diverse applications of NLP in the modern world, along with the ability to program NLP methodologies in Python.

Learning Outcomes

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

Create Python code to train a supervised learning algorithm for a variety of NLP tasks

Evaluate the Transformer Architecture

Explain recent innovations in Large Language Models

Moderate level of 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/

Create Python code to fine-tune their own open source generative Large Language Model

Networking Fundamentals | LINX.X415
Skills Needed:

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 | EDTH.X312

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.

Explain the social and cultural issues related with Neurodivergence.

Discuss strategies to help neurodiverse individuals.

Design a classroom or workspace using Universal Design for Learning and accommodations.

Topics Include

Social Dynamics of Neurodivergence

Social and cultural issues related with Neurodivergence

Empowerment through Education

Neurodivergence in the workplace

Universal Design for Learning

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Developing presentations and analyzing research content

Additional Information

Please review section notes to view the full schedule.

Next-Gen Sequence Analysis Tools - A Hands-On Approach | BINF.X405

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

At the conclusion of the course, you 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

Topics Include

Public access tools used for analyzing biological sequence data

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

The concepts of molecular and cellular biology.

Additional Information

Please review section notes to view the full schedule.

Most job postings for technicians and scientists in the molecular biology field ask for experience

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

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 | SEQA.X401

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

Programming experience required in an object oriented language. e.g. Java, C++, C#, Python, etc.
Read and design using UML

Organizational Development and Change | HRMT.X401

2.0 Units
Complete real-world projects utilizing the principles of object oriented analysis an design
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, **Skills Needed:** 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

SHRM-CP® or SHRM-SCP® 19.25 PDCs.

Outsourcing and Contract Management | PPMT.X414

1.5 Units

Securing the best outside people to get things done requires strategic planning, project bidding, negotiation, and subcontractor management, especially when dealing with overseas contract manufacturing suppliers after the pandemic.

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

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

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.

Skills Needed Basic mathematics concepts and functions, including square roots and be familiar with the concepts of ratios and proportions. Should possess a grasp of elementary algebra. Also should be able to translate a verbal phrase or sentence into an expression or equation. Be familiar with basic statistical concepts or randomness, likelihood, and correlation.

Professional Credit

SHRM-CP® or SHRM-SCP® 16.5 PDCs.

Personal Development Seminar: Concepts in Next-Gen Sequence Analysis | BINF.800

A brief introduction to Bioinformatics and Next-Generation sequencing.

Topics to be discussed include:

Why sequencing is relevant to bioinformatics

How sequence information is generated.

The computational tools used for sequence analysis.

Interpreting sequence analysis results.

Additional Information

Please review section notes to view the full schedule.

This non-credit course is not a prerequisite for BINF.X405. However, this is a good course for students that are wanting to learn more about Bioinformatics and Next-Generation Sequencing.

Personal Financial Planning Certificate Completion Fee | O-CE0163

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 | FPLN.X490

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.

Apply active listening skills to client life changing and crisis events such as death, marriage, divorce, moving, change of employment, birth.

Employ the findings from Behavioral Finance to client interactions.

Understand the sources of money conflict in client's lives.

Personal Financial Planning, Survey | FPLN.X400

4.0 Units

This course provides an introduction to the field of personal financial planning. Topics include the technical content associated with a personal financial plan, such as cash flow, debt, risk management, investments, income tax planning, retirement planning, estate planning, education planning and basic concepts in economics. The course also provides an overview of topics relevant to the financial planning profession and the practice of financial planning, including the CFP Board's 7-Step Financial Planning Process and Standards of Conduct, as well as communication skills associated with building client relationships.

This course provides the basic framework of knowledge about the financial planning profession and practice areas that comprise personal financial planning.

Learning Outcomes

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

Describe the financial planning process and approaches to financial planning analysis and recommendations.

Explain behavioral finance and communication techniques used in personal financial planning.

Have a high-level understanding of the technical areas of expertise required of a CFP® professional, including risk management, investments, income tax, retirement planning, education planning and estate planning.

Discuss key economic concepts and how they may affect a personal financial plan.

Implement technical, business and communication skills utilized by financial planning practitioners.

Understand the business and regulatory environment within which the personal financial planning profession operates, including the CFP Board's Code of Ethics and Standards of Conduct, and potential career paths for a Certified Financial Planner™ practitioner.

Note(s) A financial calculator, such as the HP12-C or equivalent is required.

Physical Design Flow From Netlist to GDSII | VLSI.X408

3.0 Units

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.

For the labs, the instructor will explain the tools used primarily for the placement and route part using IC Compiler (ICC). Other tools such as OpenROAD 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)

Basic knowledge of backend design flow. Hands-on experience with Linux/Unix will be required for lab exercises.
Demonstrate the core features of IC Compiler which is used during the course

Post-Market Regulatory Obligations for Medical Devices | MEDD.X406

1.5 Units
Generate a GDS from an RTL design

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 **Skills Needed:** 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.

Learning Outcomes

At the conclusion of the course, you should be able to Describe the principal post-market regulatory obligations for medical devices distributed in the United States.

Topics Include

Complaints and Mandatory Reporting Requirements

Recalls, Corrections, and Removals

Post-approval studies & 522 Postmarket Surveillance Studies

PMA Supplements, Annual Reports, 510(k) Modifications, etc.

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Additional Information

Please review section notes to view the full schedule.

Power of Market Research | MKTG.X401

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.

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.

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.

Analyze primary and secondary data to extract pertinent information.

Make recommendations based on data collected.

Topics Include

From basic survey techniques in both primary and secondary research to an understanding of the power of statistical fact-gathering and analysis

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

Practical Design and Implementation of VLSI Memory Devices | VLSI.X417

3.0 Units

This course for new and mid-hires in the custom memory design sector reviews key technologies in VLSI design such as CMOS (complementary metal-oxide-semiconductor), and FinFET (fin field-effect) transistors, NMOS (N-type metal oxide semiconductor) transfer curve and the derivation of MOS (metal-oxide-semiconductor) current across different regions of operation. Students in this course will learn basic memory operation and principles, discuss various tools used for verification of memories, how these tools are used, how practical compiler SRAMs are built in industry, and how they are verified. By focusing on memories and tools related to verification of memories, students go from ground zero to designing and verifying memories on the job.

The class will analyze the 6T bitcell, study of bitcell stability, typical SRAM architecture and move into a detailed discussion on the decoder architecture, sense amplifier architecture and operation, and exploration of IO architectures.

We will dive into the details of the read/write timing waveforms, and timing analysis of memories using Hspice and Nanotime and discuss other verification tools such as ESPCV (logical equivalence), and fanout and noise tools. We will see how analysis corners are derived, and how memories get characterized and analyzed across these corners. Then we will discuss how compiler memories are designed and what factors go into consideration of selecting the number of entries, bits and mux (multiplexer) factors.

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

Demonstrate knowledge of 6-T bitcell fundamentals

Explain SRAM read/write operation

Demonstrate knowledge of sense amplifier operation

Demonstrate knowledge of SRAM design

Discuss the tradeoffs made in the design of SRAM compilers

CMOS transistor operation, Hspice, schematic entry with Virtuoso is a plus

Build a spice deck to measure the read current of the 6T bitcell

Practical Design with Xilinx FPGAs | EMBD.X408

3.0 Units
Build a spice deck to read and write a simple SRAM
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.

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.

Note(s):

Skills Needed: Experience with logic design of digital systems or equivalent knowledge. Familiarity with Verilog design language.

Practical DFT Concepts for ASICs, SoC and SiP | VLSI.X409

3.0 Units

Formerly "Practical DFT Concepts for ASICs: Nanometer Test Enhancements"

Testing application-specific integrated circuits (ASICs), system on chips (SOCs) and system in packages (SIP) is becoming very challenging in today's advanced process technologies/nodes. 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.

Preparing for FDA Inspections and Conducting Sponsor Audits | CTDM.X414

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.

Learning Outcomes

At the conclusion of the course, you should be able to Describe current sponsor and FDA practices expected during inspections.

Discuss how regulations and guidance are applied to improve inspection readiness.

Explain the differences between audits and inspections, sponsor responsibilities in relation to the FDA.

Identify risks in clinical trials that will be issues during a sponsor audit or FDA inspection

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

Additional Information

Please review section notes to view the full schedule.

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 | PPMT.X422

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 Include

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

Principles of Business Analysis | BUSM.X400

3.0 Units

This course provides a sound foundation in business analysis concepts and lays the groundwork for advanced studies. You'll learn the 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 tactics for 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

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. You'll see 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. Course discussion is infused with real-world examples that demonstrate the challenges that people 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.

Learning Outcomes

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

Appreciate what is involved in bringing a new drug to market, including understanding:

* How biopharma companies make decisions to advance investigational drugs from discovery through the nonclinical and clinical stages of drug development.

* The different phases and processes of clinical evaluation of investigational drugs in humans, including clinical trial objectives, trial structure, and the kinds of data generated from these studies.

* The oversight role of the U.S. Food and Drug Administration and the impact of its regulations on the evaluation of investigational drugs in humans (which comprises pharmaceutical law, compliance, Good Clinical Practice, ICH Guidances, and the bioethics underlying the conduct of clinical trials).

Obtain a sense of the science and state-of-the-art technologies underlying the discovery and development of drugs.

Develop and use critical thinking skills to consider the challenges that biopharmaceutical companies face when developing a new drug.

* Ask questions about preconceived notions and discuss the role and benefit that the biopharmaceutical industry brings to society, and offer informed criticism based on understanding their business model.

An overview of the key technologies employed to discover small synthetic and large biologic-based drug molecules such as. monoclonal antibodies

Drug targets and their validation

Key concepts related to the therapeutic use of drugs—drug safety, efficacy, risk/ benefit ratio, drug specificity, pharmacokinetics, drug metabolism— and pharmacodynamics

Clinical trial design and associated ethical considerations, trial objectives, types of trial data generated, and how these data are used to advance drugs to the marketplace

Selected drugs and their pharmacologic mechanisms of action (especially drugs related to treatment of cancer and infectious diseases such as , COVID-19, AIDS

The mechanics of conducting a clinical trial from start to finish

Oversight role of the FDA in the clinical development stage of testing drugs, drug patents and applicable pharmaceutical regulations, and FDA inspections of pharmaceutical sponsors and clinical trial sites

Job opportunities and career pathways in the biotech and pharmaceutical industry

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Microsoft Word and Excel (latest versions)

Additional Information

Please review section notes to view the full schedule.

Please make sure computers have audio and video capabilities to support online Zoom sessions

Principles of Educational Therapy | EDTH.X300

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

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 practice

List the components of educational therapy practice

Identify common ethical issues

Determine one's eligibility for meeting educational therapy standards of practice

Topics Include

Qualities of an Educational Therapist

Code of Ethics

Components of Clinical Practice

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Additional Information

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 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 | EMBD.X409

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

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

Explain simplified electromagnetic theory and physics using a visualization approach

Design printed circuit boards and systems to achieve both signal integrity and EMC compliance quickly and at low cost

Resolve almost every signal integrity and EMC problem using five simple algebraic equations instead of time consuming simulations or attempting to solve Maxwell's equations

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 line Prior experience with printed circuit and 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.
Transmission line termination

Procurement and Supply Chain Management Certificate Completion Fee | O-CE0506

Interconnects and I/O ate 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.

Electrostatic discharge protection

Product Marketing and Management | MKTG.X406

2.0 Units

Backplanes and large busses gement: Moving the Product to Market."

Miscellaneous design techniques and concepts

Skills Needed:

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

Skills Needed

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: AWS and MS Azure | IPDV.801

3.0 CEU's

Amazon Web Services (AWS) and Microsoft Azure are the leading Infrastructure-as-a-Service (IaaS) cloud providers. AWS and Azure provide 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 and Azure. The course also covers the use of both cloud services from applications and tools that run outside of the AWS and Azure clouds. We'll start with a brief overview of cloud computing focusing on IaaS. Discussions topics will include compute, storage, database, networking, messaging, monitoring, and deployment services in both of the cloud computing platforms. These services encompass AWS EC2, EBS, S3, Lambda, DynamoDB, RDS, VPC, SQS, SNS, IAMand Azure virtual machines, Blob Storage, functions, SQL database, virtual network, queue storage, service bus, and active directory.

You will practice with technologies and tools used to work with both clouds, gaining 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 such as Ruby or Python to set up and manage an AWS or Azure cloud. Students interested in a software development approach can use programming languages such as Java, C#, Ruby, or Go to develop and deploy an application that uses AWS or Azure cloud services or resides in the AWS or Azure 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 or Azure services.

Explain how to use Amazon's AWS APIs for EC2, S3, Lambda, and other services.

Explain how to use Microsoft's Azure APIs for virtual machines, BLOB storage, functions, and other services.

Topics Include

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Cloud-computing concepts: scalability, cost, virtualization, IaaS

Storage: AWS EBS, S3 / Azure Blob Storage

Database: AWS DynamoDB, RDS / Azure SQL Database

Networking: AWS VPC, Load Balancer / Azure Virtual Network, Application Gateway

Messaging: AWS SQS, SNS / Azure Queue Storage, Service Bus

Security: AWS IAM / Azure Active Directory

Skills Needed

Experience developing programs in any of Python, Java, C#, Ruby or Go.

Notes

There will be an additional cost for accessing AWS and Azure capabilities for class projects. Cost may vary but is generally low.

Project and Program Management Certificate Completion Fee | O-CE0165

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 | PPMT.X406

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

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.

Project Leadership and Communication | PPMT.X415

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,

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

Project Scheduling Essentials | PPMT.X416

1.5 Units

Formerly titled "Managing Projects with Microsoft Project." Many project and program managers try

template

Learn how to tie the three legs of the iron triangle—scope, time and cost

Set expectations with executives and teammates about what is needed from them to run a successful project and what the project managers owes each of them

Refine existing project estimates by incorporating lessons learned, estimating errors and risk

Correlate dependencies and shared resources between projects managed by different project managers

Transition generic resource assignments into persons, set their average daily effort allocation, level their workload

Correlate top down and bottoms up schedules, set the project baseline and deadline Identify risk points

Track task progress correctly and recover from delays

Use Microsoft Project at an intermediate level, if you're using it in your organization (Supplemental material)

Topics Include

What belongs in a schedule vs. a to-do or action item list. To-do list implementation in Excel

Optimum visibility: schedule detail and granularity

Iron triangle—how to represent scope time and cost mathematically

Task types and resource types—what is pre-defined, what needs estimation and what should be calculated by a tool

Milestones and recurring activities

Dates: dynamic or dependent dates and constrained dates; encoding holidays and vacations

Workload leveling

Critical path, slack, reconciling top-down/bottoms up mismatch

Recovery techniques: fast-tracking, crashing, and crunching

Reporting. Escalating with options

Psychology of Human Learning | EDTH.X308

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

Topics Include

Teaching and Educational Psychology

Learning, Cognition, and Memory

Instructional Strategies

Creating a Productive Learning Environment

Summarizing Students' Achievement and Abilities

Working knowledge of:

Additional Information

Please review section notes to view the full schedule.

Public and Analyst Relations | MKTG.X402

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 and analyst 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 or analyst 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 and the analysts that they rely on to mitigate risk. By leveraging a variety of readings, exercises, case studies and guest speakers, this course explores the power of public/analyst 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/AR basics and are interested in building comprehensive PR or AR strategies.

Learning Outcomes

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

Define public relations

Define analyst relations

Describe a comprehensive view of public relations strategy

Describe a comprehensive view of analyst 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

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 | DBDA.X420

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 clean up your data using Python with Pandas, how to make the right decisions, and how to bring order from chaos.

Learning Outcomes

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

Describe Python's underlying object model, operators, and syntax

Experience Python's straight-forward syntax, built-in data types, and object-oriented programming (OOP). Pandas, Numpy, and Matplotlib. Learning how Python's brilliant architecture allows you to jump into any of more than 300,000 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.

Use Python and relevant libraries through 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

* Collating

* Extrapolating

* Analyzing

* Dealing with timed data

* Discovering cycles useful, but not required, are a basic experience in any programming language and a rudimentary knowledge of statistics.

Matplotlib for presenting graphs

Python for Machine Learning | DBDA.X427

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. Python for using the data libraries effectively

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.

Skills Needed

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.

Basic Programming Knowledge as can be acquired in Python Programming for Beginners (CMPR.X415) and a knowledge of mathematical concepts including Statistics understanding of the mathematical concepts and tools provide powerful core packages and acquire hands-on experience.

Skills Needed:

Python for Machine Learning and Artificial Intelligence, Essentials | DBDA.X427

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.

Basic Programming Knowledge as can be acquired in Python Programming for Beginners (CMPR.X415) and a good knowledge of mathematical concepts of Statistics.

Beginners (CMPR.X415) and a good knowledge of mathematical concepts of Statistics.

Explore some of the multiple and different Earth data provided by these powerful core packages and acquire hands-on experience.

Skills Needed:

Python for Programmers | CMPR.X416

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

The Python interpreter is free software and runs on all popular platforms.

Object-oriented features: classes and inheritance

Skills Needed: Significant experience in any programming language.

Python: Object-Oriented Programming | CMPR X420

2.0 Units

Popular libraries: os, sys, copy, unittest, cProfile, optparse, unittest, shutil, tempfile, subprocess, and more

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.

Pythonic thinking: namespaces, internationalization, iterators, generators, decorators, dynamic coding, context managers

PandasAI

Note(s):

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 Basic programming experience with Python.

Python Programming for Beginners | CMPR.X415
Event-driven systems

1.5 Units

Building graphical user interface elements

Simple games

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 straightforward, 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 many 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 integrated development environment (IDE)

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 PythThe paceion this facilitateraydberslow for people who are familiar with a programming language. 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).
Work with the Python standard library

*This course includes a module on "Introducing Generative AI Assisted Programming."
Write Python programs following a specific style guide

Python Specialization Completion Fee | O-CE0509

Explore Python's object-oriented features 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.

Note(s):
Quality Management for Enterprises, Products, and Programs | PPMT.X421

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

Quality Management Systems for Medical Devices: ISO 13485 and FDA Requirements | MEDD.X407

3.0 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.

Learning Outcomes

At the conclusion of the course, you should be able to Demonstrate how the "GXPs" interrelate with each other throughout the product life-cycle.

Understand the underlying concepts and principles of the FDA QSR and ISO 13485:2016

Update on how global initiatives are impacting the regulatory environment

inspections

Identify and discuss non-compliances to the FDA QSR and ISO 13485:2016 through case studies

Conduct a critical analysis of a "real life" company and present findings to the class

Learn how to use the quality system as a tool to achieve strategic business objectives

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

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Additional Information

Please review section notes to view the full schedule.

This course was formerly titled "Medical Device Quality Systems" & "Quality Systems for Medical Devices: FDA QSR and ISO 13485"

Real-Time Embedded Systems Programming, Introduction | EMBD.X410

3.0 Units

A real-time embedded system is designed to monitor and respond to external environments within a

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

A strong background in C programming and an understanding of embedded system architecture.
Compare and contrast existing commercial RTOS for performance and applicability

Regulation of Drugs and Biologics | REGL.X403

3.0 Units

Skills Needed.
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 | REGL.X411

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. Skills Needed

To be successful in this class all students should have working knowledge of Google's G Suite or Microsoft Office, proper email etiquette, and essential understanding of Canvas.

Learning Outcomes

At the conclusion of the course, you should be able to Describe the relevant regulations involved in biopharmaceutical product development.

Discuss how companies devise development strategies and the impact of the regulatory requirements on these decisions.

Explain how the multidisciplinary requirements for biopharmaceutical product development and its impact on strategic development decisions.

Identify the key considerations required for successful biopharmaceutical product development.

Topics Include

The IND Phase

The License Application Phase

Pediatric Regulations

Regulatory Development Strategy

Notes

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 | MEDD.X408

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 conclusion of the course, you 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

Topics Include

Intro to IVDs

IVD Submissions

IVD Product Development

Special Categories of IVDs

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Additional Information

Please review section notes to view the full schedule.

This course will provide students with an understanding of the core elements in the in vitro diagnostic device industry. Topics will include a review of the European and US FDA regulatory frameworks, device classification system, routes to market, pre-market submissions, and post-market surveillance and change requirements. The regulatory approach will address the current requirements, future impending changes and what actions can be taken now to facilitate transitions. Application of quality system requirements as pertinent to IVD devices will also be covered. The course will be interactive, with student participation required, and will consist of lectures and case studies/examples, with three exams and a brief paper with references on a relevant topic of the student's choice (approved in advance by the instructor).

Regulation of Medical Devices and Diagnostics | REGL.X404

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 | O-CE0364

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 | REGL.X405

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 conclusion of the course, you 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

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Additional Information

Please review section notes to view the full schedule.

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 | DBDA.X415

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

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

Familiarity with general database concepts and ability to install software or databases on a personal computer.
Sorting and aggregating data

Risk Management for Regulated Industries | MEDD.X409
Transaction management and stored procedures
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.
Skills Needed:
Learning Outcomes

At the conclusion of the course, you 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

Topics Include

Risk Management

Annex A Characteristics

Hazard Analysis

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Additional Information

Please review section notes to view the full schedule.

Prerequisite(s): Students need to possess reasonable experience, background, and/or theoretical

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 | PPMT.X400

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

Safeguarding the Supply Chain: Best Practices in Cybersecurity | SCMT.X409

2.0 Units

Cyber attacks and data breaches are happening on a daily basis everywhere prompting the US federal government to prioritize cybersecurity threats on critical supply chain networks. While large organizations have the ability to apply tremendous resources to manage their risks, the smaller organizations don't have the same resources to put critical safeguards in place. This means risk of the supply chain relationship because large and small organizations work together in the supply chain.

In this course, we will discuss the range of cyber threats, their impact on supply chain, 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 the basic NIST cybersecurity framework and security compliances

Compare and contrast cybersecurity best practices for your workplace

Students will participate in interactive working sessions and highlight practical solutions for implementation at the workplace.

Topics Include

Cyber threats

Impact of cyberattacks on Supply Chain

National Institute of Standards and Technology (NIST) Cyber Security Framework

Cybersecurity hygiene and best practices for supply chain safety

Industry cyber compliance (NIST SP800-171, CMMC, 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"   Page #362

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

Skills needed

Knowledge and experience of Project Management, scheduling and managing schedules.

Science of Clinical Trials Design | CTDM.X415

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 hypotheses and study objectives and determine population and sample size.

Learning Outcomes

At the conclusion of the course, you should be able to List and describe the drug and device clinical trial phases

Describe various types of clinical trial designs and their application

Explain how goals and objectives of a clinical trial are established

Understand the basic statistical considerations in the design of clinical trials

Identify whether various scientifically sound trial designs can be effectively put into practice and potential pitfalls

Topics Include

Local standards of practice affecting clinical trials

Pharmacoeconomics

Working with marketing to identify unmet medical needs

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Additional Information

Please review section notes to view the full schedule.

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 | ECED.X317

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 | MKTG.X410

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

engine optimization

Understand the basics of the Google Ads advertising environment

Create and optimize your first Google Ads campaign

Social Media Marketing Fundamentals | MKTG.X415

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 Marketing and Sales 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 | O-CE0383

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.

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 | O-CE0507

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 | O-CE0520

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 Data Engineering Completion Fee | O-CE0530

Once all the requirements have been met and your final grades are posted, please enroll in the "Specialization in Data Engineering Completion Fee" to begin the review process and pay the fee. Please allow four to six weeks to receive your Specialization certificate.

Specialization in Data Science Completion Fee | O-CE0529

Once all the requirements have been met and your final grades are posted, please enroll in the "Specialization in Data Science 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 |

Specialization in DEI for Educators Completion Fee | O-CE0521

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 DevOps and Virtualization Completion Fee | O-CE0518

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 Java Development Completion Fee | O-CE0528

Once all the requirements have been met and your final grades are posted, please enroll in the "Specialization in Java 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 Lean-Agile Project Management Completion Fee | O-CE0508

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 Learning Experience Design Completion Fee | O-CE0526

Once all the requirements have been met and your final grades are posted, please enroll in the "Specialization in Learning Experience Design Completion Fee" to begin the review process and pay the fee. Please allow four to six weeks to receive your Specialization certificate.

Specialization in Mobile Application Development Completion Fee | O-CE0500

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 Professional Writing and Technical Communication Fee | O-CE0527

Once all the requirements have been met and your final grades are posted, please enroll in the "Specialization in Professional Writing and Technical Communication Fee" to begin the review process and pay the fee. Please allow four to six weeks to receive your Specialization certificate.

Specialization in Social Media Marketing Completion Fee | O-CE0505

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 in Web Development Completion Fee | O-CE0519

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.

Statistics | BINF.X404

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 Topics Include

Orientation

Descriptive Statistics

Correlation

The Chi Squared Distribution

ANOVA

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Additional Information

Please review section notes to view the full schedule.

This is not a course that is calculus based and only a beginning to intermediate algebra level of mathematical ability is required.

TI-83, TI-83 plus, TI-84 plus or virtual TI-83 (free and available on the www.drrobertknight.com (Links to an external site.)

Virtual TI-83.html TI-83 Class Notes ClassNotes.pdf

Strategic DEI Initiatives for HR Professionals | HRMT.X420

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.

It is recommended that students new to Human Resources complete the "Human Resource Management" prior to taking this course.

Learning Outcomes

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

Understand HR's role in leading DEI initiatives throughout an organization.

Gain awareness of how to interweave a DEI perspective into the HR roles and structure of an organization.

Assess how to effectively assist the implementation of initiatives by organization leaders.

Interpret today's most pertinent social issues and execute communication strategies throughout the channels of the organization with inclusive messages.

Understand the process of how to unify an organization by creating a workplace culture of inclusiveness.

Clarify the dos and don'ts of leading difficult DEI conversations.

Implement communication strategies that prevent misunderstandings leading to formal grievances.

Understand and analyze DEI initiative tracking that supports workforce engagement and productivity.

Design systems throughout to increase inclusiveness culture in organizations.

Predict systematic issues that negatively impact organizational culture.

Identify 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

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

Strategies for Learning Differences in Mathematics | EDTH.X302

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

Topics Include

Students with learning differences and math

Working Memory and Math

The Teaching of Operations

How Math Anxiety affects Learning

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

How to use a computer and the internet

2.0 Units

Data analytics, the science of analyzing raw data to make sound business decisions, has transformed supply chain network management. In this course, you learn to take advantage of the endless data available and make it useful.

We'll cover hypothesis testing, linear regression and factor analysis, and work with key computer programs needed to analyze the data. In addition to gaining an understanding and appreciation of data analytics, you will learn to apply it to make strategic business decisions in supply chain network management.

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

optimization using MS Excel's linear programming add-in, forecasting, aggregate planning, and quality tools. You will also learn 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 Outcomes

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 include

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

Learning Outcomes

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 Include

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) | VLSI.X410

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

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. 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.

Build a framework for UVM Testbench

SystemVerilog Assertions and Formal Verification | VLSI.X411

3.0 Units
Skills Needed:
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 | LINX.X417

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

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 | HRMT.X408

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

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 conclusion of the course, you 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

Topics Include

English Learners in the 21st Century

Research on Second Language Acquisition

Effective English Learner Instruction

Emergent Literacy: English as Second Language (ESL) Reading, Writing, and Reading

Please review section notes to view the full schedule.

Teaching Grammar, Level II | TESL.X309

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 details 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 conclusion of the course, you 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

Topics Include

Fundamentals of comparative grammar relevant to an ESL classroom

Verbs: Tense, aspect, mood, and modality

Nouns, articles, prepositions

Cultural aspects of language use: Usage, register, context, discourse markers

Additional Information

Please review section notes to view the full schedule.

Teaching Writing | TESL.X310

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.

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 conclusion of the course, you 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

Topics Include

Process vs. product approach to writing

Creating writing tasks for different purposes

Planning a writing lesson

Responding to students' writing (including content, organization, and grammar)

Evaluating student writing (e.g., using rubrics, checklists)

Additional Information

Please review section notes to view the full schedule.

This is a Hybrid Live-Online class (A mixture of live-online and online (self-paced) instruction or other online activities.)

For this class, you will need a google account. We will use google drive for writing and group projects. Google Drive can be accessed in Canvas through the Collaborations page. If you already have a gmail account, you can link your gmail to Canvas. If you do not have a gmail account, you can create a new gmail account and then link the account to Canvas.

You do NOT need to change your email with UC Santa Cruz.

To link your Google account with Canvas, follow the instructions on the Collaborations link in Canvas.

Technical Communication: An Introduction to the Profession | TEWR.X400

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 | TEWR.X402

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

Reviews of other writers' work

Menus, lists, headings

Your own quality checklist

Techniques of Educational Therapy: Affective, Cognitive and Perceptual Elements | EDTH.X305

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.

Learning Outcomes

At the conclusion of the course, you should be able to Understand the importance of – and how to use – current research to use and develop techniques of skill remediation as an educational therapist

Review and demonstrate a general understanding of theoretical learning theories and how they relate to different types of learning conditions

Demonstrate general understanding of how emotions can be a significant factor to the remediation of skills, skill performance, and academic esteem.

Understand how beliefs, emotions, and sensitivity can affect clients, parents, and institutions.

Review other conditions that affect the development of academic skills and performance

Analyze data gathered by Scholastic testing, psychoeducational assessment, parent and teacher questionnaire forms, and review of history to generate an educational therapy remediation program that will meet the specific needs of the client.

Topics Include

Developing an Educational Therapy Plan

Techniques for Developing Academic Affect

Modifications for the Classroom and the Home Environment

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Additional Information

Please review section notes to view the full schedule.

It is highly recommended that students find partners outside of class to work with to develop the activities based on concepts that are discussed in class.

Reading will be assigned at first class.

During this course, many objectives will be covered. Due to this large amount of information

Current technologies continue to increase efficiency through the use of tools like RFID, Internet of Things, Big Data, cloud technology, artificial intelligence, warehouse robotics, and even drone delivery. Knowledge of available technologies is imperative for supply chain professionals in today's competitive market.

It is highly recommended that students take "Evolving Role of Supply Chain Manager" as the first course prior to taking this course.

Learning Outcomes

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 include

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) | EDUC.XSC209

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

with technology. The course objectives also satisfy the state technology requirement for your credential.

EDUC.XSC209 is worth 2 CEUs, which equals 20 hours of "in-class instruction" and participation, not including homework time. The course workload has been calibrated to meet, but not exceed these parameters. The instructor reserves the right to make slight adjustments to the course schedule to best meet the needs of the students.

Learning Outcomes

At the conclusion of the course, you should be able to Use computer-based technology appropriately to facilitate the teaching and learning process in a school setting. (TPEs 1, 2, 3, 4, 5, & 6)

Gain technology competence as defined in "Standards 1:4, 3:6, 4:4, 4:8, 5:4 and 6:6 -- California Commission on Teacher Credentialing (CCTC) 2018.

Demonstrate knowledge of current basic computer hardware, software and terminology, and the use of digital tools and learning technologies across learning environments. (TPE 4:4 & 6:6)

Select and evaluate a wide array of technologies for effective use in relation to an established curriculum. (TPEs 3:6, 3:7, 4:4 & 5:4)

Demonstrate knowledge and understanding of the appropriate use of computer-based technology for information collection, analysis, and management in the instructional setting. (TPEs: 3:6, 3:7, 4:4, 5:4 & 6:6)

Demonstrate knowledge and understanding of some of the legal and ethical issues concerned with the use of technology. (TPE 3:7 & 6:6)

Topics Include

EdTech Pedagogy and Selecting Technology in the Classroom

Technology Tools for 21st Century Teaching and Learning

Digital Citizenship and Literacy

Technology to Differentiate Instruction

Preparing Technology Enhanced Lessons in The Classroom

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Please review section notes to view the full schedule.

This course is delivered online via Canvas. The course is designed to be completed asynchronously and can be self-paced and accelerated based on student proficiency levels. By keeping pace with the course outline, students can ensure that they will complete all deliverables on a timely basis with minimal procrastination and stress. Students will also be able to contribute and collaborate more fully with our community of learners.

Assignments are completed over 6-weeks. This course moves fast and it is imperative that you keep up with your assignments.

Please note that there are a variety of assignments and it is important to pay careful attention to each assignment due date as they may vary. No matter the date, all assignments are due by 11:59 pm Pacific Standard Time.

Students are expected to login to Canvas and check their email daily. Students are expected to communicate with their professor and peers with respect at all times.

Participants will also need to have a (free) google account. A significant number of the activities will be using the Google Suite for Education apps, since that is what is freely available in the majority of schools, and a google account is needed for access.

Terminating and Managing Problem Employees | HRMT.X413

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.

SHRM-CP® or SHRM-SCP® 6.5 PDCs.

TESOL Certificate Completion Fee | O-CE0409

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 | TESL.X390

5.0 Units

The practicum provides an opportunity to apply previously learned theory and methodology to the ESL classroom through supervised student teaching. In this course, students will meet with their university instructor and peers for 10 hours of seminar work. The student is required to create and deliver a short lesson to peers in the seminar. In addition, the candidate will observe an ESL classroom for 20 hours. It is in this class that the candidate will gain experience by consulting and observing the master teacher. The candidate will create and deliver two lessons (one 30 minute lesson and one 60 minute lesson) to the observed ESL class. The classroom teacher will observe and provide feedback for the 30 minute lesson and the university instructor will observe the 60 minute lesson for evaluation. Students will organize a cumulative portfolio of their certificate course work, sample student work, and other evidence of professional achievement in the TESOL Certificate Program. The university instructor will review the portfolio as part of the evaluation for the certificate.

Learning Outcomes

At the conclusion of the course, you 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

Topics Include

Evaluations and Consultations

Necessary Knowledge

To be successful in this class all students should have working knowledge of Google Workspace or Microsoft Office, proper email etiquette, and an essential understanding of Canvas.

Additional Information

Please review section notes to view the full schedule.

Prerequisite Skill(s): Completion of or concurrent enrollment in all required TESOL courses.

The Business of AI | AISV.800

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

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

Distinguish AI hype from reality in industry and diverse markets

Leverage AI in business strategy to unlock new opportunities, differentiate and innovate

Identify opportunities to apply AI in your own business or a use-case to deliver tangible business value and outcomes

Navigate ethical and societal implications of AI and enterprise AI governance

Describe successful AI delivery organizations with business stakeholders

Summarize the AI project implementation lifecycle

Create an enterprise AI program end-to-end implementation to gain an operational view of an AI project

The Internet of Things: Big Data Processing and Analytics | EMBD.X412

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

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 software installation and some programming experience in C, Java or Python (one of the three) is required.

Skills Needed:

The Internet of Things: Sensors, Platforms, Communications, and Applications | EMBD.X413

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 and security. 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

This course is project based and requires the purchase of several sensors and IoT hardware platforms (about $250, not included in the tuition). Detailed board information will be provided at the first class. Students are required to bring laptops to class.

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

Skills Needed: Familiarity with embedded system hardware. Programming experience with a high-level language like C, C++, Python, Perl, or Java. Familiarity with networking concepts. Some practical electronics or electrical engineering experience is beneficial, but not required.

Timing Closure in Silicon IC Design | VLSI.X414

3.0 Units

As manufacturing integrated circuits becomes increasingly complex in the sub nanometer process technology, the timing closure of designs such as ASIC, FPGA, GPU, and SoC becomes more challenging.

In this course you will learn about all stages of physical design including RTL for logic changes and the standard industry practice of performing a static timing analysis (STA) on the design before signing off to manufacturing.

We will begin with the basic timing concepts and a tool agostic STA methodology, introducing you to setup/hold timing. We'll explain how to fix violations in the design and you will learn what needs to be timed and how to set up and execute STA flow. The course exposes students to constraints, exceptions and what-if analysis. We also explain how to address timing violations in ECO mode.

Advanced technology topics include noise analysis, prevention and on-chip variations. The instructor will share practical experiences meeting timing closure, budgeting, and debugging. Students will explore design tools and practice on test cases. Design engineers completing this course will be able to perform static timing analysis using Primetime, OpenROAD, 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

Linux/Unix skills are required for lab exercises.

Write ECOs

Understanding Learning Differences | EDTH.X309

3.0 Units

Explain how to fix critical timing paths

This course helps professional educators, counselors, educational therapists, and parents

Define miscellaneous terms such as PVTs, OCV, CRPR, Noise, etc.

Skills Needed:

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.

Topics Include

Neuroplasticity

Introduction to Learning Differences

Processing Differences, ADHD and Executive Functioning

Reading, Math, and Dyslexia

Autism Spectrum and Social Cognition

Learning Differences and Social Justice

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Usability Testing Documentation | TEWR.X417

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 | O-CE0613

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 | UEWD.X415

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.

Learning Outcomes

At the conclusion of the course, you should be able to Select and use design tools appropriately

Practice appropriate research techniques

Apply learnings from cognitive psychology

Select and use design methods effectively

Collaborate as designers in a team

Apply global design principles across domains

Present and share their work with others

Clearly codify and document their design ideas and solutions

Topics Include

Design Thinking

Design Methods and Strategies

Applying Design Principles

Research Methods

Working knowledge of:

User Experience Design Fundamentals | UEWD.X414

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 multidisciplinary 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.

Learning Outcomes

At the conclusion of the course, you should be able to Apply the User Centered Design process with respect to creating web sites and applications

Develop a reasonable library of design methods and strategies including a design "vocabulary".

Analyze the business needs of a website

Develop a design that will enable users to accomplish their goals at the website

Topics Include

Knowing the User, Intelligence Gathering

Idea Generation Methods and Strategies in Design

Application of Design Principles

Evaluating Prototypes, Iterations, User-Research

similar program). You will need access and some experience using.

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.

Additional Information

Please review section notes to view the full schedule.

Validating Software for Medical Devices and Emerging Technologies | MEDD.X410

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. Students engage in interactive classroom discussions and an in-depth survey of the regulations, guidance documents and standards specific to medical device software and validation.

You will work on a project designed to help you 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. Overall, you will learn how to create these types of documents and activities while also learning the regulatory requirements and expectations for software used in the medical device industry. Learning Outcomes

At the conclusion of the course, you 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

Topics Include

FDA Regulated Software, Regulations, Guidance Documents and International Standards

Detailed look at IEC 62304

Software Validation Planning and Strategy

Digital Health

Working knowledge of:

Google Workspace or Microsoft Office to submit assignments

Canvas navigation links, modules, and using the inbox to communicate with the instructor

Additional Information

Please review section notes to view the full schedule.

Most required tools and materials are available on the FDA website for free.

Value-Added Quality Audits | REGL.X407

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 conclusion of the course, you 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

Anatomy of the Audit Process

Attributes of a Good Auditor

Auditor Strategies

The Communication Process

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

MEDD.X407 " Quality Systems for Medical Devices: ISO 13485 and FDA Requirements" or equivalent experience.

Additional Information

Please review section notes to view the full schedule.

Most of the class materials provided via Canvas

Viruses, Vaccines and Antiviral Therapy | BTEC.X413

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.

Learning Outcomes

At the conclusion of the course, you should be able to Appreciate viruses as a part of our natural environment.

Obtain a sense of the complex dynamics between viruses and their hosts.

Recognize how viruses employ different strategies to multiply and spread from human to human.

Understand the impact of viral diseases on human health and society (i.e., how viral disease has impacted human history).

Learn what can be done to prevent and treat common viral infections and understand the benefits and risks associated with virus vaccines and antiviral drugs.

Have sufficient knowledge to contribute to current discussions about viruses affecting human populations today (e.g., COVID-19, Ebola, West Nile, Dengue, and Chikungunya viruses).

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.

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Molecular biology or the desire to appreciate the significance of viruses in real-world settings is sufficient for this course

Additional Information

Please review section notes to view the full schedule.

Course evaluation consists of a take home exam and an independent writing assignment. Some knowledge of molecular biology is useful, although a desire to appreciate the significance of viruses in real-world events is sufficient. This course will benefit individuals preparing for career advancement in both clinical and industry roles.

Professional Credit

Professional Credit: CA BRN/LVN Credit--Provider #CEP13114, 15.0 hours

Visual Design for Digital Media | UEWD.X416

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.

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.

Learning Outcomes

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

Topics Include

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

Introduction to design systems and design languages

Working knowledge of:

Communication and collaboration tools such as Google Workspace, Microsoft Office, or LibreOffice

Learning Management Systems (LMS) such as Canvas including navigation links, modules, etc.

Adobe Illustrator, Introduction; UX Design Fundamentals

Additional Information

Please allow 4-6 weeks to receive your certificate.

Web and Mobile Analytics | MKTG.X412

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 | IPDV.802

2.0 CEU's

In the front-end world, React Framework is the undisputed king; learning it prepares you to build complex Web Applications and helps with an easy transition to React Native, a native cross-platform framework for mobile applications. This unique course is designed to prepare you to build production-ready React applications. It covers React fundamentals and techniques, and patterns that would help you make those critical decisions for a successful product release.

This course is for those new to front-end development and want to get a high-paying job by cracking the coding interview. This course is also for those already working on React who wish to understand the fundamentals, learn common coding patterns for a fast development cycle without sacrificing maintainability and become a senior/architect developer.

Learning Outcomes

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

Implement complex interactive web applications with the backend support using React.js and Redux.

Implement scalable web applications using TypeScript.

Virtual DOM

How to break down your application into manageable components

css-in-js using styled-components

All the inbuilt React Hooks, including recently introduced ones such as useTransition, useDeferredValue, and useId

How to create custom Hooks

Global state management using Redux and React Query

Localization with i18Next

Experience with JavaScript and basic understanding of HTML and CSS.

This is a hands-on coding class; students are required to bring laptops to class.

Writing Unit Tests using Jest and React Testing Library

Web Applications Testing, Comprehensive | SEQA.X405

3.0 Units
Writing End-to-End tests using Cypress
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 **Skills Needed:**ng 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 web driver to develop automated tests

Develop tests targeting JavaScript applications

Understand and test REST based web services

Implement performance and load testing for web sites

Skills Needed:

Experience developing with HTML and CSS required.

Web Framework Using JavaScript: The MERN Stack | IPDV.803

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 MERN stack (MongoDB, ExpressJS, React, 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 MERN 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 React and Hooks on the client side. The client-server communication is through RESTful API. Class assignments and projects will give you hands-on experience.

Prior to enrolling, students should be familiar with JavaScript and understand database basics. The course covers only the essential parts of the MERN 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 web application stack end to end

Explain the basics of building reusable web components

Create back-end code using Node.js, ExpressJS, and MongoDB

Apply the RESTful API standards

Topics Include

Introduction to the MERN stack

Building the Node.js server

Connecting MongoDB and Node.js

Interacting with MongoDB using Mongoose

Configuring and using Express in a Web app

Implementing RESTful API using Express in Node.js

Understanding React principles

Implementing React application

Understanding the front-end state management using context and hooks

Wireless Communications and Mobile Antenna Design, Introduction | EMBD.X419

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.

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 Conflict Resolution and Mediation | HRMT.X419

3.0 Units

In today's dynamic and diverse professional landscape, effective conflict resolution skills are essential for fostering a harmonious and productive work environment. Within this introductory course, designed specifically for working professionals, you'll gain insights into handling employee's interpersonal conflicts. You'll also learn techniques to support your staff to effectively resolve workplace and group conflicts.

We will explore conflict resolution and mediation approaches to identify the most effective interventions to facilitate employee conflict resolution. Through a combination of engaging lectures, interactive discussions and practical exercises, you'll acquire essential skills to effectively manage conflicts.

This course is ideal for managers, team leaders, human resource professionals, project managers, and anyone interested in fostering a healthier, more collaborative work environment.

Learning Outcomes

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

Understand the role conflict management techniques and how mediation plays in the resolution of disputes

Identify and implement strategies for preventing or defusing rising conflict

Recognize how mediator and party biases and cultural differences can affect the resolution process

Understand the mediation process when participating in a EEOC mediation

Topics Include

Core concepts of workplace conflict

De-escalation mediation techniques

Workplace Investigations | HRMT.X415

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.

SHRM-CP® or SHRM-SCP® 6.5 PDCs.

Writing Successful Instructions, Procedures and Policies | TEWR.X403

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

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

Grades are issued for the entire class approximately two weeks after the scheduled end date.
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.