For every creative risk we take, we’re given a thousand reasons not to take the next step.

At UCSC Extension, we’re here to challenge the voices of:

Why not?

Innovate
Discover
Inspire
Lead
You’re Invited

JOIN US FOR FREE INFO SESSIONS HOSTED BY STAFF TO LEARN ABOUT OUR PROFESSIONAL EDUCATION PROGRAMS. RESERVE YOUR SEAT TODAY.

March 2017

22 WEDNESDAY
- USER EXPERIENCE AND WEB DESIGN

23 THURSDAY
- INFORMATION TECHNOLOGY AND DATABASE AND DATA ANALYTICS

24 FRIDAY
- SOFTWARE DEVELOPMENT PROGRAMS

27 MONDAY
- EMBEDDED SYSTEMS AND VLSI ENGINEERING PROGRAMS

28 TUESDAY
- EARLY CHILDHOOD EDUCATION
- EDUCATIONAL THERAPY

29 WEDNESDAY
- BIOSCIENCES PROGRAMS

30 THURSDAY
- INSTRUCTIONAL DESIGN AND DELIVERY
- TESOL

April 2017

ONLINE APRIL 3
- TECHNICAL WRITING AND COMMUNICATION

AVAILABLE UNTIL MAY 26

May 2017

22 MONDAY
- BIOSCIENCES PROGRAMS

Learn about our programs, network with working professionals and gain valuable insight from experts in your field.

Sign up now at ucsc-extension.edu/events.

What’s keeping you from scoring a home run? At UCSC Silicon Valley Extension, we understand how scary it can be to step up to the plate, regardless of your years on the field. Wherever you are in your career, we see you. We see you longing to launch a new product, develop an app, refresh your teaching, or take your company public. When you’re ready to take the next step, so are we. Join us to see how our UC-quality courses can prepare you to go the distance.

Courses enroll weekly. Copyright © 2017 The Regents of the University of California. All rights reserved.

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Facebook: ucsext
Twitter: @UCSCExtension
LinkedIn: ucsc-extension-in-silicon-valley
All content correct at time of printing but subject to change, please check website.
We face trying times.

In a land as multi-faceted as it is varied, a statement was made that certain individuals are no longer welcome within our borders. This country, built for and by immigrants, seems to have turned its back on one of the core values that make it great— inclusion.

Now, more than ever, we must present a united front against the spirit of divisiveness invading our country. The University of California opens their doors to any and all individuals who seek to learn and experience the much-vaunted “American dream.” This dream has no exceptions based on race, color, or creed, and we are committed to seeing this dream realized.

As UC President Janet Napolitano states, “The UC community, like universities across the country, has long been deeply enriched by students, faculty, and scholars from around the world, including the affected countries, coming to study, teach, and research.”

At UCSC Silicon Valley Extension, we are acutely aware of the immense value brought to us by our international students. These are the individuals who go on to found the startups that improve our quality of life, teach our future doctors and lawmakers, and continuously innovate and drive this country to higher heights.

We stand with you.

We host a multitude of programs geared to helping students, foreign or domestic, better themselves. Our International Program is first-rate, even offering preparation courses for non-English speakers that allow you to segue directly into the certificate program of your choice, without having to take a TOEFL or IELTS exam.

The world is becoming more interconnected by the day. Companies are extending their reach across borders to attract top talent and meet growing global demand. As the world becomes flatter, you will need to exhibit a highly applicable skillset and relevant experience to increase your likelihood of being hired. We offer that experience via our courses—taught by industry professionals—and internship programs that afford you the opportunity to actually work for local Silicon Valley companies.

Here, you will find the tools necessary to build a life for yourself—a life of service to all mankind, without exception.

Regardless of who you are; if you want an education, you can get one here.

Sincerely,

Lynda M. Rogers, Ed.D.
Dean, UCSC Silicon Valley
Areas of Study

CERTIFICATE PROGRAMS

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Continuing Professional Education for Licensing, Credentials, Certification

Many courses at UCSC Silicon Valley Extension offer credit and/or continuing education units that apply toward professional licensing, relicensing or accreditation, professional teaching credentials and credential renewals, or prepare you for a certification exam.

To locate courses that apply to your professional field, please consult the list below.

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WHERE THOUGHT LEADERS COME TO LEARN.
Welcome to UCSC Silicon Valley Extension

Accreditation
As part of the University of California, Santa Cruz, UCSC Silicon Valley Extension is certified by the Accrediting Commission for Senior Colleges and Universities of the Western Association of Schools and Colleges (WASC).

Mission Statement
**UCSC SILICON VALLEY EXTENSION** combines the academic excellence of the University of California with the expertise of seasoned practitioners to provide advanced professional training that addresses the real-world needs of people who work and live in Silicon Valley.

Goal
**YOUR SUCCESS IS OUR SUCCESS**
We want to make your path to career success as smooth as possible. Our courses are designed to help you discover the skills necessary to navigate a career transition, a job promotion or a change in field.
By opening this catalog, you’ve taken the first step toward advancing your career.

About Us
UCSC Silicon Valley Extension focuses on providing professional education stewarded by Program Chairs in the following departments:

**BIOSCIENCES**
**BUSINESS & MANAGEMENT**
**EDUCATION**
**ENGINEERING & TECHNOLOGY**

**THE VALUE OF A UC CERTIFICATE**
UCSC Extension’s professional courses, and subsequent certificate programs, were crafted to support the business needs and interests of lifelong learners located in the heart of Silicon Valley. Developed with guidance from key industry leaders and academic experts, these programs present University of California-approved curricula that address the specific requirements of the discipline. Programs take a practical approach, and are structured to accommodate working professionals. When studying with us, you’ll interact with students and instructors who work in some of the region’s top companies. Thousands of Silicon Valley professionals have studied with us and gone on to successful careers.

We make it easy for residents all over the South Bay to continue their education. The majority of our courses are offered during the evening hours and on weekends. Once enrolled Extension students can choose to study in a few different ways:

- in state-of-the-art labs and classrooms at our Santa Clara location;
- online, via our dynamic learning platform;
- and in hybrid courses, which offer a combination of classroom meetings and online learning.

**AMENITIES**
Take advantage of our computer labs, student lounges, wifi access and free tea and coffee. Our facility is conveniently located off Highway 101, just south of Great America and Levi’s Stadium, in Santa Clara. We are located opposite Santa Clara Square, which offers new establishments that make time spent with us on site all the more enjoyable.

---

**About You**

**ELIGIBILITY**
Our courses are offered as open enrollment; open to everyone and no application is required. Though prerequisites vary by department, you need not be a UC Santa Cruz student to enroll.

**CONCURRENT ENROLLMENT**
In addition to professional development courses, UCSC Extension supports concurrent enrollment students (also referred to as Open Campus). You can take classes to fit your time and needs. See page 103 for full details.

**INTERNATIONAL STUDENTS**
International students will be interested in our visa approved programs and internship opportunities. See page 96 for full details that fit your needs.

**FINANCE**

*Pay-as-you-go:* You may pay for courses one at a time. No upfront investment is required.

**What to ask yourself before enrolling:**

i. Am I interested in enrolling in a specific course or pursuing a certificate?

ii. Which courses work best with my schedule?

iii. What delivery mode is available?
   - CLASSROOM
   - ONLINE
   - HYBRID: MIX OF CLASSROOM AND ONLINE

iv. Do I meet the minimum requirements or prerequisites for this course or program?
   - Program and course requirements vary.

v. Do I qualify for course exemptions or transfer credit?

vi. Am I ready to Declare Candidacy in a certificate?

vii. How would I like to purchase a course?
   - Do I qualify for retraining assistance or federal aid?

**Where To Start:**

It is easy to enroll online, in person, or over the phone. Please note that some courses have prerequisites that provide a foundation for a complete learning experience.

If you are seeking a more comprehensive educational experience, explore our certificate programs. Certificates are composed of UC-approved courses organized by departments in specific disciplines. In order to earn a certificate, you must earn a cumulative grade point averages of 3.0 or higher.

**You enrolled in a course. Now what?**

i. Have I gotten my textbooks? See page 100 to learn about our Amazon partnership.

ii. Have I accessed or downloaded my course materials? You may access your course materials starting 24 hours before your course begins.

iii. Am I familiar with the grade policy?

iv. Am I interested in transferring credit from another institution?

v. What happens if I need to drop a class or seek a refund?

vi. What is the UCSC Code of Conduct?

vii. What are the UC policies?

**Simply turn the page and begin…**

NOTES: Full details are found in the General Information & Academic Policy section which starts on page 98.
“The function of education is to teach one to think intensively and to think critically. Intelligence plus character—that is the goal of true education.”

DR. MARTIN LUTHER KING, JR.

Quick Guide

I

What to consider:
Research classes and interests.

Are you looking at:

(A) individual courses
or
(B) pursuing a certificate

II

Review schedules:
Specific dates and times are online.

III

Review prerequisites:
Knowledge base or required courses.

IV

How our system works to your benefit:
Declare candidacy in a certificate.

Enroll:
Pay-as-you-go; Pay only for the courses you enroll in that fit your schedule.

• Enrollment confirmation is sent via email.

V

VI

Once you’ve enrolled:
24-hours before your course begins,
access your course materials.

NOTE: Full details are found in the General Information & Academic Policy section which starts on page 98.

Enroll NOW

Online: Visit our website at ucsc-extension.edu.

Credit Card: We accept the following major credit cards: Visa, MasterCard, American Express and Discover.

By Phone: Call (408) 861-3700.
LOCATE US:
3175 Bowers Avenue
Santa Clara, CA 95054
Driveway entry is on Scott Blvd.

Visit our website at ucsc-extension.edu for updated information and to enroll online.
CONTACT US:

**PROGRAM OUTREACH**

*new* students
extension program@ucsc.edu
408.450.3860

**STUDENT SERVICES**

*current* students
extension services@ucsc.edu
408.450.4920

**ONLINE SERVICES**

*online* students
extension online@ucsc.edu
408.861.3832

**INTERNATIONAL DEPARTMENT**

*international* students
extension international@ucsc.edu
408.450.4945

M-F: Appointments are recommended for meeting with staff*.  

Ray Porras  
International Student Advisor  
Kathy Harrington  
International Student Advisor, OPT Specialist  
Diane Johansen  
International Student Advisor, Internship Coordinator  
Michael Mrache  
Director of International, WDB

---

**SERVICE CENTER HOURS**

M-F 8 am–9:30 pm
Saturday 8 am–5 pm

**feedback & comments**
extension feedback@ucsc.edu

---

 grades
extension grades@ucsc.edu

 drops (deadline restrictions apply)
estension drops@ucsc.edu
FORMS: ucsc-extension.edu/drops

 transcripts
extension transcripts@ucsc.edu
FORMS: ucsc-extension.edu/student-services/transcript-info

---

*Business days are 8 am–5 pm, Monday through Friday, not including holidays. Administrative staff availability is best between 8:30 am–4:30 pm. Service Center support is available throughout the day and while classes are running. The Service Center is located in the corridor next to reception.

NOTE: Full details are found in the General Information & Academic Policy section which starts on page 98.
BHAVNA DIXIT  
Biotechnology Student

Bhavna Dixit worked as a biotechnology research scholar in India before moving to California in 2015. Armed with a master’s degree in biotechnology and work experience abroad, she started researching programs that could prepare her to work in the Bay Area. She enrolled in UCSC Extension’s Biotechnology certificate program and within nine months had completed her course work and an internship, and had been hired as a research technician in Silicon Valley.

Courses Reflect Industry Needs

“I was excited to see that UCSC Extension offers ‘Next Generation DNA Sequencing: Methods and Applications,’ because there aren’t many programs in the Bay Area that cover that topic,” she says. “When I was interviewing for jobs, I discovered that many recruiters seek candidates who are familiar with NGS. I also liked the ‘Molecular Diagnostics’ course, because I had no experience in that area, and was eager to learn new skills.”

She was able to use her new skills at her internship, where she did molecular research related to gene therapies for age-related diseases.

“In our diagnostics course, we had to design a practical experiment for a fictional company—we even had to design a kit for a particular diagnostic,” she says. “This helped me understand the tactical challenges that companies face, and it was really helpful.”

Practical Applications

“In the ‘Drug Development’ course, our instructor taught us about the various challenges scientists have when bringing a drug to market and shared his real-life experiences in industry,” she says. “No book can teach you that. The program covered everything.”

Tell Us Your Story

We’d love to hear how you applied new skills in the workplace, or how your new credentials led to exciting job opportunities. Share your latest achievements by submitting your Extension story to extensionfeedback@ucsc.edu.
Bioinformatics

Certificate Program

Bioinformatics

CERTIFICATE CONTACT
Applied and Natural Sciences Department, (408) 861-3860, or email extensionprogram@ucsc.edu.

PROGRAM SUMMARY
Biological data continue to accumulate at a phenomenal rate. UCSC Extension’s Bioinformatics Certificate Program was created in consultation with industry leaders to meet the need for biologists and computer scientists with the ability to analyze and interpret this deluge of biological information. Courses in this program are taught by experienced molecular biologists and bioinformatics professionals who bring real-world perspectives and cutting-edge technologies into their classrooms.

The Bioinformatics Certificate provides theoretical foundations and practical skills in bioinformatics. The required courses provide the necessary computational and scientific foundations. A range of electives allows individuals to tailor their studies to their particular needs and interests. Life scientists learn how to effectively use the tools and methods of bioinformatics to enhance their work, while computer scientists gain a background in molecular biology and important bioinformatics methods and tools.

This program is designed for students who have a degree in biology, biochemistry or computer science who want to enrich their careers by learning and applying the key principles and practices of bioinformatics.

CERTIFICATE REQUIREMENTS
To satisfy the requirements for the Certificate in Bioinformatics, you must complete three required courses and 7 units of electives, for a minimum total of 16 units. For GPA requirements and program time limits, see page 98.

To pursue two bioscience-related certificates in parallel or in sequence, see page 13.

PREREQUISITES
Familiarity with the principles of modern molecular biology is required. Completion of "Molecular Biology, Introduction" or an equivalent course within the last five years, or equivalent experience satisfies this requirement. An understanding of probability and statistics is required for "Statistical Analysis and Modeling for Bioinformatics and Biomedical Applications." Students without this background should first complete "Statistics" or the equivalent prior to taking "Statistical Analysis and Modeling for Bioinformatics and Biomedical Applications."

RECOMMENDED COURSE SEQUENCE
Those new to the field of bioinformatics should start with “Bioinformatics Tools, Databases and Methods” and/or "Experimental Methods in Molecular Biology" (after completing the prerequisites). Courses may then be taken in any sequence unless otherwise specified in the individual course description.

COURSES MAY BE TAKEN INDIVIDUALLY OR AS PART OF THE CERTIFICATE PROGRAM.

FOR MORE INFORMATION
Current and future course schedules can be found at ucsce-extension.edu/biosciences. For more information on this program or to be added to our mailing list, please call (408) 861-3860 or contact extensionprogram@ucsc.edu.

PROGRAM CHAIR
Bioinformatics and Biotechnology

EDWARD ROZHON, Ph.D, has a long and distinguished career as a contributor to the development of drugs for viral and bacterial diseases, autoimmune diseases, and cancer. Dr. Rozhon recently retired from Genentech where he was a senior manager of clinical trials for autoimmune, infectious and ophthalmologic diseases. He worked at Schering-Plough and Roche. Dr. Rozhon completed his Ph.D. at Indiana University and pursued post-doctoral training in neurovirology at the University of Alabama School of Medicine and at Northwestern University School of Medicine, where he was subsequently appointed as faculty. He has taught courses in drug development and virology at UCSC Extension for 16 years.
BIOINFORMATICS CERTIFICATE

16-unit minimum

<table>
<thead>
<tr>
<th>PREREQUISITE COURSES</th>
<th>Units</th>
<th>Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>Molecular Biology, Introduction</td>
<td>3.0</td>
<td>4213</td>
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<tr>
<td><strong>AND</strong></td>
<td></td>
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<tr>
<td>Statistics</td>
<td>5.0</td>
<td>23588</td>
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<tr>
<th>REQUIRED COURSES (3)</th>
<th>Units</th>
<th>Course</th>
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</thead>
<tbody>
<tr>
<td>Bioinformatics Tools, Databases and Methods</td>
<td>3.0</td>
<td>2447</td>
</tr>
<tr>
<td>Experimental Methods in Molecular Biology</td>
<td>3.0</td>
<td>1912</td>
</tr>
<tr>
<td>Statistical Analysis and Modeling for Bioinformatics and Biomedical Applications</td>
<td>3.0</td>
<td>1032</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>ELECTIVE COURSES (7 units required)</th>
<th>Units</th>
<th>Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>Take required courses before electives.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DNA Microarrays: Principles, Applications and Data Analysis</td>
<td>3.0</td>
<td>2183</td>
</tr>
<tr>
<td>Drug Discovery, Introduction</td>
<td>3.0</td>
<td>4853</td>
</tr>
<tr>
<td>Gene Expression and Pathways</td>
<td>2.0</td>
<td>6020</td>
</tr>
<tr>
<td>Genomics and Next Generation DNA Sequencing: Methods and Applications</td>
<td>3.0</td>
<td>30330</td>
</tr>
</tbody>
</table>

Any one course from UCSC Extension’s Biotechnology Certificate may be applied toward the elective unit requirement for the Bioinformatics Certificate Program.

Certificate schedule outline of program curriculum and annual schedule are found online. From the homepage, select: “Area of Study”; department; then certificate title as listed above.

Statistics
AMS.X400.102 (5.0 quarter 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.

Prerequisite(s): “Molecular Biology, Introduction.”
Guido Bordignon, M.S., Ph.D.

ONLINE | April 4–June 30
Enrollment accepted through May 25.
Fee: $860.
To enroll, use Section Number 23588.(023)

Required Courses
Experimental Methods in Molecular Biology
NATSC.X446.5 (3.0 quarter units)
This lecture-based course 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. Topics include gene cloning, manipulation and sequencing, PCR, RNA interference, gene expression analysis, protein expression, engineering, and structure determination and the fundamentals of experimental design. You’ll also learn about high-throughput sequencing and microarray expression analysis and the types of data these techniques generate.

Prerequisite(s): “Molecular Biology, Introduction.”
Guido Bordignon, M.S., Ph.D.

ONLINE | April 4–June 30
Enrollment accepted through May 25.
Fee: $765.
To enroll, use Section Number 1912.(053)

Elective Courses
DNA Microarrays: Principles, Applications and Data Analysis
For course description, see page 15.

Drug Discovery, Introduction
For course description, see page 14.

Gene Expression and Pathways
NATSC.X426.2 (2.0 quarter units)
This course provides a solid foundation in the molecular concepts and cutting-edge technologies that are central to the study of gene expression pathways in simple cells (prokaryotes) and complex multicellular organisms. You will learn about abnormalities in gene expression pathways and how they relate to human diseases, including viral, immune and metabolic diseases, as well as cancer. The course also discusses 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.

Prerequisite(s): “Molecular Biology, Introduction.” Prior molecular biology course work or background is strongly recommended.

Lamia Wahba, Ph.D.

CLASSROOM WITH ONLINE MATERIALS
5 meetings | 6–9:30 pm | April 11–May 9; and 9 am–4:30 pm | May 13
Fee: $715.
To enroll, use Section Number 6020.(028)

Genomics and Next Generation DNA Sequencing: Methods and Applications
For course description, see page 15.

Visit our website at ucsc-extension.edu for updated information and to enroll online.
Biotechnology

Certificate Program

Biotechnology

PROGRAM CONTACT
Applied and Natural Sciences Department, (408) 861-3860, or email extensionprogram@ucsc.edu.

PROGRAM SUMMARY
The Bay Area is a leader in the global biopharmaceutical industry, with local companies and research institutions setting the pace in the discovery and development of biopharmaceuticals to target major unmet medical conditions, such as cardiovascular disease, cancer, AIDS and other degenerative diseases.

The Biotechnology Certificate equips professionals with a rich background in the principles, processes and technologies central to biotechnology. This combination of general and practical knowledge enhances the skills of professionals currently working in this industry and helps prepare others to enter this dynamic field. The certificate program provides a solid understanding of the scientific disciplines that underlie the industry’s activities, a foundation in the principles that guide drug discovery and development, an appreciation of cutting-edge bioscience research and technology, and a broader awareness of today's biopharmaceutical industry.

This program benefits professionals from all disciplines who want to develop a solid scientific foundation in the principles and applications of biotechnology, in order to work more effectively in or transition into the biopharmaceutical sector.

CERTIFICATE REQUIREMENTS
To satisfy the requirements for the Certificate in Biotechnology, you must complete the four required courses as indicated in both Core A and B, and 8 units of electives from the disciplines central to biotechnology. This combination of general and practical knowledge enhances the skills of professionals currently working in this industry and helps prepare others to enter this dynamic field. The certificate program provides a solid understanding of the scientific disciplines that underlie the industry’s activities, a foundation in the principles that guide drug discovery and development, an appreciation of cutting-edge bioscience research and technology, and a broader awareness of today's biopharmaceutical industry.

This program benefits professionals from all disciplines who want to develop a solid scientific foundation in the principles and applications of biotechnology, in order to work more effectively in or transition into the biopharmaceutical sector.

To pursue two bioscience-related certificates in parallel or in sequence, see box item below.

PREREQUISITES
Familiarity with the principles of modern molecular biology is required. Completion of “Molecular Biology, Introduction” or an equivalent course taken within the last five years, or equivalent experience satisfies this requirement. Please direct questions about the suitability of a prerequisite to extensionprogram@ucsc.edu.

For those new to the industry, we recommend that “Biotechnology Basics for Non-Scientists” be taken prior to starting other course work.

RECOMMENDED COURSE SEQUENCE
We recommend that you begin with “Drug Discovery, Introduction” or “Drug Development Process.” After that, you may take courses in any sequence, unless otherwise specified.

COURSES MAY BE TAKEN INDIVIDUALLY OR AS PART OF THE CERTIFICATE PROGRAM.

FOR MORE INFORMATION
Current and future course schedules can be found at ucsc-extension.edu/biosciences. For more information on this program or to be added to our mailing list, please call (408) 861-3860 or contact extensionprogram@ucsc.edu.

Learn More for Less
Do you know that you can complete two bioscience certificate programs at UCSC Extension, simultaneously or in sequence, with fewer units than if the programs were taken individually?

Students pursuing two certificates need to complete the total number of units indicated in the table below, including all the required courses for both programs. In order to obtain two certificates with the fewest number of units, students must select some electives that are common to both programs. Please contact extensionprogram@ucsc.edu or call (408) 861-3860 if you need more information or would like assistance creating a study plan.

<table>
<thead>
<tr>
<th>Program</th>
<th>Biotechnology</th>
<th>Clinical Trials</th>
<th>Medical Devices</th>
<th>Regulatory Affairs</th>
<th>Bioinformatics</th>
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<tbody>
<tr>
<td>Biotechnology</td>
<td>19 units</td>
<td>32 units</td>
<td>31 units</td>
<td>32 units</td>
<td>30 units</td>
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<tr>
<td>Clinical Trials</td>
<td>32 units</td>
<td>19 units</td>
<td>31 units</td>
<td>32 units</td>
<td>X</td>
</tr>
<tr>
<td>Medical Devices</td>
<td>31 units</td>
<td>31 units</td>
<td>17 units</td>
<td>31 units</td>
<td>X</td>
</tr>
<tr>
<td>Regulatory Affairs</td>
<td>32 units</td>
<td>32 units</td>
<td>31 units</td>
<td>19 units</td>
<td>X</td>
</tr>
<tr>
<td>Bioinformatics</td>
<td>30 units</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>16 units</td>
</tr>
</tbody>
</table>
BIOTECHNOLOGY CERTIFICATE

19-unit minimum

PREREQUISITE COURSE | Units | Course
--- | --- | ---
Molecular Biology, Introduction | 3.0 | 4213

REQUIRED COURSES A AND B (four) | Units | Course
--- | --- | ---
Core A—Both required | 3.0 | 4853
Drug Discovery, Introduction
Drug Development Process | 2.0 | 6559

Core B—Choose 2 of 4 | | |
Biochemistry, An Introduction | 3.0 | 0022
Cellular Biology | 3.0 | 3383
Experimental Methods in Molecular Biology | 3.0 | 1912
Immunology, Principles | 3.0 | 2257

ELECTIVE COURSES | Units | Course
--- | --- | ---
(8 units required; at least one unit must be from each track.)

Track 1: Discovery | |
Biology of Cancer | 2.0 | 6630
DNA Microarrays—Principles, Applications and Data Analysis | 3.0 | 2183
Gene Expression and Pathways | 2.0 | 6020
Human Physiology in Health and Disease | 3.0 | 6999
Genomics and Next Generation DNA Sequencing: Methods and Applications | 3.0 | 30330
Stem Cell Biology | 1.5 | 13567
Toxicology Basics for Biotechnology | 1.5 | 2310
Viruses, Vaccines and Gene Therapy | 1.5 | 6974

Track 2: Development | |
Drug Quality Fundamentals: Quality Control of Small Molecule Drugs and Biologics | 1.5 | 23400
Good Manufacturing Practices | 3.0 | 6328
Molecular Diagnostics | 1.5 | 21972
Regulation of Drugs and Biologics | 3.0 | 19007

RECOMMENDED COURSE | Units | Course
--- | --- | ---
Data Privacy and Security for Healthcare and Biosciences | 1.5 | 30120

Any one course from UCSC Extension’s Bioinformatics, Clinical Trials Design and Management, Medical Devices or Regulatory Affairs Certificate Programs may be applied toward the elective unit requirement for the Biotechnology Certificate.

Certificate schedule outline of program curriculum and annual schedule are found online. From the homepage, select: “Area of Study”; department; then certificate title as listed above.

**Required Courses Core A**

**Drug Development Process**

NATSC.X428.2 (2.0 quarter units) Professional Credit: CA BRN/LVN Credit—Provider #CEP13114, 24.0 hours.

The development of new drugs is a complex, lengthy, and expensive process. This course examines this process—from discovery to market and beyond—and explores what makes the biopharmaceutical industry unique. Infused with real-world examples, lectures address drug discovery, preclinical characterization of new drug entities; the phases and purposes of pharmacological and clinical development; regulatory filings, compliance and oversight; FDA jurisdiction; and strategic issues in drug development. The course provides a foundation in drug development for professionals from all disciplines who work in, or are considering a move to, the biopharmaceutical industry.

EDWARD ROZHON, Ph.D.

CLASSROOM WITH ONLINE MATERIALS
10 meetings | 6–9 pm | April 13–June 29
Fee: $765.
To enroll, use Section Number 6559.(058)

**Drug Discovery, Introduction**

NATSC.X427.7 (3.0 quarter units) Professional Credit: CA BRN/LVN Credit—Provider #CEP13114, 30.0 hours.

This introductory course provides a framework for understanding the process of drug discovery, from target selection and validation to lead optimization and preclinical studies. The instructor will address fundamental and translational principles and cutting-edge approaches to the tools, technologies and methods used in discovery and development, along with strategies for integrating current scientific approaches into the drug discovery process. You will gain an understanding of pharmacokinetics, pharmacodynamics, toxicology and personalized medicine in drug discovery, including the OMICS technologies, biomarkers and single nucleotide polymorphism analysis in patient diagnosis, stratification and monitoring.

Prerequisite(s): “Molecular Biology, Introduction.”

CHAKK RAMESHA, Ph.D.

CLASSROOM WITH ONLINE MATERIALS
10 meetings | 6–9 pm | April 19–July 5
Fee: $765.
To enroll, use Section Number 4853.(034)

**YOU MAY BE CLOSER TO A CERTIFICATE THAN YOU REALIZE**

Are you just a few courses away from earning a bioscience certificate? Let us review your academic record and help to fast track your goals.
**Required Courses Core B**

### Biochemistry: An Introduction

**NATSC.X426.1 (3.0 quarter units)**

This course covers biochemistry concepts central to the biotechnology industry with an emphasis on the enzymatic and metabolic processes of living systems at the molecular level. Topics include the structure and function of biomolecules including proteins, carbohydrates, lipids and nucleic acids; enzymes and enzyme kinetics; and metabolism, including energy production and storage. The course is beneficial for scientists and non-scientists interested in the critical biochemistry processes underlying core technologies in the pharmaceutical, medical devices, diagnostics, biotechnology and biofuel industries.

**Prerequisite(s):** A college-level chemistry course. Some knowledge of organic chemistry is required.

GAIL KATSR, Ph.D.

CLASSROOM WITH ONLINE MATERIALS
10 meetings | 6–9 pm | April 1–May 7

Fee: $580.

To enroll, use Section Number 3383.(005)

### Cellular Biology

**NATSC.X428.1 (3.0 quarter units) Professional Credit: CA BRN/LVN Credit–Provider #CEP13114, 30.0 hours.**

Essential to any understanding of biology and its practical applications is an appreciation of the structures, functions and complex biological processes at work in the cell. This course covers the essential concepts of cellular biology, including the functions of cellular macromolecules, subcellular organization, nuclear control of cellular activity, cytoskeleton, cell signaling, cancer and more. You’ll also learn the experimental approaches used to explore cellular activities.

**Prerequisite(s):** "Molecular Biology, Introduction."

JUAN JOSE FUNG, Ph.D.

ONLINE | April 1–May 7
Enrollment accepted through May 25.
Fee: $765.

To enroll, use Section Number 3383.(005)

### Experimental Methods in Molecular Biology

For course description, see page 12.

### Elective Courses Track 1 - Discovery

#### DNA Microarrays: Principles, Applications and Data Analysis

**NATSC.X429.6 (3.0 quarter units)**

DNA microarrays have revolutionized molecular biology and are changing the face of discovery research and medicine. This course addresses the underlying principles and applications of the latest DNA microarray technologies, as well as the analysis of microarray data. It is intended for biopharmaceutical professionals, statisticians, computer scientists and others who are interested in understanding this important technology.

**Prerequisites:** "Molecular Biology, Introduction."

JANANI RANGARAJAN, M.S.

ONLINE | April 4–June 30
Enrollment accepted through May 25.
Fee: $765.

To enroll, use Section Number 2183.(022)

#### Gene Expression and Pathways

For course description, see page 12.

#### Genomics and Next Generation DNA Sequencing: Methods and Applications

**NATSC.X400.005 (3.0 quarter units)**

Next Generation DNA Sequencing (NGS) has made it possible to sequence a human genome at an incredibly low cost, vastly expanding the potential applications of genomics in cancer diagnostics, pathogen identification, forensic human identification and genetic disease diagnosis. This course begins with the basics of this revolutionary process and then delves into specific applications of NGS in research and clinical settings. The course covers the primary methods used for highly parallel sequencing. You will develop the knowledge needed to perform analyses from sample prep to generating the final data.

ABIZAR LAKDAWALLA, Ph.D.

CLASSROOM WITH ONLINE MATERIALS
4 meetings | 8:30 am–5 pm | April 1–May 7
Fee: $950.

To enroll, use Section Number 30330.(005)

### Stem Cell Biology

**BIOL.X400.110 (1.5 quarter units) Professional Credit: CA BRN/LVN Credit–Provider #CEP13114, 15.0 hours.**

California is at the forefront of stem cell research and the industry continues to offer exciting opportunities in the Bay Area. This introduction to stem cell and their applications is geared towards professionals in the pharmaceutical, biotech, medical device, and healthcare industries. It addresses the basic biology and clinical applications of embryonic and adult stem cell therapies, provides a market overview of stem cell startup companies, and touches on the FDA regulation of biologic products. This course prepares students conceptually and technically for the emerging stem cell and biologics therapy market.

**Prerequisites:** Basic cell biology knowledge is recommended but not required.

CASEY CASE, Ph.D.

CLASSROOM WITH ONLINE MATERIALS
5 meetings | 6–9 pm | May 16–June 13
Fee: $595.

To enroll, use Section Number 13567.(014)

### Toxicology Basics for Biotechnology

**NATSC.X429.3 (1.5 quarter units) Professional Credit: CA BRN/LVN Credit–Provider #CEP13114, 15.0 hours.**

Biopharmaceutical companies expend vast resources to identify new chemical and biological agents that have the potential for clinical benefit. However, before these can be tested and used widely in patients, safety and acceptable toxicity to critical organs must be demonstrated. This course surveys the adverse effects resulting from the interaction of chemical agents with living systems. Topics include criteria and mechanisms of toxicity, dose-response relationships, factors influencing toxic action, acute and chronic effects, kinetics, metabolism, and toxicity testing. Applications in both pharmacology and drug development are discussed.

**Prerequisite(s):** Completion of at least one college-level chemistry course.

RONALD TJEERDEMA, Ph.D., DABT

ONLINE | April 4–June 30
Enrollment accepted through May 25.
Fee: $580.

To enroll, use Section Number 2310.(029)

### Elective Courses Track 2 - Development

#### Regulation of Drugs and Biologics

For course description, see page 21.

### Also of Interest

#### Clinical Trials Essentials: An Intensive One-Week Course

For course description, see page 18.

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**Medical and Health Career Preparation**

**Considering a career in medicine?**

Medical schools recommend that applicants study advanced topics in biosciences as they relate to health and disease. At UCSC Extension, we offer a variety of courses that fulfill the suggested electives for medical, dental and veterinary colleges.

Contact extensionprogram@ucsc.edu for more information.
Clinical Trials Design and Management

PREREQUISITES
Successful completion of “Medical/Clinical Terminology,” an equivalent course, or medical training is required. We strongly recommend that students without a medical background take “Human Physiology in Health and Disease” early in their studies.

RECOMMENDED COURSE SEQUENCE
We recommend that you begin the program with “Drug Development Process” after completing the prerequisites. You may then take courses in any sequence, unless otherwise specified.

CERTIFICATE REQUIREMENTS
To obtain the Certificate in Clinical Trials Design and Management, you must complete 6 required courses and 6 units of elective courses, for a minimum total of 19 units. For GPA requirements and program time limits, see page 98.

To pursue two bioscience-related certificates in parallel or sequence, see page 13.

COURSES MAY BE TAKEN INDIVIDUALLY OR AS PART OF THE CERTIFICATE PROGRAM.

STANFORD CLINICAL RESEARCH INTERNSHIP PROGRAM
for recent Graduates of UCSC Extension’s Clinical Trials Design and Management Certificate Program

Qualifying recent graduates from the Clinical Trials Design and Management Certificate Program may have the opportunity to bring their coursework to life and gain valuable experience in a clinical research setting at Stanford. Space is limited.

If interested, please contact (408) 861-3860 or email extensionprogram@ucsc.edu.
Clinical Research: The Study Site Perspective

NATSC.X400.007 (1.5 quarter units) Professional Credit: CA BRN/LVN Credit—Provider #CEP13114, 15.0 hours.

This course covers the clinical research process from the viewpoint of the study site. Lectures and exercises explore the roles, responsibilities, interactions, and concerns of study site personnel and highlights important differences between clinical study sites and industry sponsors. Content applies to all study sites including academic medical centers, community hospitals, rural clinics, physician private practices, hospital networks, and Phase I units. Whether you work at a study site, as a sponsor, or are interested in opportunities at these organizations, this course will help you understand the study site’s role in clinical research.

Prerequisite(s): “Good Clinical Practices.”

JESSICA STURM, M.P.H., RN
ONLINE | April 4–June 30
Enrollment accepted through May 25.
Fee: $580.
To enroll, use Section Number 18994.(027)

CLINICAL TRIALS DESIGN AND MANAGEMENT CERTIFICATE

19-unit minimum

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<th>PREREQUISITE COURSES</th>
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<tr>
<td>Medical/Clinical Terminology</td>
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<td>Human Physiology in Health and Disease (Recommended)</td>
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<td>Medical Devices: Regulatory Strategies and Marketing Pathways</td>
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<td>Good Clinical Practices</td>
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<td>Clinical Project Management</td>
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<td>Clinical Trials Site Monitoring II</td>
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<td>Contracting with Contract Research Organizations (CROs)</td>
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<td>Document Preparation: Protocols, Reports, Summaries</td>
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<td>Electronic Data Capture for Clinical Trials</td>
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Any one course from UCSC Extension’s Regulatory Affairs Certificate Program may be applied toward the elective unit requirement for the Clinical Trials Design and Management Certificate.

Certificate schedule outline of program curriculum and annual schedule are found online. From the homepage, select: “Area of Study”; department; then certificate title as listed above.

ACRP: ASSOCIATION OF CLINICAL RESEARCH PROFESSIONALS CONTACT HOURS

Many of the required and elective courses in UCSC Extension’s Clinical Trials Certificate Program qualify as contact hours toward ACRP recertification. See the Association of Clinical Research Professionals website at acrpnet.org for certification information.

BRN: BOARD OF REGISTERED NURSING

All courses designated BRN are approved for continuing education hours for RNs and LVNs (Provider #CEP13114).

RAPS: REGULATORY AFFAIRS PROFESSIONAL SOCIETY CREDIT

Many of the required and elective courses in UCSC Extension’s Clinical Trials and Regulatory Affairs certificate programs qualify for points toward recertification for RAC. See the Regulatory Affairs Professionals Society at www.raps.org for details.
Drug Safety and Adverse Events Reporting
NATSC.X427.2 (1.5 quarter units) Professional Credit: CA BRN/LVN Credit–Provider #CEP13114, 15.0 hours.

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.

Prerequisite(s): *Good Clinical Practices,* and *Medical/ Clinical Terminology.*

NARINDER SINGH, M.B.A., PharmD
CLASSROOM WITH ONLINE MATERIALS
2 meetings | 8:30 am–5 pm | June 3 and 10
Fee: $580.
To enroll, use Section Number 3990.(026)

Medical Writing
BUSAD.X493.5 (2.0 quarter units) Professional Credit: CA BRN/LVN Credit–Provider #CEP13114, 21.0 hours.

Biopharmaceutical companies must produce scientific reports and summary documents for regulatory agencies that are scientifically sound, clear, effective, and concise. This hands-on course builds the skills needed to write effective documents for the bioscience industry. Topics include a review good writing essentials, including the correct use of grammar and punctuation; drafting user-friendly documents that comply with global regulations; and creating clear and concise content. You’ll gain practice through exercises and projects based on documentation used in pharmaceutical development. The course will help you streamline the writing process from raw ideas to finished documents.

DAVID WEST, M.P.H.
CLASSROOM AND ONLINE (HYBRID)
4 meetings | 6–9 pm | May 5–June 9
Fee: $750.
To enroll, use Section Number 4451.(020)

Preparing for FDA Inspections and Conducting Sponsor Audits
BUSAD.X484.1 (1.5 quarter units) Professional Credit: CA BRN/LVN Credit–Provider #CEP13114, 15.0 hours.

In the regulated pharmaceutical and biotechnical medical device industries, inspections by government agencies are often a prerequisite for new product marketing approvals. Knowing what to expect and how to respond to clinical inspections is as critical as conducting sound clinical research. This course helps participants prepare for FDA inspections and conduct sponsor audits. Topics include investigator and sponsor/monitor inspections; how and when inspections occur; FDA inspection procedures and practices; conducting sponsor audits and inspections; interacting professionally with inspectors; and responding effectively to inspectors’ observations.

Prerequisite(s): *Good Clinical Practices.*

FRANCES MCKENNEY, M.S.
CLASSROOM WITH ONLINE MATERIALS
4 meetings | 5:30–9:30 pm | April 7–28
Fee: $580.
To enroll, use Section Number 5168.(026)

Also of Interest

Clinical Trials Essentials: An Intensive One-Week Course
NATSC.825. (3.0 CEUs) Professional Credit: CA BRN/LVN Credit–Provider #CEP13114, 35.0 hours.

Well-planned, well-executed clinical trials are the cornerstones of effective drug and medical device development. Offered in an accelerated format taught by a team of biopharmaceutical industry leaders, 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.

The 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.

Expert Instruction Team: Taught by a team of clinical research experts, including many from UCSC Extension’s Clinical Trials Design and Management Certificate.

INSTRUCTIONAL TEAM
CLASSROOM WITH ONLINE MATERIALS
5 meetings | 8:30 am–5:30 pm | March 13–March 17
Fee: $1865.
To enroll, use Section Number 5433.(015)
Medical Devices

Certificate Program

Medical Devices

Certificate Contact
Applied and Natural Sciences Department, (408) 861-3860, or email extensionprogram@ucsc.edu.

Program Summary
Medical devices include a broad spectrum of products, from the simple tongue depressor to surgically implanted stents and in vitro diagnostics. Altogether, the U.S. medical device market is estimated at approximately $100 billion. The Bay Area is home to one of the highest concentrations of medical device start-ups in the U.S., with a broad array of established companies that vary in size, core technology and therapeutic focus. There are exciting opportunities in this robust industry for professionals from a range of disciplines.

The Medical Devices Certificate program covers topics that are critical to the development and commercialization of safe and effective medical devices and in vitro diagnostics (IVDs). Taking a practical and hands-on approach, the courses build a solid foundation that spans product design and development, regulatory and quality issues, innovation strategy, risk management and more.

Experienced and aspiring medical device professionals will gain insight into the technological, regulatory and business aspects of the industry and learn what it takes to be successful in the dynamic and highly regulated medical device industry. Courses in this program will benefit professionals from a wide range of disciplines.

Audience
- Those who want to enter the expanding field of medical devices
- Cross-development teams from medical device and IVD (in vitro diagnostics) companies; including those in quality assurance (QA), regulatory, R&D, product development, software and hardware engineering, product management, customer support, product verification and validation, marketing, operations/ manufacturing and clinical research

Certificate Requirements
Total of 17 units
- 11 required units
- 6 elective units

For GPA requirements and program time limits, see page 98.

To pursue two bioscience-related certificates in parallel or in sequence, see chart on page 13.

Prerequisites
There are no prerequisites for entering this program, although an understanding of statistics is necessary. “Statistics” (23588) is recommended for students entering the program without prior knowledge.

Recommended Course Sequence
Those new to the field should start by taking "Quality Systems for Medical Devices: FDA QSR and ISO 13485," (formerly "Medical Device Quality Systems"), followed by "Introduction to Medical Device Regulation." After that, core courses can be taken in any order. For those with experience in this field, courses can be taken in any order.

Program Chair
Medical Devices and Regulatory Affairs

KIRAN GULATI, B.S., M.B.A., RAB-LA, is a management consultant with more than 20 years of experience in quality systems and process improvement for the medical device and biotech sectors. She has taught for UCSC Extension since 2006. Ms. Gulati has held positions at Genentech and McGhan Medical (formerly Collagen Corporation), where she managed the auditing and quality system training functions. Ms. Gulati has extensive experience designing and presenting training for companies in domestic as well as international settings. Since 2001, she has helped a large number of medical device startups and established companies achieve successful results during ISO 13485, CE Mark assessments and FDA audits.

Ms. Gulati serves on the advisory board for UCSC Extension’s Medical Devices and Regulatory Affairs Certificate programs. In addition, she has been a speaker at conferences sponsored by the Institute of Validation Technology (IVT) and the ASQ Silicon Valley Division. Ms. Gulati served as the RAPS San Francisco/Bay Area Chair from 2011 to 2014 and is currently on the RAPS North American Advisory Board.

Medical Devices Advisory Board

DOUG ALLEAVITCH, M.B.A., M.S., Vice President of Quality and Operations, Nevro
PEPE DAVIS, Ph.D., Vice President of Business Process Excellence, Carl Zeiss Meditec, Inc.
STEVE GEERDES, CQA, Director of Regulatory Affairs and Quality Assurance, Zonare
KRISTEN GRUMET, B.A., Executive Director, NSF Healthcare
KIRAN GULATI, B.S., M.B.A., RAB-LA, Management Consultant and Program Chair, UCSC Extension’s Medical Devices and Regulatory Affairs Certificate Program
CONNIE HOY, B.A., Senior Vice President of Regulatory Affairs and Quality, Cynosure, Inc.
RON KORONKOWSKI, B.S., Director of Quality and Regulatory, Vention Medical Design and Development, Inc.
DIANA LANE, B.A., Director Quality Management and Regulatory Affairs, Roche Sequencing Solutions

Enroll Early!
Enroll at least seven days prior to your course’s start date to save your seat and allow time to prepare for the first class meeting. Enrolling early also helps ensure that your course is not cancelled due to low enrollment.
Quality Systems for Medical Devices: FDA QSR and ISO 13485
NATSC.X400.012 (2.5 quarter units)
This course uses the principles of the medical device quality system (QS) regulations and ISO 13485:2015 to take a risk-based approach to compliance, while achieving strategic business objectives in today’s regulatory environment. You will learn about key processes in the quality system medical device regulation (21 CFR 820 and ISO 13485), while addressing noncompliance challenges. This interactive course covers quality system requirements from an application-based perspective, and discusses industry trends, FDA initiatives (including the Medical Device Single Audit Program or MDSAP) and best practices for interacting with global regulatory agencies.
KIRAN GULATI, B.S., M.B.A., RAB-LA
CLASSROOM WITH ONLINE MATERIALS
7 meetings | 6:15–9:45 pm | March 21–May 9
Fee: $800.
To enroll, use Section Number 30407.(023)

Elective Courses
Global Medical Device Submissions and Strategy
For course description, see page 22.

Regulation of in vitro Diagnostics in Europe and the US
BME.X400.001 (2.5 quarter units)
This course offers a comprehensive overview of the current European and U.S. Regulatory and Quality Affairs for in vitro diagnostic (IVD) products. You will gain a perspective on the critical elements of the regulatory requirements for obtaining IVD marketing approval. This course will take an extensive look into specific in vitro diagnostics topics and learn about the new and emerging regulatory requirements surrounding them. Learn about the impending transition for IVDs from the current European Directives (IVDD) to new substantially different European Regulations (IVDR) expected to be approved by the end of 2016, and which will bring a majority of currently self-declared IVDs to require Notified Body involvement.
Prerequisite(s): *Quality Systems for Medical Devices: FDA QSR and ISO 13485* or working knowledge/experience in Quality Systems is needed.
CONCETTA DEL BUONO, B.A.
CLASSROOM WITH ONLINE MATERIALS
4 meetings | 9 am–4 pm | May 6–June 17
Fee: $800.
To enroll, use Section Number 30476.(002)

Value-Added Quality Audits
For course description, see page 22.
Regulatory Affairs

Certificate Program

Regulatory Affairs

Certificate Contact
Applied and Natural Sciences Department, (408) 861-3860, or email extensionprogram@ucsc.edu.

Program Summary
Regulatory affairs professionals play critical roles in ensuring compliance with the laws and regulations guiding the development and commercialization of healthcare products. As Bay Area bioscience companies grow and mature, their need for trained regulatory personnel intensifies. Recent industry studies cite regulatory affairs as one of the most crucial human resource needs in the coming decade. However, there are currently few options available in our region for formal, in-depth training for early-stage regulatory professionals.

The Regulatory Affairs Certificate was developed under the guidance of industry and government experts to provide a broad regulatory foundation, exposure to practical, real-world applications of the regulations, and an appreciation of the important roles that regulatory affairs professionals play in the bioscience industry. Courses are taught by experienced regulatory professionals currently working in the device, diagnostic, pharmaceutical and biologic sectors. Instructors bring the regulations to life with relevant examples and hands-on exercises designed to prepare students for rewarding careers in regulatory affairs.

Certificate Requirements
To obtain the Certificate in Regulatory Affairs, students must complete the six required courses and 5 units of elective courses, for a minimum total of 19 units. For GPA requirements and program time limits, see page 98.

To pursue two bioscience-related certificates in parallel or sequence, see page 13.

Prerequisites
Given the scientific foundations of the bioscience industry and the importance of effective communication to the regulatory role, students who come to the program with a basic understanding of the life sciences and strong written and oral communication skills will benefit most from this program.

Recommended Course Sequence
We recommend students begin the program with “Quality Systems for Medical Devices: FDA QSR and ISO 13485” (formerly “Medical Device Quality Systems”) or “Good Manufacturing Practices,” followed by “Drug Development Process” or “Regulation of Medical Devices and Diagnostics.”

For More Information
Current and future course schedules can be found at ucsc-extension.edu/biosciences. For more information or to be added to our mailing list, please call (408) 861-3860 or contact extensionprogram@ucsc.edu.

Required Courses

Drug Development Process
For course description, see page 14.

Quality Systems for Medical Devices: FDA QSR and ISO 13485
For course description, see page 20.

Regulation of Drugs and Biologics
NATSC.X400.009 (3.0 quarter units)
Complex regulations govern the development, manufacture, and commercialization of biomedical products. This course will help you understand the regulatory requirements, both U.S. and International, for patented and generic pharmaceuticals, over-the-counter drugs, and biological products. Through lectures, case studies, and hands-on exercises, you’ll gain knowledge and insight into the regulatory agencies and their roles and responsibilities, regulatory applications and pathways, post-marketing requirements, the impact of regulatory differences between U.S. and other countries, and how regulatory approval processes affect corporate strategy.

Prerequisite(s): Completion of, or concurrent enrollment in “Drug Development Process” or equivalent experience.

Sheeldon Mullins, M.B.A.

Classroom with Online Materials
10 meetings | 6–9 pm | April 17–July 10
Fee: $825.
To enroll, use Section Number 19007.(024)

Enroll Early!
Enroll at least seven days prior to your course’s start date to save your seat and allow time to prepare for the first class meeting. Enrolling early also helps ensure that your course is not cancelled due to low enrollment.

Access to Online Courses and Materials
If you are enrolling for the first time in an Online course, or a classroom course with Online Materials, you will receive an account for UCSC Extension Online via email within 12 hours. If you have previously taken a course with online materials, you should use your existing account. Course sites will open one day prior to the official start date.

For more information, including help retrieving your account info, please visit ucsc-extension.edu/online-faqs.

For information on textbooks, see page 100 or visit ucsc-extension.edu/bookstore.
Elective Courses

Global Medical Device Submissions and Strategy
NATSC.X400.032 (1.5 quarter units)
The global nature of the medical device industry presents opportunities and challenges for medical device companies and regulatory affairs professionals who must navigate a diverse regulatory terrain. In this course, students gain a practical understanding of international medical device requirements and regulations for major and emerging markets around the world, including the EU, Canada, Japan, China and Brazil. A comparative approach highlights similarities and differences between countries and underscores the impact they have on global regulatory and business strategies.

Prerequisite(s): Given the fast-paced, information-rich nature of this course, prior completion of the “Regulation of Medical Devices and Diagnostics” or equivalent course or work experience is required.

Prerequisite(s):
INSTRUCTOR TBA
CLASSROOM WITH ONLINE MATERIALS
2 meetings | 8:30 am–5 pm | June 24 and July 8
Fee: $750.
To enroll, use Section Number 20343.(012)

Good Clinical Practices
For course description, see page 16.

Preparing for FDA Inspections and Conducting Sponsor Audits
For course description, see page 16.

Regulation of in vitro Diagnostics in Europe and the US
For course description, see page 18.

Value-Added Quality Audits
NATSC.X400.018 (1.5 quarter units)
By auditing to domestic and international quality system regulations, biomedical corporations can improve 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. Through understanding the psychology of audits and practice in questioning techniques, participants can take their organization’s quality audit program to another level.

Prerequisite(s): "Medical Device Quality Systems."
KIRAN GULATI, B.S., M.B.A., RAB-LA
CLASSROOM WITH ONLINE MATERIALS
3 meetings | 8:30 am–5 pm | April 29; and 6:15–9:45 pm | May 4 and 11
Fee: $700.
To enroll, use Section Number 19073.(013)
One day I’d be studying for class and the next day we are discussing the same topics at our organization.

MANYA JAIN

Project and Program Management // Database and Data Analytics

When Manya Jain moved from India to California with her husband, she had already worked as a financial data analyst on process optimization for six years. Her daughter was only six months old, so she decided to research creative ways to keep up her skillset until she was ready to enter the American job market. She was delighted to discover that UCSC Extension’s Project and Program Management and Database and Data Analytics programs both presented practical course work that she could apply toward her career. Within nine months of enrolling, Jain had completed both certificates, gained internship experience at a local startup, and been offered a job.

Skills to Perform
The knowledge she gained at UCSC Extension gave her the skillset to perform at her internship and help optimize her companies’ performance.

“I worked in analysis in India, and at UCSC Extension I learned more about analytics,” she says. “With analytics you can better your business or projects’ performance. You can build interactive dashboards and experiment with different platforms. Even though I had the background in analysis, this program helped me pick up where I left off.”

Education that Pays Off
"I interned at a local startup, where I worked with Tableau and other data analytics platforms,” she says. “Both my Project Management and Data Analytics courses were so relevant to the work we were doing. One day I’d be studying for class and the next day we are discussing the same topics at our organization."

Jain was eventually offered a job at the startup. She credits her experience at UCSC Extension, and it’s instructors, with equipping her to start off strong in the United States.

“I loved that my professors shared firsthand their experiences in the field,” she says. “They were really knowledgeable and were ready to answer my questions. A few of my instructors gave me links and recommendations on LinkedIn, which I found added to my credibility while applying for work.”

Tell Us Your Story

We’d love to hear how you applied new skills in the workplace, or how your new credentials led to exciting job opportunities. Share your latest achievements by submitting your Extension story to extensionfeedback@ucsc.edu.
In recent years, accounting has undergone major change. For aspiring CFOs, the CPA remains the gold standard credential. For mid-career financial managers and accountants, the CMA is a great alternative.

We offer two state-of-the-art programs to help get you there:

- Certificate in Accounting (CPA foundation)
- Accounting core for CPA candidates

Our introductory courses qualify for credit toward accounting degrees and CPA continuing education units. CPA candidates can also fulfill 100 percent of their general business education requirements by taking courses from our Business Administration, Human Resources, Project Management and Marketing programs.

Silicon Valley Expertise at Your Fingertips

Our Business and Management Department provides working professionals with UC-quality training in 10 disciplines. We are accredited by WASC’s Commission for Senior Colleges and Universities.

Whether you are testing the waters, changing careers, pursuing a degree track, or seeking a recognized credential, you’ll benefit from the academic-quality course work we offer at a fraction of the cost elsewhere.

While our curriculum is modeled after the nation’s best business, graduate and professional schools, instruction is grounded in real-world practice, designed and taught by local expert practitioners, and approved by the Chair of the world-renowned UCSC Economics Department.

### Certificate Program

#### Accounting

<table>
<thead>
<tr>
<th>Program</th>
<th>Contact</th>
<th>Summary</th>
<th>Audience</th>
<th>Requirements</th>
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<tbody>
<tr>
<td>Certificate in Accounting (CPA foundation)</td>
<td>Business and Management Department, (408) 861-3860, or email <a href="mailto:extensionprogram@ucsc.edu">extensionprogram@ucsc.edu</a>.</td>
<td>Professional accountants must position themselves as savvy financial and managerial analysts to advance their careers.</td>
<td>Aspiring M.B.A.s, Business owners, Corporate managers, Technical professionals, Bookkeepers who want to move up, Accounting assistants, Anyone wanting to understand accounting</td>
<td>Total of four required courses.</td>
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ACCOUNTING PROGRAMS

Not unit-specific

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<td>Introduction to Accounting II: Managerial Accounting</td>
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CPA PREPARATION

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<td>Auditing and Attestation</td>
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<td>Cost Accounting</td>
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<td>Financial Statement Analysis</td>
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<td>Business Law and Its Environment</td>
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<td>Business Statistics II</td>
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<td>Principles of Marketing</td>
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</table>

Certificate schedule outline of program curriculum and annual schedule are found online. From the homepage, select: “Area of Study”; department; then certificate title as listed above.

PROGRAM CHAIR
DIANNE CONRY, M.S. in financial accounting, CPA, is a consultant with Kranz & Associates and has more than 20 years of accounting experience both in public accounting (Pricewaterhouse Coopers) and in private industry (Sony Electronics, Accretive Solutions, Cliniometrics and RoseRyan). She is an experienced instructor who has taught financial accounting at several area colleges and has been teaching with UCSC Extension since 1996.

BIOLOGY & GENETICS

IN THIS SECTION

- Accounting 24
- Administrative and Executive Assistant 28
- Bookkeeping 30
- Business Administration 30
- Financial Planning 32
- Human Resource Management 34
- Legal Studies 38
- Marketing 39
- Minimum Continuing Legal Credit (MCLE) 41
- Project and Program Management 42
- Technical Writing and Communication 46
**Required Courses**

**Intermediate Accounting I**
BUSAD.X436.4 (4.0 quarter units)

Designed for those specializing in accounting, this intermediate-level course covers the theory and application of accounting. The course emphasizes revenue recognition, current assets and liabilities, and fixed asset accounting.

**Prerequisite(s):** "Introduction to Accounting I: Financial Accounting." and "Introduction to Accounting II: Managerial Accounting," and "Introduction to Accounting I: Financial Accounting."

INSTRUCTOR TBA
CLASsroom with ONLINE MATERIALS
10 meetings | 6–10 pm | April 17–June 26
Fee: $775.
To enroll, use Section Number 5675.(070)

**Intermediate Accounting II**
BUSAD.X436.5 (4.0 quarter units)

This intermediate-level course covers the theory and application of accounting. Through lectures, readings and course exercises, this course covers investment accounting, bonds, pensions, leases and earnings per share.

**Prerequisite(s):** "Intermediate Accounting I," "Introduction to Accounting II: Managerial Accounting," and "Introduction to Accounting I: Financial Accounting."

BRETT LAYTON, M.S., CPA
CLASsroom with ONLINE MATERIALS
10 meetings | 6–10 pm | April 18–June 20
Fee: $775.
To enroll, use Section Number 6381.(066)

**Introduction to Accounting I: Financial Accounting**
BUSAD.X434.8 (4.0 quarter units) Professional Credit:
MCLE—Minimum Continuing Legal Education State Board of CA.; HRCI–PHR, SPHR and GPHR strategic recertification credit.

The fundamentals of financial accounting are presented in this course, as well as the identification, measurement and reporting of the financial impacts of economic events on enterprises. Topics include 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; depreciation of operational assets; accounting for investments; and accounting for liabilities and present value concepts.

DIANNE CONRY, M.S., CPA
CLASsroom with ONLINE MATERIALS
10 meetings | 6–10 pm | April 5–June 7
Fee: $775.
To enroll, use Section Number 3658.(159)

**Introduction to Accounting II: Managerial Accounting**
BUSAD.X434.9 (4.0 quarter units) Professional Credit:
MCLE—Minimum Continuing Legal Education State Board of CA.; HRCI–PHR, SPHR and GPHR strategic recertification credit, 37.5 hours.

This course covers managerial accounting and how to evaluate cost-accounting data in order to help management do its job effectively in the areas of planning, control, motivation, communication, evaluation of performance and decision making. Accordingly, topics include traditional and activity-based costing, standard costing, relevant costing, variable costing, cost-volume-profit analysis, short- and long-term budgeting, alternative decisions, performance measurement, responsibility accounting and transfer-pricing.

**Prerequisite(s):** "Introduction to Accounting I: Financial Accounting."

PENELOPE FAURE, M.B.A.
ONLINE | April 10–June 23
Enrollment accepted through April 10.
Fee: $775.
To enroll, use Section Number 1224.(080)

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**CPA Preparation**

**PROGRAM CONTACT**
Business and Management Department, (408) 861-3860, or email extensionprogram@ucsc.edu.

**PROGRAM SUMMARY**
The accountant’s role encompasses a great deal of analysis, making the position more important and certainly more complex. This program addresses these issues and offers students the background needed to remain successful in this field.

This program helps participants meet the requirements to take the Certified Public Accountant (CPA) examination—still the gold standard credential in the profession.

**GOALS**
The goals of this program are to provide:

- More advanced training on complex accounting issues
- Advanced U.S. accounting principles for professionals trained in other countries
- Academic accounting requirements and accounting units to prepare students to take the CPA examination

**COURSES**
We offer 10 accounting courses (40 quarter units) and 16 general business courses (36 quarter units). The minimum requirements for taking the CPA exam in California are:

- A bachelor’s degree
- 36 quarter units of accounting
- 36 quarter units of general business courses.

Candidates must complete all educational requirements prior to sitting for the exam.

For more information, please refer to the California Board of Accountancy at dca.ca.gov/cba.
Accounting

**Corporate Income Tax Accounting**  
*BUSAD.X464.1 (4.0 quarter units)*

In this course, federal income tax topics are examined; including incorporation, corporate capital structure, dividends and redemptions, mergers and reorganizations, liquidations, and the transferability of tax attributes. Also covered are the fundamental legal concepts, statutory provisions, and computational procedures of taxable income and deductions, passive activities, alternative minimum tax, property transactions, deferred compensation, and taxation factors relevant to business decisions. The S Corporation is explored as an alternative to the regular corporation and other modes of operation.

WAYNE SCHOENE, B.S., CPA
CLASSROOM WITH ONLINE MATERIALS
10 meetings | 6–10 pm | April 20–June 22
Fee: $775.
To enroll, use Section Number 5744.(023)

**Cost Accounting**  
*BUSAD.X450.5 (4.0 quarter units)*

The requirements for cost accounting, the standards used to evaluate cost-accounting systems, management uses for cost-accounting data and the correct processes for implementing systems form the basis of this course. The methods required by the Generally Accepted Accounting Principles (GAAP) are addressed. Topics include the flow of costs through a firm; the difference between a job order costing system and a process costing system; the use of standard costing; and how management uses data.

THARAN LANIER, M.B.A.
CLASSROOM WITH ONLINE MATERIALS
10 meetings | 6–10 pm | April 27–June 29
Fee: $775.
To enroll, use Section Number 2841.(015)

**Introduction to Accounting I: Financial Accounting**  
For course description, see page 26.

**Introduction to Accounting II: Managerial Accounting**  
For course description, see page 26.

**Intermediate Accounting I**  
For course description, see page 26.

**Intermediate Accounting II**  
For course description, see page 26.

**General Business**

**Business and Professional Writing**  
For course description, see page 30.

**Business Statistics I**  
For course description, see page 31.

**Finance for the Business Professional**  
For course description, see page 28.

**Implementing Winning Marketing Strategies**  
For course description, see page 39.

**Integrated Marketing Communication**  
For course description, see page 39.

**Management and Organization, Principles**  
For course description, see page 30.

**Microeconomics, Introduction**  
For course description, see page 30.

**Organizational Development and Change, Introduction**  
For course description, see page 36.

**Power of Market Research**  
For course description, see page 40.

**Principles of Marketing**  
For course description, see page 39.

**Project Leadership and Communication**  
For course description, see page 43.

**Role of the Project Manager**  
For course description, see page 43.

---

**Get University of California Santa Cruz Credit!**

Several UCSC Extension courses are recognized by the UCSC Economics Department and may be used to waive the corresponding UCSC economics degree requirements. The following courses apply:

**UCSC Extension Courses**
- X434.8, Introduction to Accounting I: Financial Accounting
- X434.9, Introduction to Accounting II: Managerial Accounting
- X414, Introduction to Microeconomics
- X415, Introduction to Macroeconomics

**Qualify to waive the following UCSC Courses**
- 10A, Economics of Accounting
- 10B, Economics of Accounting
- 1, Introductory Microeconomics: Resource Allocation and Market Structure
- 2, Introductory Macroeconomics: Aggregate Economic Activity

If you have questions, call (408) 861-3860 or email extensionprogram@ucsc.edu.
Administrative and Executive Assistant

Certificate Program

Administrative and Executive Assistant

PROGRAM CONTACT
Business and Management Department, (408) 861-3860, or email extensionprogram@ucsc.edu.

PROGRAM SUMMARY
This is the profession the Mercury News calls “the power behind the CEO,” and ours is the training program that is generating all the excitement in Silicon Valley.

Enroll in the Bay Area’s only training program for administrative and executive assistants. Whether you are looking to enter the profession or aiming for the next level, you’ll receive tailored instruction and mentoring delivered by experienced CEO and executive assistants. This program will help get you into one of the most-sought-after jobs in the market today!

Acquire essential skills while learning methods that your manager will notice immediately:
• Increase your productivity and effectiveness
• Improve your ability to organize and prioritize
• Expand your network and build alliances
• Develop self-confidence
• Garner respect for your position, yourself and others
• Set realistic goals for yourself that achieve positive results

Adding this certificate to your résumé can open doors to Fortune 500 companies, regardless of your educational background.

AUDIENCE
• Administrative professionals at any level
• Current assistants seeking improved skill sets
• Mid-career assistants wanting to enhance their prospects
• Career changers

CERTIFICATE REQUIREMENTS
Total of 14.5 units:
• 9 required units
• 5.5 elective units

PROGRAM CONTACT
BONNIE TOKIWA-SAVAGE has more than 25 years of experience in the high-tech industry. She has taught for UCSC Extension since 2007. She is currently an executive assistant at Agilent Technologies. Ms. Savage’s career includes similar positions at Avaya Inc., JDSU Corporation, Aspect Communications, Beyond.com and Skystream Corporation, early-stage and public companies in the e-commerce and Internet area. She is also a leader to the administrative teams, providing resources and insight to improve overall company efficiency and teamwork. Ms. Savage is a member of the Silicon Valley Catalyst Association (SVCA), a group of executive assistants to Silicon Valley CEOs.

PROGRAM CO-CHAIR
SHERRY PARSONS, B.S.B.M., has more than 30 years of experience in the administrative field and is currently senior executive assistant to the CMO & SVP/GM of Networking for Avaya, Inc. She has taught at UCSC Extension since 2006. Prior to joining Avaya, Ms. Parsons supported senior executives at Earthbound Farm, Network General, Aspect Communications, and Advanced Micro Devices in Silicon Valley. She is an advisory board member for the Hilton Santa Clara and a past advisory board member for the AdminAwards, Silicon Valley.

PROGRAM CO-CHAIR
DIANNE CONRY, M.S., CPA
CLASSROOM WITH ONLINE MATERIALS
4 meeting | 6–9:30 pm | May 2–May 30
Fee: $515.
To enroll, use section Number 30473.(004)

Elective Courses

Adobe Illustrator, Introduction
For course description, see page 87.

Business Statistics I
For course description, see page 31.

Graphic Design Fundamentals
For course description, see page 87.

HTML Fundamentals
For course description, see page 88.

Interviewing for Success: Using Structured Interviewing Techniques
For course description, see page 37.

Required Courses

Administrative and Executive Assistants’ Practicum
BUSAD.X400.035 (2.0 quarter units)
This final required course in the Administrative and Executive Assistant Program unifies and reinforces all aspects and content explored in the previous courses. You will explore some of the vital components of this career, such as functioning in a team environment, leading a team to success, developing effective conflict management skills, planning a project, and assessing your critical-thinking and planning skills.
Prerequisite(s): “Project Management for Administrative and Executive Assistants,” and “Communication Skills for Administrative and Executive Assistants.”

SHERRY PARSONS, B.S.
CLASSROOM WITH ONLINE MATERIALS
8 meetings | 6–9 pm | April 6–May 25
Fee: $560.
To enroll, use Section Number 19031.(016)

Business and Professional Writing
For course description, see page 30.

Finance for the Business Professional
BUSAD.X437.5 (1.0 quarter units) Professional Credit: HRCI–PHR, SPHR and GPHR strategic recertification credit.
This hands-on seminar focuses on learning to read, analyze and evaluate the numbers behind a good financial statement and their relevant data. Materials include the tools used to improve an organization’s financial performance and to assess its competitive strength. The course covers key accounting concepts, financial statements, cash budgets, strategic plans, detailed budgets, and financial ratios.

DIANNE CONRY, M.S., CPA
CLASSROOM WITH ONLINE MATERIALS
4 meeting | 6–9:30 pm | May 2–May 30
Fee: $515.
To enroll, use section Number 30473.(004)
ADMINISTRATIVE AND EXECUTIVE ASSISTANT CERTIFICATE

14.5-unit minimum

REQUIRED COURSES (9 units are required.)

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<td>Business and Professional Writing</td>
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<td>Communication Skills for Administrative and Executive Assistants</td>
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ELECTIVE COURSES (5.5 units are required.)

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<td>Cross-Cultural Negotiation: Asian and Western Business Environments</td>
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<td>Sharpening Your Listening Skills</td>
<td>0.7 CEU</td>
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<td>Role of the Project Manager</td>
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<td>Using Positive Political Skills in the Workplace</td>
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Certificate schedule outline of program curriculum and annual schedule are found online. From the homepage, select: “Area of Study”; department; then certificate title as listed above.

Management and Organization, Principles
For course description, see page 30.

Organizational Development and Change, Introduction
For course description, see page 36.

Role of the Project Manager
For course description, see page 43.

Also of Interest

Effective Employee Relations
For course description, see page 36.

Principles of Marketing
For course description, see page 39.

Project Leadership and Communication
For course description, see page 43.

Administrative and Executive Assistant Advisory Board

BONNIE TOKIWA-SAVAGE, Executive Assistant, Agilent Technologies
DEBBIE GROSS, CEA Assistant, Cisco Systems
SHERRY PARSONS, Senior Executive Assistant, Avaya
Certified Bookkeeper Program

**PROGRAM CONTACT**
Business and Management Department, (408) 861-3860, or email extensionprogram@ucsc.edu.

**PROGRAM OVERVIEW**
Bookkeepers need to have a competitive edge to enhance their standing and earning potential. According to the U.S. Bureau of Labor Statistics, Certified Bookkeepers will have the best prospects.

Our program is endorsed by the American Institute of Professional Bookkeepers and consists of a single 12-week course, during which you will:

- Receive in-depth instruction to prepare you for the three certification exams
- Complete personal-study workbooks outside of class
- Take the Certified Bookkeeper qualification examinations

**PREREQUISITE**
Two years of general-ledger bookkeeping experience or completion of "Introduction to Accounting I."

**AUDIENCE**
- Bookkeepers
- Accounting clerks
- Small-business owners
- Auditing clerks
- Anyone wanting to understand modern bookkeeping

**Offered in the Fall Quarter, please visit our website for details.**

**American Institute of Professional Bookkeepers**
AIPB—the American Institute of Professional Bookkeepers—is the bookkeeping profession’s national association. AIPB’s mission is to achieve recognition of bookkeepers as accounting professionals; keep bookkeepers up-to-date on changes in bookkeeping, accounting and tax; answer bookkeepers’ everyday bookkeeping and accounting questions; and certify bookkeepers who meet high, national standards. Founded in 1987, the current membership is over 30,000.

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**Bookkeeping**

**Business Administration**

**Certificate Program**

**Business Administration**

**PROGRAM CONTACT**
Business and Management Department, (408) 861-3860, or email extensionprogram@ucsc.edu.

**PROGRAM SUMMARY**
Today’s business leaders must command a broad set of skills—from sales and marketing to economics, finance, and management. This not only requires hands-on experience in the day-to-day aspects of running a business, but also fundamental training and education in the latest business administration practices. This program is designed to equip new managers, subject-matter professionals who have been promoted to management positions, and those interested in the broad theory of business to develop the competency in critical functions of business. We also offer a range of electives to target knowledge in specific subjects.

Individual courses may also fulfill MCLE and CPA continuing education requirements—which you can obtain through the Business Administration Certificate program at UCSC Silicon Valley Extension.

**CERTIFICATE REQUIREMENTS**
Five required courses: 14.0 units. Electives: 11.0 units

**MCLE CREDIT**
"Business Law and Its Environment," 29.0 credit hours

**PROGRAM CHAIR**

JEFF COX, M.S., B.A., is a veteran human resources professional with over 30 years of experience in the field. His areas of expertise include program development and improvement, executive and management development, maximizing employee performance, continuous improvement in operations, administration, HR/O, healthcare, and hi-tech–software, hardware and information technology—in both for-profit and non-profit domestic and international companies.

In addition, he regularly provides pro-bono advice to non-profit organizations.

Mr. Cox has twenty years of experience in academic program development, has taught more than 100 graduate and undergraduate courses in 30 subjects, and has authored courses in HR, International HR and international business.

**Required Courses**

**Management and Organization, Principles**
BUSAD.X435.1 (2.0 quarter units) Professional Credit:
HR/CH–PHR, SPHR and GPHR strategic recertification credit 19.5 hours; MCLE–Minimum Continuing Legal Education State Board of CA.

This course introduces valuable management tools, processes and techniques practiced by successful businesses. You’ll learn how managers orchestrate resources to achieve corporate objectives. Topics include performance management, management by objective, communication and teamwork; systematic decision-making, staffing, motivation and leadership; and organizational structure and control.

LY-HUONG PHAM, Ph.D., M.B.A., M.S.

**CLASSROOM WITH ONLINE MATERIALS**
6 meetings | 6–9:30 pm | April 26–May 31
Fee: $660.
To enroll, use Section Number 0692.(074)

**Microeconomics, Introduction**
ECON.X414. (4.0 quarter units) Professional Credit: HRCI–PHR, SPHR and GPHR strategic recertification credit, 37.5 hours.

This course is an introduction to basic economics, analysis of prices and markets, consumer behavior, the theory of production and costs, pricing and employment of the factors of production, international trade issues, public policy and current domestic microeconomics problems.

MALKIAT SANDHU, M.A.

**CLASSROOM WITH ONLINE MATERIALS**
10 meetings | 6–10 pm | April 10–June 19
Fee: $775.
To enroll, use Section Number 4548.(062)

**Principles of Marketing**
For course description, see page 39.

**Elective Courses**

**Business and Professional Writing**
BUSAD.X440.9 (2.0 quarter units)

According to Fortune magazine, professionals with the best writing skills earn three times more than their least-capable peers. This course is designed to immediately improve your written business communications through concrete, no-nonsense tools that will serve you throughout your career. The workshop format provides action-oriented feedback that builds confidence through in-class exercises, while homework practice solidifies your new skills.

Prerequisite(s): Sound knowledge of English grammar.

LINDA RODGERS-PRICE, B.S., M.A.

**CLASSROOM WITH ONLINE MATERIALS**
6 meetings | 6–9:30 pm | April 4–May 9
Fee: $660.
To enroll, use Section Number 5916.(057)

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View each courses’ full schedule online at ucsc-extension.edu
BUSINESS ADMINISTRATION CERTIFICATE

REQUIRED COURSES (14 units)  
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<thead>
<tr>
<th>Course</th>
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<th>Course</th>
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<tbody>
<tr>
<td>Business Law and Its Environment</td>
<td>3.0</td>
<td>6360</td>
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<tr>
<td>Finance I, Fundamentals</td>
<td>3.0</td>
<td>3636</td>
</tr>
<tr>
<td>Management and Organization, Principles</td>
<td>2.0</td>
<td>0692</td>
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<tr>
<td>Microeconomics, Introduction</td>
<td>4.0</td>
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<tr>
<td>Principles of Marketing</td>
<td>2.0</td>
<td>0104</td>
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ELECTIVE COURSES (11 units)  
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<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>Business Essentials</td>
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<tr>
<td>Business and Professional Writing</td>
<td>2.0</td>
<td>5916</td>
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<tr>
<td>Cross-Cultural Negotiation:</td>
<td></td>
<td></td>
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<tr>
<td>Asian and Western Business Environments</td>
<td>1.5</td>
<td>30236</td>
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<tr>
<td>Effective Negotiations: Principles, Strategies, and Techniques</td>
<td>1.5</td>
<td>1493</td>
</tr>
<tr>
<td>Facilitation Skills</td>
<td>2.0</td>
<td>0426</td>
</tr>
<tr>
<td>Macroeconomics, Introduction</td>
<td>4.0</td>
<td>0479</td>
</tr>
<tr>
<td>Principles of Business Analysis</td>
<td>2.0</td>
<td>30110</td>
</tr>
<tr>
<td>Principles of Real-World Economics</td>
<td>2.0</td>
<td>30273</td>
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Financial Analysis/Accounting  
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<tr>
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<tr>
<td>Business Statistics I</td>
<td>2.5</td>
<td>5620</td>
</tr>
<tr>
<td>Business Statistics II</td>
<td>2.5</td>
<td>6538</td>
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<tr>
<td>Financial Statement Analysis</td>
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<td>6938</td>
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<tr>
<td>Introduction to Accounting I: Financial Accounting</td>
<td>4.0</td>
<td>3658</td>
</tr>
<tr>
<td>Introduction to Accounting II: Managerial Accounting</td>
<td>4.0</td>
<td>1224</td>
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Management Development  
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<tr>
<th>Course</th>
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<th>Course</th>
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<tr>
<td>Business Communications</td>
<td>2.0</td>
<td>30480</td>
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<tr>
<td>Human Resources Management, Introduction</td>
<td>1.5</td>
<td>55580</td>
</tr>
<tr>
<td>Organizational Development and Change, Introduction</td>
<td>2.0</td>
<td>2719</td>
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Marketing Business Development  
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<tr>
<th>Course</th>
<th>Units</th>
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<tr>
<td>Marketing Operations 2.0: Tactical Discipline to Strategic Vision</td>
<td>2.0</td>
<td>21944</td>
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<tr>
<td>Power of Market Research</td>
<td>2.0</td>
<td>0109</td>
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<tr>
<td>Product Management: Moving the Product to Market</td>
<td>2.0</td>
<td>2466</td>
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</tbody>
</table>

Certification schedule outline of program curriculum and annual schedule are found online. From the homepage, select: "Area of Study"; department; then certificate title as listed above.

Business Statistics I  
BUSAD.X438.8 (2.5 quarter units)  
Professional Credit: HRCI–PHR, SPHR and GPHR strategic recertification credit.  
An introduction to the business use of statistical concepts and tools, this course covers the basic concepts of descriptive statistics—such as means and variances, uses of probability, and statistical inference—and their application to business processes and decisions. In addition, the course addresses the use of statistical estimation techniques, decision theory (hypothesis-testing process), and the use of regression and correlation.  
LAURENCE O’CONNELL, M.A.  
ONLINE | April 10–June 5  
Enrollment accepted through April 12.  
Fee: $720.  
To enroll, use Section Number 5620.(069)

Human Resource Management, Introduction  
For course description, see page 36.

Introduction to Accounting I: Financial Accounting  
For course description, see page 26.

Introduction to Accounting II: Managerial Accounting  
For course description, see page 26.

Marketing Operations 2.0: Tactical Discipline to Strategic Vision  
For course description, see page 40.
Organizational Development and Change, Introduction
For course description, see page 36.

Power of Market Research
For course description, see page 40.

Principles of Business Analysis
BUSAD.X410.353 (3.0 quarter units)
This course provides a foundation in business analysis and lays the groundwork for advanced studies. It will equip you with the practical skills required to succeed in the business analyst role, communicate requirements to the technical team before solutions are designed and implemented, and create deliverable documents. You’ll learn the Six Sigma techniques to define value, control business processes and derive requirements for process and automation projects that add value to your organization. The course includes group and individual exercises, a threaded case study, and an action planning on-the-job implementation.

RICHARD RONDEAU, PMP®, M.B.A., M.S.
CLASWRoom with ONLINE MATERIALS
5 meetings | 8:30 am–3:30 pm | April 22–May 20
Fee: $880.
To enroll, use Section Number 30110.(011)

Role of the Project Manager
For course description, see page 43.

Also of Interest
Terminating and Managing Problem Employees
For course description, see page 37.

Financial Planning
Certificate Program

Personal Financial Planning

PROGRAM CONTACT
Business and Management Department, (408) 861-3860, or email extensionprogram@ucsc.edu.

PROGRAM SUMMARY
Financial planning and wealth management remains a fast-growing field because of the complexity of the financial decisions confronting almost everyone, including the “Boomer” generation, which is about to retire en masse. This cultural and economic shift presents rewarding career opportunities for those interested in personal finance. UCSC Extension offers Silicon Valley’s only CERTIFIED FINANCIAL PLANNER™ Board-registered program. Our training will ground you in CFP Board education requirements—fulfilling a qualification for you to sit for the rigorous CFP® examination.

Additionally, because of our program’s alignment with the Financial Planning Association, you receive the unique opportunity to network within the professional community while earning this universally recognized credential. All our instructors are leading practitioners. They provide real-world practices and the latest information and insight into the field. Take individual courses to expand or update specific knowledge—or pursue the certificate and put yourself on track to become a CFP® professional.

AUDIENCE
• Anyone interested in their financial well-being
• Financial planners (uncredentialled)
• Real estate and mortgage professionals
• Accountants
• Attorneys
• Trust officers
• Stockbrokers
• Insurance agents
• Private bankers
• Career changers

PROGRAM PREREQUISITES
If you intend to pursue the Certificate in Personal Financial Planning (PFP) 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.

CERTIFICATE REQUIREMENTS
• You must take all eight courses and attain an overall average of 3.0 to qualify, including a B or better in “Applied Mathematics for Financial Planning,” “PFP Survey” and “PFP, Practicum,” and a C or better in each of the other courses.
• Course work must be completed within three years of declaring candidacy.
• Courses completed more than five years prior to date certificate is issued cannot be used to fulfill requirements.

COURSE SEQUENCE
The two prerequisite courses (“Applied Mathematics for Financial Planning” and “PFP Survey”) must be completed prior to enrolling in the remaining courses. The final course for all candidates is the “Personal Financial Planning, Practicum.”

FOR UCSC EXTENSION POLICIES, SEE PAGE 96.

ABOUT CFP® CERTIFICATION
Certified Financial Planner Board of Standards, Inc., owns the trademarks CFP®, CERTIFIED FINANCIAL PLANNER™ and CFP (with flame logo)® certification marks in the U.S., which it awards to individuals who successfully complete the CFP Board’s initial and ongoing certification requirements. UCSC Silicon Valley Extension does not certify individuals to use the CFP®, Certified Financial Planner™ or CFP (with flame logo)® certification marks. CFP® certification is granted only by the Certified Financial Planner Board of Standards, Inc., to those persons who, in addition to completing an educational requirement such as this CFP Board-registered program, have met its ethics, experience and examination requirements.

CFP® EXAMINATION INFORMATION
For information regarding the CFP® examination and experience requirements, please write the CFP Board, 1425 K St., NW, Suite 500, Washington, DC 20005, call toll-free (800) 487-1497, or visit www.cfp.net.

PROGRAM CHAIR

RENÉE SNOW, Ph.D., CFP®, EA, has worked as a Certified Financial Planner® for the past 20 years and has combined technical expertise with psychology and philosophy in service to her clients. She earned a M.S. in accounting and worked eight years for a large regional CPA firm. Dr. Snow manages her own firm and specializes in tax planning, asset management and the psychological aspects of wealth management. As a financial planning instructor at UCSC Extension, she grounds students in the philosophy of economics while giving them the practical tools to work in the financial services industry.
PERSONAL FINANCIAL PLANNING CERTIFICATE

Prerequisite Courses

Personal Financial Planning, Survey
BUSAD.X444. (4.0 quarter units)
This course introduces the professional and technical content of personal financial planning. It emphasizes the identification and quantification of financial objectives and the interrelated facets of a wide range of technical material. This course also covers ethics, strategies, and processes of professional practice and CFP® standards of practice. An HP-12C or equivalent financial calculator is required.
ELLEN LAU, M.B.A., CFP
CLASSROOM WITH ONLINE MATERIALS
10 meetings | 6–10 pm | April 12–June 14
Fee: $770.
To enroll, use Section Number 4309.(081)

Required Courses

Income Taxation in Personal Financial Planning
BUSAD.X459.9 (3.5 quarter units)
Designed for students intending to become financial planning professionals, this course focuses on the interrelationship between common income tax rules and planning techniques that are applicable to individuals. Topics include income, deductions, credits, sales and exchanges, real estate transactions, compensation planning and stock options, retirement plans, business entities, and overall coordination with the individual’s financial plan.
Prerequisite(s): “Mathematics for Financial Planning,” and “Personal Financial Planning, Survey.”
NANCY PYZEL, M.B.A., EA
CLASSROOM WITH ONLINE MATERIALS
10 meetings | 6–9:30 pm | April 25–June 27
Fee: $720.
To enroll, use Section Number 3672.(036)
Investments in Personal Financial Planning: Principles and Methods  
BUSDAD.X455.8 (4.0 quarter units)  
This course provides a comprehensive overview of investments through readings, case studies, problem solving exercises and discussion. This balance of practical application and theory should be useful to both the practitioner and the investor. The course emphasizes the structure, regulation and operation of investment markets; understanding modern portfolio theory, asset allocation and risk control; detailed analysis of fixed income, equity and derivative investing; portfolio design and construction; fulfilling fiduciary responsibilities; and investment performance measurement and reporting.  
Prerequisite(s): “Mathematics for Financial Planning,” and “Personal Financial Planning, Survey.”  
RUSSELL BLAHETKA, DBA, CFP  
CLASSROOM WITH ONLINE MATERIALS  
12 meetings | 6–9:30 pm | March 28–June 27  
Fee: $790.  
To enroll, use Section Number 1556.(039)

Risk Management in Personal Financial Planning  
BUSDAD.X460.1 (3.5 quarter units)  
This course provides a survey of risk management with a focus on applying the fundamentals to such personal issues as premature death, medical costs, long-term care, property and liability exposures. After a review of the fundamentals, the course covers the techniques and strategies of risk management, including the use of various forms of insurance and risk retention and reduction. You’ll use readings, case studies, in-class discussion, and a review of real-world situations to understand the often-overlooked, yet critically important, dimensions of personal risk management.  
Prerequisite(s): “Mathematics for Financial Planning,” and “Personal Financial Planning, Survey.”  
FARUK JAFFER, B.S.  
CLASSROOM WITH ONLINE MATERIALS  
10 meetings | 6–9:30 pm | April 24–July 17  
Fee: $720.  
To enroll, use Section Number 2040.(042)

Practicum Course

Personal Financial Planning, Practicum  
BUSDAD.X460.4 (3.0 quarter 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.  
RENEE SNOW, Ph.D., CFP®, EA  
CLASSROOM AND ONLINE (HYBRID)  
10 meetings | 6–9 pm | April 12–June 14  
Fee: $690.  
To enroll, use Section Number 5129.(069)
HUMAN RESOURCE MANAGEMENT CERTIFICATE

Not unit-specific.

<table>
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<tr>
<th>REQUIRED COURSES</th>
<th>Units</th>
<th>Course</th>
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<tbody>
<tr>
<td>Benefits Management: A Comprehensive Study of Employee Benefit Programs</td>
<td>2.0</td>
<td>6251</td>
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<tr>
<td>Compensation Management</td>
<td>2.0</td>
<td>4506</td>
</tr>
<tr>
<td>Effective Employee Relations</td>
<td>1.5</td>
<td>4698</td>
</tr>
<tr>
<td>Finance for the Business Professional</td>
<td>1.0</td>
<td>30473</td>
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<td>Human Resource Management, Introduction</td>
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<td>5580</td>
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<td>Law and Human Resource Management</td>
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<td>5283</td>
</tr>
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<td>Managing the Staffing Function</td>
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<td>5019</td>
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<td>Organizational Development and Change, Introduction</td>
<td>2.0</td>
<td>2719</td>
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<th>ELECTIVE COURSES (Choose three)</th>
<th>Units</th>
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<tr>
<td>Recruiting and Staffing</td>
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<tr>
<td>Building Your HR Career From the Inside Out</td>
<td>1.0</td>
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<tr>
<td>Interviewing for Success: Using Structured Interviewing Techniques</td>
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<td>6254</td>
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<td>Talent Acquisition 101</td>
<td>1.5</td>
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<tr>
<td>Effective Performance Management</td>
<td>2.0</td>
<td>30433</td>
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| Leadership Development                                                             |       |        |
| Facilitation Skills                                                                | 2.0   | 0426   |
| Leading People Through Change                                                      | 0.5   | 4689   |
| Business Communications                                                             | 2.0   | 30480  |
| Improving Your Business Presentation Skills                                        | 2.0   | 0913   |

| Employee Relations                                                                 |       |        |
| Effective Negotiations: Principles, Strategies and Techniques                      | 1.5   | 1493   |
| Cultural Proficiency                                                               | 2.0   | 6475   |
| Terminating and Managing Problem Employees                                         | 0.5   | 30131  |
| Workplace Investigations                                                            | 0.5   | 5512   |

| HR Business Partners/Generalist                                                    |       |        |
| HR Technology—What You Need to Know to Be a Technology Proponent                   | 1.5   | 30238  |
| Management and Organization, Principles                                            | 2.0   | 0692   |
| Role of the Project Manager                                                       | 1.5   | 0306   |

Certificate schedule outline of program curriculum and annual schedule are found online. From the homepage, select “Area of Study”; department; then certificate title as listed above.

PROGRAM CHAIR
NANCY NELSON, B.A., SPHR-CA®, GPHR®, principal of HRProse, LLC, and has more than 20 years of experience managing a variety of corporate HR functions in the telecommunications and high-tech sectors. She has taught for UCSC Extension since 2007. She most recently served as HR director for Ultra Clean Technology. Ms. Nelson is past adjunct faculty in the CSU East Bay College of Business and Economics and has facilitated the Northern California Human Resource Association PHR/SHRM certification prep course. She is certified as a Senior Professional in Human Resources by the Human Resources Certification Institute.

HRCI PROVIDER APPROVAL

The Human Resource Certification Institute (HRCI), the national certification board for HR professionals, has certified our HRM program as an Approved Provider.

All our HRM courses now qualify for recertification credit hours, based on HRCI standards. Taking just three of our courses every two years can fulfill all recertification requirements. See hrcl.org for complete details.

The use of this seal is not an endorsement by HRCI of the quality of the program. It means that this program has met HRCI’s criteria to be pre-approved for recertification credit.

Human Resource Management Advisory Board

NANCY NELSON, B.A., SPHR-CA®, GPHR®
ROBERT COON, Ph.B., Wayne State University
LEA VALENCIA DAVIS, M.B.A., Santa Clara University
JEFF JACOBS, B.S., Santa Clara University
STEPHEN McELFRESH, Ph.D., JD, SPHR®, Boston College
RICK PARTRIDGE, M.Ed., Ed.S., University of Florida

ACCESS TO ONLINE COURSES AND MATERIALS

If you are enrolling for the first time in an Online course, or a classroom course with Online Materials, you will receive an account for UCSC Extension Online via email within 12 hours. If you have previously taken a course with online materials, you should use your existing account. Course sites will open one day prior to the official start date.

For more information, including help retrieving your account info, please visit ucsc-extension.edu/online-faqs.

For information on textbooks, see page 100 or visit ucsc-extension.edu/bookstore.

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Required Courses

Benefits Management: A Comprehensive Study of Employee Benefit Programs
BUSAD.X422.4 (2.0 quarter units) Professional Credit: HRCL–PHR, SPHR and GPHR general recertification credit, 19.25 hours.

This course presents a comprehensive view of benefits, including the latest approaches for analyzing and selecting programs and funding options; developing strategies and negotiating techniques to reduce healthcare costs; and evaluating employee needs and helping them better understand their coverage. The course includes detailed discussion of health and welfare plans, including cafeteria plans, qualified retirement plans such as 401(k) plans, vacation and sick leave programs, incidental benefits, and overall benefit cost management.

Prerequisite(s): “Human Resource Management, Introduction.”

MARCO ROSA, M.A.
CLASSROOM WITH ONLINE MATERIALS
6 meetings | 6–9 am | April 4–May 16
Fee: $650.
To enroll, use Section Number 2719.(098)

Compensation Management
BUSAD.X425. (2.0 quarter units) Professional Credit: HRCL–PHR, SPHR and GPHR general recertification credit, 22 hours.

This course presents wage theories and practices and their application to problems in business and industry. A workshop approach will be applied to the study of wage survey techniques; job analysis, classification, and evaluation; methods of individual wage determination; and incentive plans.

Prerequisite(s): “Human Resource Management, Introduction.”

INSTRUCTOR TBA
CLASSROOM WITH ONLINE MATERIALS
6 meetings | 8:30 am–12:30 pm | April 22–June 3
Fee: $710.
To enroll, use Section Number 4506.(094)

Effective Employee Relations
BUSAD.X466.3 (1.5 quarter units) Professional Credit: HRCL–PHR, SPHR and GPHR general recertification credit, 16.5 hours.

This course presents legal and practical methods for handling employee relations issues. Special emphasis is given to the 80 percent of job terminations that are on-the-job behavior related. Topics include employee communications, handling employee complaints, resolving employee conflicts and harassment, coaching managers through employee issues; performance management; voluntary and involuntary terminations; and the impact of mergers and acquisitions.

Prerequisite(s): “Human Resource Management, Introduction.”

JILL PODOLSKY, B.S.
CLASSROOM WITH ONLINE MATERIALS
5 meetings | 6–9 pm | May 17–June 14;
and 9 am–4 pm | June 10
Fee: $650.
To enroll, use Section Number 4698.(079)

Finance for the Business Professional
For course description, see page 28.

Human Resource Management, Introduction
BUSAD.X425.1 (1.5 quarter units)

Human resource management is a rapidly evolving profession. This introductory course and intensive overview provides an in-depth exploration of today's HR function and its place in the modern organization. Designed for those who are new to the field, as well as those who would like a refresher, this highly interactive course covers key HR functions through lecture, class discussions, and team exercises. You will be provided an overview of primary HR roles including talent acquisition, rewards strategy, business partnership, and other practices that are aligned to drive business success.

NANCY NELSON, B.A., SPHR-CA®, GPHR®
PATRICIA MAHONY, M.S., M.A.
CLASSROOM WITH ONLINE MATERIALS
2 meetings | 9 am–5 pm | May 6–13
Fee: $610.
To enroll, use Section Number 5580.(148)

Managing the Staffing Function
BUSAD.X476.7 (1.5 quarter units) Professional Credit: HRCL–PHR, SPHR and GPHR general recertification credit, 16.5 hours.

Recruiting top talent for an organization is one of the most difficult challenges for staffing departments today. This workshop explores these critical issues related to managing the staffing function: understanding staffing models and organizational costs, workforce planning, budgeting and managing staffing costs, marketing the staffing function, developing effective hiring processes, selecting and evaluating resources, maximizing the recruiting website, college-recruitment and employee-referral programs, managing global requirements, and measuring performance.

Prerequisite(s): “Human Resource Management, Introduction.”

LEON BEZDIKIAN, B.A.
CLASSROOM WITH ONLINE MATERIALS
6 meetings | 6–9 pm | April 19–May 24
Fee: $650.
To enroll, use Section Number 5019.(053)

Organizational Development and Change, Introduction
BUSAD.X424.3 (2.0 quarter units) Professional Credit: HRCL–PHR, SPHR and GPHR general recertification credit.

Designed for those charged with bringing about change, this course is valuable for managers, human resource professionals, internal or external consultants, as well as those interested in pursuing a career in this field. The course is experiential and is delivered in a participative workshop style, which includes groupwork outside of class. An overview of OD, the nature of change, and the OD practitioner is provided. Topics include the 21st century organization; organizational structure, design, culture, systems and rewards; management and leadership; and diagnostic models and systematic change intervention.

JUDY LACROIX, B.A., M.B.A.
CLASSROOM WITH ONLINE MATERIALS
8 meetings | 6–9 pm | April 27–June 15
Fee: $710.
To enroll, use Section Number 2719.(098)
Elective Courses

Building Your HR Career From the Inside Out
BUSAD.X493.8 (1.0 quarter units)
Are you looking to focus your HR career? Wondering what will bring you the most job satisfaction? How will you reconcile your work values, experience and skills? Through assessments, self-reflection and discussions, this course will assist you in evaluating and comparing your current HR skills and experience to those required for various positions within the field. The course will help you identify gaps in career experience and create an action plan for development. HR experts discuss how they developed their career paths, and will explain strategies to augment HR skillsets.
NANCY NELSON, B.A., SPHR-CA®, GPHR®
CLASSROOM WITH ONLINE MATERIALS
3 meetings | 6–9:30 pm | June 5–June 19
Enrollment accepted through May 2.
Fee: $500.
To enroll, use Section Number 3842.(009)

Interviewing for Success: Using Structured Interviewing Techniques
BUSAD.X407.1 (0.5 quarter units) Professional Credit: HRCI–PHR, SPHR and GPHR general recertification credit.
This course is designed to improve the interviewing skills of staffing professionals, managers, supervisors and other employees involved in personnel selection decisions. The course covers specific techniques for behavioral, technical, and executive interviews. You’ll learn a variety of interviewing and evaluation techniques for making more effective hiring decisions. Topics include how to prepare job specifications; review resumes quickly and accurately; plan, control, evaluate and document the interview; and use effective questioning techniques in the interview process.
JULIUS SCHILLINGER, M.S.
CLASSROOM WITH ONLINE MATERIALS
1 meeting | 9 am–5 pm | April 15
Fee: $420.
To enroll, use Section Number 6254.(054)

Management and Organization, Principles
For course description, see page 30.

Role of the Project Manager
For course description, see page 43.

Terminating and Managing Problem Employees
BUSAD.X447.3 (0.5 quarter units) Professional Credit: MCLE–Minimum Continuing Legal Education State Bar of CA.
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.”
DEANNA MOUSER, B.S., J.D.
CLASSROOM WITH ONLINE MATERIALS
1 meeting | 9 am–5 pm | April 29
Fee: $420.
To enroll, use Section Number 30131.(006)

Also of Interest

Designing Training Programs
For course description, see page 59.

If you are enrolling for the first time in an Online course, or a classroom course with Online Materials, you will receive an account for UCSC Extension Online via email within 12 hours. If you have previously taken a course with online materials, you should use your existing account. Course sites will open one day prior to the official start date.
For more information, including help retrieving your account info, please visit ucsc-extension.edu/online-faqs.
For information on textbooks, see page 100 or visit ucsc-extension.edu/bookstore.

ENROLL EARLY!
Enroll at least seven days prior to your course’s start date to save your seat and allow time to prepare for the first class meeting. Enrolling early also helps ensure that your course is not cancelled due to low enrollment.

ACCESS TO ONLINE COURSES AND MATERIALS
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Legal Studies

Paralegal Certificates of Completion

UCSC EXTENSION PROGRAM CONTACT
Business and Management Department, (408) 861-3860, or email extensionprogram@ucsc.edu.

PROGRAM SUMMARY
We offer The Center for Legal Studies’ nationally acclaimed paralegal training online. Our comprehensive two-course sequence is designed for maximum efficiency of instruction and will prepare you for employment as a paralegal in the State of California.

PROGRAM REQUIREMENTS
You must complete both the paralegal core courses and the advanced paralegal courses to meet the requirements for California Business and Professions Code 6450.

ONLINE COURSES
The total number of class hours is comparable to classroom instruction offered elsewhere. Students are expected to complete an average of 15 hours of homework outside of class sessions.

• Core Paralegal Certificate Course
• Advanced Paralegal Certificate Course

2017 Session Dates
Online courses are held during two seven-week sessions. The dates below reflect the available start dates for each 14-week course. End dates vary depending on when a student commences instruction.

• 2017 Session 1: January 9—February 24
• 2017 Session 2: March 6—April 21
• 2017 Session 3: May 1—June 16
• 2017 Session 4: June 26—August 11
• 2017 Session 5: August 21—October 6
• 2017 Session 6: October 16—December 1

Students will be required to purchase the Westlaw® access for this course directly from The Center for Legal Studies. The Center for Legal Studies will send students logon information on the day the session begins.

Certificate of Completion

Paralegal Core Course

LGST.803. (9.0 CEUs)

Our core Paralegal curriculum is a 14-week intensive, nationally acclaimed program designed for beginning as well as advanced legal workers. The instruction is practice-oriented and relates to those areas of law in which paralegals are the most in demand:

• Legal terminology, documents, ethics and the litigation process
• Introduction to the evidentiary predicate, which covers the rules of evidence and civil procedure
• Identification of relevant authority
• Introduction to legal research practice, which covers research techniques for use in legal memoranda, motions, and briefs
• Legal research practice, which emphasizes shepardizing statutes, case law, and the use of computerized legal research terminal (Research assignments will be discussed and critiqued, and the West Key Number System® will be reviewed thoroughly)
• Legal writing and appellate procedure, which concentrates on the preparation and critique of legal memoranda, including an interoffice memorandum of law and an appellate brief

The subject material for this course is broken down into two seven-week modules: Paralegal I and Paralegal II.

The course fee includes both sessions. At the conclusion of Paralegal I, students will be asked to “enroll” for the second session (Paralegal II). Registration for Paralegal II is done through The Center for Legal Studies and not UCSC Extension.

Students will be required to purchase Westlaw® access for Paralegal II directly from The Center for Legal Studies.

The section below is for the entire two part program.

ONLINE | May 1—June 16
Enrollment accepted through May 1.
Fee: $1289.
To enroll, use Section Number 0710.(085)

ONLINE | June 26—August 11
Enrollment accepted through June 26.
Fee: $1289.
To enroll, use Section Number 0710.(086)

Advanced Paralegal Course

LGST.809. (27.0 CEUs)

In this challenging course designed to meet the requirements of California Business and Professions Code §6450, participants choose six of the following topics: Advanced Legal Research; Bankruptcy Law; Business Law and Practices; Constitutional Law and Civil Liberties; Criminal Law; Criminal Procedure; Education Law; Estate Planning; Probate, Wills, and Trusts; Family Law; Immigration Law; Intellectual Property; Mediation and Other Forms of ADR; Real Property Law; Victim Advocacy; and Water Law.

ONLINE | May 1—June 16
Enrollment accepted through May 1.
Fee: $1800.
To enroll, use Section Number 5827.(080)

ONLINE | June 26—August 11
Enrollment accepted through June 26.
Fee: $1800.
To enroll, use Section Number 5826.(081)

Legal Studies

Curriculum Details
For curriculum details, textbooks, Westlaw access and syllabus, visit the CLS website at www.legalstudies.com, call (800) 522-7737 or email info@legalstudies.com.

Course Fee
No courses offered in conjunction with The Center for Legal Studies qualify for discounts, gift certificates or comps.

For Additional Information
UCSC Extension Program Contact: Business and Management Department, (408) 861-3860, or email extensionprogram@ucsc.edu.

Enrollment Policy
Students are subject to UCSC Extension policies and pay the fees associated with the policies. For our enrollment policies, please see page 98.
Marketing Management

PROGRAM CONTACT
Business and Management Department, (408) 861-3860 or email extensionprogram@ucsc.edu.

PROGRAM SUMMARY
Nearly every industry relies on marketing professionals to promote their goods or services to retain and acquire customers. Customer-driven marketing has become increasingly important to Silicon Valley companies. Our marketing curriculum brings this orientation to the forefront and reflects the latest developments in marketing technology and practice.

We offer two tailored tracks that blend key principles with cutting-edge techniques:
• Marketing Management
• Digital Marketing (includes social media)

Take individual courses to expand or master the array of marketing disciplines from tactical know-how to strategic insight or pursue the certificate for comprehensive training from the pros that have helped make Silicon Valley what it is today.

CERTIFICATE REQUIREMENTS
Total of 14 units
• 6.5 required units
• 7.5 elective units

RECOMMENDED COURSE SEQUENCE
It is recommended you start with "Principles of Marketing."

PROGRAM CHAIR
LY-HUONG PHAM, Ph.D., M.B.A., M.S., has over 30 years of experience as an executive in the high tech industry and is CEO of Mobiscale LLC, a provider of strategic management, educational, and software system development services. Ms. Pham has developed a co-creator index, a global sourcing framework to maximize competitive advantages as part of her research, and has over a dozen patents. Her clients range from startups to Fortune 500 companies in high-tech, social media, mobile, education and healthcare sectors.

Required Courses

Implementing Winning Marketing Strategies
BUSAD.X420.8 (2.0 quarter units)
This introductory course emphasizes revenue generation and investigates the 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. You’ll learn to systematically convert prospects into customers and to maintain relationships to maximize long-term profitability. Topics include buyer psychology, prospecting methodologies, customer relationship management, lead generation tactics, and channels and merchandising.
LY-HUONG PHAM, Ph.D., M.B.A., M.S.
CLASSROOM WITH ONLINE MATERIALS
6 meetings | 6–9:30 pm | May 2–June 6
Fee: $630.
To enroll, use Section Number 1661.(060)

Integrated Marketing Communication
BUSAD.X458.7 (2.5 quarter units)
An integrated marketing communication plan is the best way to reach your appropriate target market in a cost-effective and measurable way. This course shows you how to develop a plan and budget with a good return on investment using a blend of marketing tools that conveys a consistent message. Upon completion of this course, you will be able to explain the manager’s role in the marketing communication process, determine marketing communication objectives versus general marketing objectives, and properly identify the key messages for your target markets. You’ll learn the criteria for developing creative materials, evaluate and integrate all the various marketing communication tools available, select the appropriate traditional and modern digital media channels, develop integrated budgets using the “Task Method,” and develop and implement measurement and feedback processes.
MICHAEL SAVOD, B.S., M.B.A.
CLASSROOM WITH ONLINE MATERIALS
7 meetings | 6–9 pm | March 22–April 26; and 9 am–4 pm | April 22
Fee: $685.
To enroll, use Section Number 3599.(041)

Principles of Marketing
BUSAD.X433.5 (2.0 quarter units) Professional Credit: PRCE–PRH, PRPH and GPHR strategic recertification credit; MCLE–Minimum Continuing Legal Education State Board of CA, 19.25 hours.
This course emphasizes the role of marketing in shaping and developing new ideas; the 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. You will also explore the impacts of changing lifestyles and international market forces on American buying patterns, consumer and organizational buying behaviors, and methods and resources for researching and segmenting markets.
LY-HUONG PHAM, Ph.D., M.B.A., M.S.
CLASSROOM WITH ONLINE MATERIALS
6 meetings | 6–9:30 pm | March 20–April 24
Fee: $630.
To enroll, use Section Number 0104.(077)

Elective Courses

Advanced Social Media Marketing: A Practical Approach for Business
BUSAD.X400.095 (1.5 quarter units)
This course provides a pragmatic approach to achieving measurable sales and marketing goals. The course updates traditional sales and marketing strategies and techniques using modern social media marketing tools and platforms. You will learn how to use social platforms such as Facebook, Twitter, and LinkedIn to expand the sales funnel globally, shorten the traditional sales cycle, and automate large portions of the sales process.
Prerequisite(s): "Fundamentals, Social Media Marketing," and "Principles of Marketing."
NATASCHA THOMSON, M.A., M.B.A.
CLASSROOM WITH ONLINE MATERIALS
2 meetings | 9 am–5 pm | April 7–21
Fee: $580.
To enroll, use Section Number 22871.(015)

Applied Digital Marketing for Business: Tools, Technologies, Techniques and their Applications
BUSAD.X400.318 (2.0 quarter units)
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 reportinganalytics behind running successful multi-channel campaigns.
THOMAS MOYER, M.B.A.
CLASSROOM WITH ONLINE MATERIALS
6 meetings | 10 am–2 pm | April 22–May 20
Fee: $610.
To enroll, use Section Number 30487.(002)

Business and Professional Writing
For course description, see page 30.

ENROLL EARLY!

Enroll at least seven days prior to your course’s start date to save your seat and allow time to prepare for the first class meeting. Enrolling early also helps ensure that your course is not cancelled due to low enrollment.
**Consumer Insights:**
Data Analysis and Interpretation
BUSAD.X421.068 (1.5 quarter units)

Through case studies, this course introduces concepts required to understand consumer data from various sources, including retail, web, survey, and call center data. You will learn the key strategies and promotions companies use to increase the profitability of their businesses based on consumer feedback data. You will have the opportunity to work on three detailed business case studies. In the final project, you’ll perform a complete analysis of a business case from its inception to execution. The course utilizes advanced MS Excel skills for data manipulation.

**Prerequisite(s):** Basic Mathematics

SHALINI GOPALKRISHNAN, B.S.C.S., M.B.A., Ph.D.
LAB WITH ONLINE MATERIALS
5 meetings  |  6:30–9:30 pm  |  April 11–May 9
Fee: $580.
To enroll, use Section Number 30038.(009)

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**CRM: Customer Relationship Management, Fundamentals**
BUSAD.X494.4 (2.0 quarter 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.

SATYA KRISHNASWAMY, M.B.A.
LAB WITH ONLINE MATERIALS
7 meetings  |  6:30–9:30 pm  |  April 4–May 16
Fee: $630.
To enroll, use Section Number 3386.(008)

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**Marketing Operations 2.0:**
Tactical Discipline to Strategic Vision
BUSAD.X400.080 (2.0 quarter units)

This course explores the difference between marketing operations and traditional marketing. It covers the best practices necessary to bring discipline to the marketing function so that it supports the organization’s sales objectives. You will learn a new approach to marketing management which leverages process, technology, guidance and metrics to run marketing as a fully accountable profit center. Key topics include the marketing operations ecosystem; interdisciplinary tools; achieving organizational alignment; designing, deploying and managing marketing infrastructure; and the marketing operations life cycle.

GARY KATZ, M.S.O.D.
LAB WITH ONLINE MATERIALS
5 meetings  |  6–9 pm  |  March 21–April 18
Fee: $630.
To enroll, use Section Number 21944.(015)

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**Power of Market Research**
BUSAD.X417.6 (2.0 quarter units) Professional Credit: HRCI-PhR, SPHR and GPHR strategic recertification credit.

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. You will learn to identify the strengths and limitations of market research, as well as the proper ways to gather and present information—in the process demonstrating the market power you can gain from key knowledge points. Topics range from basic survey techniques in both primary and secondary research to an understanding of the power of statistical fact-gathering and analysis.

JENNIFER JACKSON, B.S.
CLASSROOM WITH ONLINE MATERIALS
7 meetings  |  6–9 pm  |  May 1–June 26
Fee: $630.
To enroll, use Section Number 0109.(053)

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**Search Engine Marketing**
BUSAD.X400.050 (2.0 quarter 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? In this course, you’ll find answers to these questions and learn to create a complete and effective Web-marketing program. You’ll learn how you can score better by having an active organic search (SEO) program and understand when it pays to advertise online and use SEM/PPC campaigns. The course also covers using social media to boost your search engine rankings.

JOHN THYFAULT, B.A.
CLASSROOM WITH ONLINE MATERIALS
7 meetings  |  6–9 pm  |  April 20–June 1
Fee: $630.
To enroll, use Section Number 19966.(020)

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**MARKETING MANAGEMENT CERTIFICATE**

14 units (Certificate students should complete the required units, and then the required final project *)

<table>
<thead>
<tr>
<th>REQUIRED COURSES</th>
<th>Units</th>
<th>Course</th>
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<tbody>
<tr>
<td>Implementing Winning Marketing Strategies</td>
<td>2.0</td>
<td>1661</td>
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<tr>
<td>Integrated Marketing Communication</td>
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<td>Principles of Marketing</td>
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<tr>
<th>SPECIALIZED ELECTIVES</th>
<th>Units</th>
<th>Course</th>
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<tbody>
<tr>
<td>Digital Marketing</td>
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<tr>
<td>Advanced Social Media Marketing: A Practical Approach for Business</td>
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<tr>
<td>Applied Digital Marketing for Business</td>
<td>2.0</td>
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<td>CRM: Customer Relationship Management, Fundamentals</td>
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<td>Fundamentals of Customer Acquisition and Retention</td>
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<td>Database Management and Social Selling</td>
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<td>Leveraging Social Media Partners</td>
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<td>Search Engine Marketing</td>
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<td>Fundamentals, Social Media Marketing</td>
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<td>Web and Mobile Analytics</td>
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<tr>
<td>Web Writing That Works</td>
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| Marketing Management | 2.0 | 5916 |
| Cross-Cultural Negotiation: Asian and Western Business Environments | 1.5 | 30236 |
| Consumer Insights: Data Analysis and Interpretation | 1.5 | 30038 |
| Marketing Operations 2.0: Tactical Discipline to Strategic Vision | 2.0 | 21944 |
| Medical Device Marketing | 3.0 | 30119 |
| Power of Market Research | 2.0 | 0109 |
| Positioning and Brand Management | 1.5 | 3781 |
| Product Management: Moving the Product to Market | 2.0 | 2466 |
| Public Relations: Winning the Mindshare Battle | 1.5 | 0511 |

**Final Project**
Capstone: Social Media | 2.0 | 30484 |

Certificate schedule outline of program curriculum and annual schedule are found online. From the homepage, select: “Area of Study”; department; then certificate title as listed above.
Minimum Continuing Legal Credit (MCLE)

MBA in Brief for Attorneys

PROGRAM CONTACT
Business and Management Department, (408) 861-3860, or email extensionprogram@ucsc.edu.

BETTER EQUIP YOURSELF TO RUN YOUR PRACTICE WHILE YOU FULFILL YOUR MCLE REQUIREMENTS

Learning to deal with the general business issues that attorneys confront in finance, accounting and management is part of your continuing professional education. The M.B.A. in Brief for Attorneys at UCSC Extension is designed to meet the goals and time constraints today’s attorneys face. Our courses are accredited, convenient, and attractively priced to help you fulfill your Minimum Continuing Legal Education (MCLE) credit requirements.

You’ll receive UC-quality instruction studying at UCSC Extension, where working professionals make us the choice for their advanced educational needs.

Courses

Finance for the Business Professional
For course description, see page 28.

Introduction to Accounting I: Financial Accounting
For course description, see page 26.

Introduction to Accounting II: Managerial Accounting
For course description, see page 26.

Principles of Marketing
For course description, see page 39.

Terminating and Managing Problem Employees
For course description, see page 37.

MCLE CREDIT

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<tr>
<th>COURSES</th>
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<tr>
<td>Introduction to Accounting II: Managerial Accounting</td>
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<td>Financial Statement Analysis</td>
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<td>Business Statistics II</td>
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<td>Finance</td>
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<td>Estate Planning</td>
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<td>Finance I, Fundamentals</td>
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<td>Finance for the Business Professional</td>
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<td>General Business Administration</td>
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<td>Business Law and Its Environment</td>
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<td>Principles of Marketing</td>
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<td>Web 2.0: Social Media Marketing</td>
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<tr>
<td>Human Resources Management</td>
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<tr>
<td>Law and Human Resource Management</td>
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<tr>
<td>Terminating and Managing Problem Employees</td>
<td>6.0</td>
<td>30131</td>
</tr>
<tr>
<td>Workplace Investigations</td>
<td>6.0</td>
<td>5512</td>
</tr>
</tbody>
</table>

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For more information, including help retrieving your account info, please visit ucsc-extension.edu/online-faqs.

For information on textbooks, see page 100 or visit ucsc-extension.edu/bookstore.
PROJECT AND PROGRAM MANAGEMENT CERTIFICATE

Not unit-specific.

REQUIRED COURSES

<table>
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<tr>
<th>Course Description</th>
<th>Units</th>
<th>Course</th>
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<td>Role of the Project Manager</td>
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<td>Project Integration and Risk Management</td>
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<tr>
<td>Project Leadership and Communication</td>
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<td>Applied Project Management</td>
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ELECTIVE COURSES (Choose any three)

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<td>Agile Product Life-cycle Management (APLM)</td>
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<td>Agile Project Management Using Scrum</td>
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<td>Clinical Project Management</td>
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<td>Creating the Successful Project Team</td>
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<td>Decision-Making Tools and Techniques</td>
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<tr>
<td>Effective Negotiations: Principles, Strategies, and Techniques</td>
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<tr>
<td>Extreme/Agile Project Management</td>
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<tr>
<td>Lean-Agile Project Management: Achieving Business Value</td>
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<td>Managing International Projects</td>
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<td>Managing Projects at Start-up Companies</td>
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<td>Managing Projects with Microsoft Project</td>
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<td>Managing the Development of New Products</td>
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<td>Principles of Business Analysis</td>
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<td>Project Procurement: Outsourcing and Contract Management</td>
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<td>Schedule Optimization Techniques for Managers</td>
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<tr>
<td>Strategic Thinking and Problem Solving</td>
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SPECIAL OFFERING

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<tr>
<td>PMP® Preparation</td>
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<tr>
<td>PMP® Examination Preparation: 35 Hour</td>
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</tbody>
</table>

Certificate schedule outline of program curriculum and annual schedule are found online. From the homepage, select “Area of Study”; department; then certificate title as listed above.

PROGRAM CHAIR

FRANK MANGINI, M.S.E.E., M.B.A., PMP®, PMI®-ACP, CSP, has over 25 years of experience in project management and product development and served as the director of programs for the ARGOSystems/Boeing Electronic Defense Systems. He has taught for UCSC Extension since 2002. His special interests are project risk management, critical chain project management (CCPM) and Agile-Lean development projects.

Visit our website at ucsc-extension.edu for updated information and to enroll online.
### Required Courses

#### Applied Project Management

**BUSAD.X486.5 (3.0 quarter units) Professional Credit:**
Project Management Institute–PMP Professional Development Units 30.0 hours; HRCT–PHR, SPHR and GPHR general recertification credit, 27.5 hours.

In this final course, you’ll be given tools to develop a realistic team project. The course emphasizes practical application of PM principles, processes, and techniques affecting control, cost management, project tracking, and outsourcing. You will learn how to minimize “scope creep.” Topics include project portfolio management techniques, as well as how to estimate project costs and forecast investment returns, apply cybernetic-control techniques to schedules and budgets, use earned-value management (EVM) to track projects, fast-track and crash the project’s critical path, and use stochastic techniques to ensure accurate project schedules.

**Prerequisite(s):** "Role of the Project Manager," “Project Integration and Risk Management,” and “Project Leadership and Communication.”

**JEFFREY SCHLAGETER, M.S.E.E.**

**CLASSROOM WITH ONLINE MATERIALS**
10 meetings | 6:30–9:30 pm | April 4–June 6
Fee: $880.
To enroll, use Section Number 4550.(092)

**FRANK MANGINI, M.B.A., M.S.E.E.**

**ONLINE** | April 4–June 6
Enrollment accepted through April 4.
Fee: $880.
To enroll, use Section Number 5837.(142)

#### Project Leadership and Communication

This course covers the soft skills needed to manage projects, including leadership, communications, team organization and development, conflict management, quality management, and negotiating. You’ll explore aspects of participative management such as building commitment, leadership styles, organizational cultures and configurations, interpersonal skill development, project staffing, and working with distance-separated teams. You’ll learn to establish project goals, overcome communication problems, write performance reports, and manage agreement. Topics include project leadership versus project management, improving project communications, building project commitment, managing conflict, and using the Johari Window to assess your interpersonal skills.

**Prerequisite(s):** "Role of the Project Manager.”

**ALAN TSUDA, M.B.A.**

**CLASSROOM WITH ONLINE MATERIALS**
10 meetings | 8:30 am–5 pm | June 3–10
Fee: $720.
To enroll, use Section Number 0306.(220)

**FRANK MANGINI, M.B.A., M.S.E.E.**

**ONLINE** | June 3–10
Enrollment accepted through June 6.
Fee: $720.
To enroll, use Section Number 2356.(096)

#### Project Integration and Risk Management

**BUSAD.X454.9 (1.5 quarter units) Professional Credit:**
Project Management Institute–PMP Professional Development Units 15.0 hours; HRCT–PHR, SPHR and GPHR general recertification credit, 13.75 hours.

Designed for project leaders, team members, engineering and marketing managers, directors and vice presidents, this course provides a proven set of global best practices to achieve fast time to market. It will equip you with project-integration and risk-management tools and techniques to get outstanding results in industries such as systems, software, IT, Web, integrated circuits, hardware, services, medical, biotech, and more. Topics include integrating all aspects of a project, managing project scope, conducting efficient project status-review meetings, eliciting, analyzing, and validating product requirements; and successfully managing project risks.

**Prerequisite(s):** "Role of the Project Manager.”

**FRANK MANGINI, M.B.A., M.S.E.E.**

**CLASSROOM WITH ONLINE MATERIALS**
2 meetings | 6:30–9:30 pm | April 4–June 6
Fee: $880.
To enroll, use Section Number 4550.(092)

**SANJAY BHATIA, B.S., PMP®**

**ONLINE** | April 17–May 22
Enrollment accepted through April 18.
Fee: $880.
To enroll, use Section Number 4550.(093)

**Role of the Project Manager**

**BUSAD.X454.9 (1.5 quarter units) Professional Credit:**
Project Management Institute–PMP Professional Development Units 15.0 hours; HRCT–PHR, SPHR and GPHR general recertification credit, 13.75 hours.

This course is designed to acquaint you with project management and the roles that a project manager plays in the five primary processes involved in managing projects: 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; and understanding project phases and project life cycles. You’ll learn the life cycle of typical projects and identify the diverse skills needed to successfully play these project manager roles.

**ALAN TSUDA, M.B.A.**

**CLASSROOM WITH ONLINE MATERIALS**
2 meetings | 6:30 am–5 pm | June 3–10
Fee: $720.
To enroll, use Section Number 0306.(219)

**SANJAY BHATIA, B.S., PMP®**

**ONLINE** | April 4–June 6
Enrollment accepted through April 4.
Fee: $880.
To enroll, use Section Number 5837.(141)
Elective Courses

Advanced Schedule Optimization Techniques
BUSAD.X412.366 (1.5 quarter units)
This follow-up course to Schedule Optimization Techniques provides objective metrics that answer the question “How will we know this is a good schedule?” Students will learn the techniques needed to determine the optimal project scope for the trajectory of a particular industry, cope with uncertainties of an experience-based scheduling tool, and achieve optimal scheduling of multiple-project portfolios.

The course provides advanced scheduling and evolutionary-algorithm based optimization tools that solve scheduling problems too complex for analytical or heuristics-based schedule optimization. Students will learn how to develop accurate project plans quickly that perform Design to Schedule project optimization, while avoiding common mistakes. You will gain valuable hands-on experience solving problems through real-world examples using the techniques and tools provided.

Prerequisite(s): “Role of the Project Manager” and “Schedule Optimization Techniques for Managers.”
WILLIAM BROOKS, M.A., MPM, CIPM
CLASSROOM WITH ONLINE MATERIALS
5 meetings | 6–9 pm | April 12–May 10
Fee: $720.
To enroll, use Section Number 30127.(006)

Agile Project Management Using Scrum
BUSAD.X400.111 (1.5 quarter 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, executing, monitoring, and 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.

Prerequisite(s): “Role of the Project Manager.”
RAVI KALLURI, M.S.E.E., M.B.A.
CLASSROOM WITH ONLINE MATERIALS
3 meetings | 12–5 pm | June 3–17
Fee: $720.
To enroll, use Section Number 23596.(014)

Creating the Successful Project Team
BUSAD.X495.4 (1.5 quarter units) Professional Credit: Project Management Institute—PMP Professional Development Units, 15.0 hours
Explore the fundamental principles of teams and characteristics of highly effective teams. You’ll gain perspective on how people work and why they think differently, how they make decisions and the mindset and behaviors that are conducive to effective team building and team performance. Additional topics include virtual teams, teams and change management, teams and high performance organization. Finally, you’ll complete the course with a team tool kit to take home that includes practical techniques for effective team meetings, creative thinking, the decision-making framework, and constructive confrontation.

Prerequisite(s): “Role of the Project Manager.”
KETAN DAVE, M.B.A., M.S., PMP®
CLASSROOM WITH ONLINE MATERIALS
2 meetings | 8:30 am–5 pm | April 1–8
Fee: $720.
To enroll, use Section Number 1156.(041)

Extreme/Agile Project Management
BUSAD.X400.055 (1.5 quarter units) Professional Credit: Project Management Institute—PMP Professional Development 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.

Prerequisite(s): “Role of the Project Manager.”
FRANK MANGINI, M.B.A., M.S.E.E.
CLASSROOM WITH ONLINE MATERIALS
5 meetings | 6–9 pm | April 6–May 4
Fee: $720.
To enroll, use Section Number 20035.(029)

Managing International Projects
BUSAD.X499.4 (1.5 quarter units)
This course provides project management techniques for developing an international project that can succeed in a multinational business environment. You’ll learn critical success factors for international projects and techniques for international project expansion, including how to find partners in emerging markets; manage intellectual property; communicate effectively on international teams; navigate project costs; and manage international contracts and agreements. You’ll be assessed on a practical problem-solving, exercise-based project. If your company hopes to extend its market reach, or if your start-up is seeking emerging market spaces, this is the course for you.

Prerequisite(s): “Role of the Project Manager.”
WILLIAM BROOKS, M.A., MPM, CIPM
LAB WITH ONLINE MATERIALS
5 meetings | 6–9 pm | April 6–May 4
Fee: $720.
To enroll, use Section Number 30323.(004)
Managing Projects with Microsoft Project
BUSAD.X479.7 (1.5 quarter units) Professional Credit: Project Management Institute—PMP Professional Development Units.

This course presents practical concepts and techniques for using a commonly available, but often-misused, management tool to reduce the time spent on planning and increase the time available to manage the project. The course is based on PM processes, not on software features, so students learn how to effectively leverage the tool during all phases of project management, from requirements analysis, detailed planning, and tracking/implementation to close-out. Topics include preplanning activities, defining tasks and resources, resource leveling, schedule optimization, establishing buy-in, tracking actual data, multiple projects and users, resource pooling, customizing the software, and valuable add-on tools. No software programming experience is required.

Prerequisite(s): “Role of the Project Manager.”
OLIVER GILDERSLEEVE, B.S.E.E., MSEE
LAB WITH ONLINE MATERIALS
5 meetings | Thursdays, 6–9 pm | April 6–May 4
Fee: $720.
To enroll, use Section Number 4556.(076)

Managing Software Projects
BUSAD.X481.9 (1.5 quarter units) Professional Credit: Project Management Institute—PMP Professional Development Units, 15.0 hours

In a six-year longitudinal study conducted by The Standish Group, nearly 75% of the 30,000 software projects tracked failed to meet schedule, budget, or scope requirements. During the same time, when fully implemented, the techniques presented in this course typically produce at least 90% success rates.

This course presents best practices in software project management both for students new to this field and for practicing project managers eager to improve results. The course materials discuss a range of corrective and preventative actions designed to help project managers deliver on time.

Prerequisite(s): “Role of the Project Manager.”
OLIVER GILDERSLEEVE, B.S.E.E., MSEE
CLASSROOM WITH ONLINE MATERIALS
2 meetings | 8:30 am–5 pm | May 6–13
Fee: $720.
To enroll, use Section Number 0943.(038)

Principles of Business Analysis
For course description, see page 32.

Project Procurement: Outsourcing and Contract Management
BUSAD.X494.7 (1.5 quarter units) Professional Credit: Project Management Institute - PMP® Professional Development Units.

This course provides you with all the information needed to plan and organize the issuance of subcontracts and manage them as self-contained projects. Instruction covers subcontract management development, organizing subcontract management teams, developing subcontract management plans, writing effective requests for proposals, contract types and incentives, negotiating with subcontractors, managing and controlling subcontractors, and keeping subcontractors on your team. You’ll use case studies and exercises to learn how to apply project management principles when managing subcontractors.

Prerequisite(s): “Role of the Project Manager.”
MICHAEL TAYLOR, M.S.
ONLINE | May 1–June 5
Enrollment accepted through May 2.
Fee: $720.
To enroll, use Section Number 4470.(031)

Also of Interest

PMP Examination Preparation: 35 Hour
BUSAD.829.3 (3.5 CEUs)

Students have had impressive success rates in passing the PMP® exam after completing this comprehensive 35-hour course. The course offers an in-depth review of the exam context and content by reviewing the current version of PMI®’s source document for the exam: A Guide to the Project Management Body of Knowledge®, (PMBOK® Guide) - Fifth Edition, Project Management Institute, Inc., 2013. You will gain a thorough understanding of PMI® standards and their application, study topics that PMI® certification candidates are expected to know that are not included in PMBOK® Guide, and practice answering exam questions. At the end of the course, you will take a simulated 200-question practice exam to get a feel for what it takes to sit for the four-hour exam.

Prerequisite(s): “Role of the Project Manager.”
KETAN DAVE, M.B.A., M.S., PMP®
CLASSROOM WITH ONLINE MATERIALS
5 meetings | 8:30 am–5:30 pm | April 15–May 13
Fee: $1200.
To enroll, use Section Number 0205.(046)
Technical Writing

Certificate Program

Technical Writing and Communication

CERTIFICATE CONTACT
Business and Management Department, (408) 861-3860, or email extensionprogram@ucsc.edu.

PROGRAM SUMMARY
Technical communicators work in a variety of fields, and professionals must expand their skills to keep pace with the needs of the world's most innovative companies. Whether addressing advanced topics or grammar basics, our comprehensive program centered around information usability educates superb technical communicators at all levels in all technical disciplines.

Our program is structured into five categories of courses, each catering to a different need and expertise within the professional community:
- Technical Communication Fundamentals
- Advanced Topics in Communication
- Project Leadership
- Tools and Technologies
- Engineering Communication

Take individual courses to expand or update specific skills, or pursue the certificate for comprehensive instruction from the professionals who helped define the profession in Silicon Valley.

AUDIENCE
- Information developers, engineers and architects
- Career changers
- Documentation project leads
- Engineering managers
- Technical writers, editors and communicators
- User experience architects and designers
- Usability engineers
- Visual designers

View each courses’ full schedule online at ucsc-extension.edu

CERTIFICATE REQUIREMENTS
- Total of 10 courses
  - Seven required courses
  - Three elective courses
- Overall GPA of 3.0
- Course work must be completed within three years of declaring candidacy
- Courses completed more than five years prior to date certificate is issued cannot be used to fulfill requirements

RECOMMENDED COURSE SEQUENCE
- It is strongly recommended that you start with “Technical Communication: An Introduction to the Profession.”
- You must end with “Final Project: Preparing Your Job Search.”

PROGRAM CHAIR
ANDREA AMES, M.S., is a senior technical staff member (STSM) and information experience strategist and architect at IBM. She has taught for UCSC Extension since 1998. She specializes in user-centered information usability, strategy, architecture and design. Ms. Ames’ specialty is architecting and designing information for software user interfaces—such as labels, embedded instructional text, and hover help—and making the interfaces deploying that information as easy to explain as possible before developing traditional documentation. She teaches at the university level and is in demand as a conference speaker internationally. She is a fellow and past president (2004–05) of the Society for Technical Communication and a distinguished engineer of the Association for Computing Machinery.

Final Project: Preparing Your Job Search

This final course in the Technical Writing and Communication certificate program is designed to prepare you to secure employment as technical communicators. You’ll develop an industry-appropriate portfolio and resume that are tailored to the job market and the type of job desired. You’ll also learn how to make the most of social networks and prepare for interviews.


TIMOTHY BOMBOSCH, Ph.D.
ONLINE | April 10–May 15
Enrollment accepted through April 10.
Fee: $630.
To enroll, use Section Number 6181.(038)

Information Architecture and Design Basics

This course focuses on data used in information-rich user interfaces including multimedia, software products and interfaces, product help, and Web sites. It also addresses the technologies used to create the underlying infrastructure for presenting online information and the tools used for developing information using those technologies. 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.

Prerequisite(s): “Technical Communication: An Introduction to the Profession,” and “Developing Technical Information from Plan to Completion.”

ANDREA AMES, B.A., M.S.
ONLINE | April 17–May 28
Enrollment accepted through April 17.
Fee: $630.
To enroll, use Section Number 2662.(027)
## TECHNICAL WRITING AND COMMUNICATION CERTIFICATE

### REQUIRED COURSES

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Units</th>
<th>Course</th>
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<tbody>
<tr>
<td>Technical Communication Fundamentals</td>
<td>1.5</td>
<td>5931</td>
</tr>
<tr>
<td>Technical Communication: An Introduction to the Profession</td>
<td>1.5</td>
<td>5931</td>
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<tr>
<td>Grammar and Style for Technical Communicators</td>
<td>3.0</td>
<td>4360</td>
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<tr>
<td>Technical Writers’ Workshop</td>
<td>1.0</td>
<td>2145</td>
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<tr>
<td>Writing Successful Instructions, Procedures and Policies</td>
<td>1.5</td>
<td>1931</td>
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<tr>
<td>Developing Technical Information from Plan to Completion</td>
<td>2.0</td>
<td>1947</td>
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<tr>
<td>Advanced Topics in Communications</td>
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<tr>
<td>Information Architecture and Design Basics</td>
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<td>2662</td>
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<tr>
<td>Final Project: Preparing Your Job Search</td>
<td>1.5</td>
<td>6181</td>
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### ELECTIVE COURSES (Choose three)

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<tr>
<th>Course Title</th>
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<tbody>
<tr>
<td>Building and Maintaining Your Technical Eminence</td>
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<td>5494</td>
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<tr>
<td>Content Management</td>
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<td>DITA Authoring, Introduction</td>
<td>2.0</td>
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<td>DITA Information Architecture</td>
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<td>Graphic Design Fundamentals</td>
<td>2.0</td>
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<td>Human Factors for Technical Communicators</td>
<td>2.0</td>
<td>0907</td>
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<td>Managing Technical Documentation Projects</td>
<td>1.0</td>
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<td>Minimalist Design for Documentation</td>
<td>0.5</td>
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<td>Mobile UA</td>
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<td>Role of the Project Manager</td>
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<td>Usability Testing Documentation</td>
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<td>Visual Communication</td>
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<tr>
<td>XML for the Rest of Us</td>
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<td>3560</td>
</tr>
</tbody>
</table>

Certificate schedule outline of program curriculum and annual schedule are found online. From the homepage, select: “Area of Study”; department; then certificate title as listed above.

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### Technical Communication: An Introduction to the Profession

**BUSAD.X472.6 (1.5 quarter units)**

This introductory course first reviews the history of technical communication, the top 10 indicators of success, and the roles of technical communicators in Fortune 500 companies, start-ups, government labs, and freelance consulting. You’ll also examine the key technical communications processes, including information design and development, user-centered design, and how these processes fit into the product or research life cycle. The course offers tangible skills, including how to interview subject-matter experts and users, define an information set, write parts of typical documentation, and measure the work product.

ANDREA AMES, B.A., M.S.

ONLINE | March 20–April 23
Enrollment accepted through March 20.
Fee: $630.
To enroll, use Section Number 5931.(044)

### Technical Writers’ Workshop

**BUSAD.X469.7 (1.5 quarter units)**

This course is an introduction to creating short technical documents, such as reports and correspondence. Through lecture, exercises, reading and homework, students demonstrate their ability in these areas: the basics of good writing; formatting of technical documents; rhetorical modes; clear, grammatically correct writing at the sentence and paragraph levels; appropriate styles for a diverse technical audience; and punctuating technical information. Included are four writing assignments, which consist of different types of documents, such as descriptive or instructional reports. The final project will be portfolio-worthy.

JONATHAN PRICE, D.F.A.

ONLINE | April 10–May 14
Enrollment accepted through April 10.
Fee: $630.
To enroll, use Section Number 2145.(032)
Elective Courses

Building and Maintaining Your Technical Eminence
Formerly Survey of Computer Tools and Technologies
BUSAD.X475.5 (2.0 quarter units)

Technical communicators are expected to begin a new job or project and quickly use information development tools and learn the technologies about which they will be writing. This is a challenge since industry technologies are changing at Web speed. How can they learn what is necessary? What is important to know before the new project or job begins?

This course provides an introduction to the latest communicators’ tools, concepts and terminology used in the field of computers, both hardware and software engineering. Lecture and group exercises emphasize what employers expect technical communicators to know and what can be learned on the job during the course of a project. Intended for technical writers who are new to the field or those considering this profession.

JENNIFER FELL, B.A.
ONLINE | May 1–June 11
Enrollment accepted through May 1
Fee: $630.
To enroll, use Section Number 5494.(013)

DITA Authoring, Introduction
BUSAD.X400.079 (2.0 quarter units)

Understanding the DITA standard topic types and the content that is included in each type is crucial to getting the most from DITA-authored content. This course covers the basics of the DITA standard (topics and maps), guidelines and best practices around the standard, and the building blocks of good topic-based information. Participants will learn to produce reusable topics and usable, user-centered content that can be quickly configured to meet new product, user, or media requirements.

Topics include a basic introduction to XML; topic-based authoring and the DITA standard; DITA content types (concept, task, reference, and glossary); creating titles, short descriptions, and other content appropriate for each DITA type; designing information deliverables using maps; and reusing content within a topic or map.

TONI MANTYCH, M.A.
ONLINE | May 1–June 18
Enrollment accepted through May 1.
Fee: $685.
To enroll, use Section Number 20830.(012)

Graphic Design Fundamentals
For course description, see page 87.

Managing Technical Documentation Projects
BUSAD.X408.2 (1.0 quarter units)

This course equips technical communicators with the knowledge, tools, and techniques necessary to develop information and project plans; reasonable, accurate, and detailed documentation project budgets; and schedules to meet due dates and control costs. In addition, students learn to track and close out projects and manage documentation projects in Agile environments.

TIMOTHY BOMBOSCH, Ph.D.
ONLINE | May 23–July 4
Enrollment accepted through May 23.
Fee: $580.
To enroll, use Section Number 1025.(043)

Role of the Project Manager
For course description, see page 43.

Also of Interest

Principles of Business Analysis
For course description, see page 32.

View each courses’ full schedule online at ucsc-extension.edu

Visit our website at ucsc-extension.edu for updated information and to enroll online.
Science Waits For No One

AUGUST 2015: NASA Veggie plant growth system “Outredgeous” red romaine lettuce harvest enjoyed by resident ISS astronauts.

What role will you play in the future of bioscience? From clinical trials to regulatory affairs, medical devices, biotech to bioinformatics, UCSC Silicon Valley Extension offers the training you need to monitor clinical trials, prepare for FDA audits, market medical devices, analyze biological data, or, who knows, grow full crops in space. What are you waiting for?

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BIOINFORMATICS | BIOTECHNOLOGY | CLINICAL TRIALS DESIGN AND MANAGEMENT
MEDICAL DEVICES | REGULATORY AFFAIRS
After graduating from UCSC with a degree in sociology, Angela Alcantara-Cruz earned a master’s in organizational development and led a successful 20-year career in business operations in the semiconductor industry. She felt her career start to shift after becoming a parent and coping with some health issues. The pace and stress of her Silicon Valley job began to lose its appeal, and after investigating her options, she decided to enroll in UCSC Extension’s Early Childhood Education certificate program. The experience helped her realize her ultimate goal: to create her own after-school enrichment program for children.

“I really like working with kids,” she says. “When I got sick, I decided to quit my semiconductor career. At the time I was volunteering at a local preschool, and I realized that when I was working with kids, I didn’t feel sick. The kids gave me so much joy that I felt like I was getting better as I was spending time with them.”

Transformative Learning

At UCSC Extension, Alcantara-Cruz learned valuable skills that were transferrable to the classroom, especially in her “ECE: Creative Arts for the Young Child (Preschool through Grade 3)” course.

“That class has made me stop and think through how to talk to my children, as well as the kids at my school,” she says. “It’s not just about art; this philosophy extends to other facets of children’s lives.”

First-Hand Experience

As part of her certificate program, Alcantara-Cruz completed a practicum and gained first-hand experience in the classroom.

“For my practicum, I volunteered over 150 hours at my daughter’s preschool,” she says. “It was interesting volunteering there while I was taking classes, because I took mental note of things that I would modify or adapt. I definitely thought it was a great experience to be in that environment, gaining experience. I now work there as a substitute teacher. While someday I want to run my own program, working at this school has been a great way to gain experience.”

ANGELA ALCANTARA-CRUZ

Early Childhood Education

UCSC Extension was the best place for me to pursue my education.”

Tell Us Your Story

We’d love to hear how you applied new skills in the workplace, or how your new credentials led to exciting job opportunities. Share your latest achievements by submitting your Extension story to extensionfeedback@ucsc.edu.
Credential Courses

PROGRAM CONTACT
Education Department, (408) 861-3860, or email extensionprogram@ucsc.edu.

PROGRAM CHAIR
VIVIAN RHONE-LAY, Ph.D., has been an educator for over ten years. During that time, she has worked in many roles, including teaching, academic counseling, university admissions, higher education management, program development, educational software development, and educational research. Dr. Rhone-Lay has experience with peer-evaluation in teaching, and supervising and supporting colleagues within the K–12 and university settings. Her publications and conference presentations have addressed issues such as teacher preparation and school-based initial training, accountability in schools, professional identities, supporting immigrant learners and disadvantaged students, and topics in comparative education, among others.

COURSES FOR CLEARING PRELIMINARY CREDENTIAL
UCSC Extension offers programs for educators seeking to meet selected teacher preparation requirements for the SB 2042 Preliminary credential. Many of our credential courses are offered online for the convenience of professional educators. Please confirm with the administrator of your credential program that the course you intend to take is acceptable.

UCSC Extension Courses | Notes
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Becoming a Professional Educator XSC2652 | 5 units: Teacher Preparation Standards 10 and 14. Combines special populations (mainstreaming) and supportive, healthy environments (health ed). Does not include CPR.
UCSC SB 2042 |  
Introduction to Technology in Schools XSC209 | 2 units: Approved by the commission for SB 2042 Teacher Preparation Standard 11.

For information and guidance, contact the Education Department at (408) 861-3860 or email extensionprogram@ucsc.edu.

1. California Commission on Teacher Credentialing. See www.ctc.ca.gov.
2. To satisfy the Mainstreaming and Health Education requirements, the Education Department offers a combined course approved by the CCTC: "Becoming a Professional Educator: Special Populations and Healthy Environments" (Course Number 4317).
Becoming a Professional Educator: Special Populations and Healthy Environments

EDUC.XSC265. (5.0 quarter units) Meets the California Commission on Teacher Credentialing requirements in healthy environment and special populations for SB 2042 preliminary Multiple or Single Subject.

On the path to your SB 2042 Multiple or Single Subject teaching credential? This course will train you in the best practices for creating and maintaining a healthy and positive learning environment for all learners. It offers an overview of the Individualized Education Program (IEP) and the expanded role of the teacher in developing literacy across content areas and fostering social-emotional development. By the end of the course, you’ll be able to perform essential teaching tasks such as designing learning experiences and creating effective social environments for student learning.

VIVIAN RHONE-LAY, Ph.D.

ONLINE | April 3–June 3
Fee: $915.
To enroll, use Section Number 4317.(084)

Technology in Schools, Introduction (SB 2042 Standard 11)

EDUC.XSC 209 (2.0 quarter units)

This course meets the SB 2042 Level 1 technology requirement (Standard 11) for teacher preparation. This course meets the SB 2042 Level 1 technology requirement (Standard 11) for teacher preparation. The course prepares K-12 teacher candidates to use appropriate technology to facilitate the teaching and learning process. You’ll learn to leverage multiple modalities to communicate with students, parents, colleagues and administration; design technology-integrated instructional activities; gain insight into related legal and ethical issues; and practice using a variety of technology for instruction and assessment. By the end of the course, you’ll have a toolkit of technology resources and strategies you can use in your classroom.

NATALIE BERNASCONI, Ed.D.

ONLINE | April 24–May 26
Fee: $370.
To enroll, use Section Number 23388.(030)

Early Childhood Education

Certificate Program

Early Childhood Education

CERTIFICATE CONTACT
Education Department, (408) 861-3860, or email extensionprogram@ucsc.edu.

PROGRAM SUMMARY
The Early Childhood Education (ECE) program at UCSC Extension prepares preschool teachers and operators to manage the unique challenges they face in our region.

Our entry-level ECE program provides all the training and background needed to understand child growth and development, strategies for effective classroom teaching, developmentally based curriculum, and current research and trends.

Our instructors are among the top teachers and administrators of Early Childhood Education in the greater Bay Area. As a result, our students network with career professionals and educational leaders in early childhood education and day-care service, while acquiring University of California-certified training.

CERTIFICATE REQUIREMENTS
To obtain the Certificate in Early Childhood Education, you must successfully complete 32 units of required courses and 3 units of electives.

PREREQUISITES
Enrollment for “ECE 7” requires the completion of “ECE 1,” “ECE 3” and “ECE 4.”

MELISSA LE, B.A., Multi-Subject Teaching Credential, has more than 23 years of experience working with children from infants to preschool-age students, and in K-6 classrooms. Ms. Le has worked in public and private school settings, and examined a variety of learning programs such as Challenger, Montessori, High Scope, college-run preschools at DeAnza, San José State University, and Stanford, to name a few. She has also supervised K-6 after-school programs, where she developed lesson plans and curriculum to meet the needs of diverse populations and students with special needs. Ms. Le has extensive experience mentoring emerging teachers in the SJSU and Stanford student-teacher programs, as well as beginning teachers completing their two year BTSA programs. Ms. Le’s expertise is in identifying the needs of her students, both children and adults, and helping them to reach their full potential.

JUANITA CAMPBELL-RODRIGUEZ, M.Ed., M.A., M.A.T., has been an educator for over 15 years. Mrs. Campbell-Rodriguez has a B.A. from the University of San Diego, a Master of Education with a specialization in Cross-Cultural Teaching, a Master of Arts in English, and a Master of Arts in Teaching with a specialization in early childhood education. Additionally, she has a Professional Clear Teaching Credential with a CLAD and Gifted and Talented Education (GATE) certification. Mrs. Campbell-Rodriguez has worked as a classroom teacher, program chair, college professor, mentor, course designer, and faculty trainer in pre K-12 through college environments. She enjoys helping teachers develop their instructional programs to meet the needs of a diverse student population. She is pursuing a doctorate of education in leadership with a specialization in curriculum, instruction, and assessment, and is working on her first children’s book.

VIEW EACH COURSE’S FULL SCHEDULE ONLINE AT UCSC-EXTENSION.EDU

Visit our website at ucsc-extension.edu for updated information and to enroll online.
ECE 3: Curriculum Development in Early Childhood Programs
EDUC.X306.9 (4.0 quarter units)

This course examines basic child development theories in relation to the design and implementation of curriculum for young children. You'll learn the fundamentals of designing developmentally appropriate lesson plans, according to the National Association for the Education of the Young Child, and understand how learning centers meet the needs of specific age groups. In addition, you'll learn the steps involved in curriculum development, how to select materials and equipment and plan group experiences. The course emphasizes the value of play and learning environments and developmentally appropriate materials and activities.

MELISSA LE, B.A., Multi-Subject Teaching Credential
CLASSROOM AND ONLINE (HYBRID)
4 meetings | 9 am–3 pm | May 13–June 10
Fee: $510.
To enroll, use Section Number 3674.(046)

**CERTIFICATE REQUIREMENTS**

35-unit minimum

<table>
<thead>
<tr>
<th>Course Description</th>
<th>Units</th>
<th>Course</th>
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<tbody>
<tr>
<td><strong>ECE CERTIFICATE REQUIRED COURSES</strong></td>
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<tr>
<td>ECE 1: Development in Early Childhood</td>
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<td>ECE 2: Introduction to Teaching Young Children</td>
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<tr>
<td>ECE 3: Curriculum Development in Early Childhood Programs</td>
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<td>ECE 4: The Young Child in the Family and Community</td>
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<tr>
<td>ECE 5: Positive Guidance and Discipline for the Young Child</td>
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<td>2529</td>
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<tr>
<td>ECE 6: Culture and Diversity in the Early Childhood Classroom</td>
<td>3.0</td>
<td>2611</td>
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<tr>
<td>ECE 7: Practicum in Early Childhood Education</td>
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<tr>
<td>ECE 8: Child Health, Safety and Nutrition</td>
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<tr>
<td>ECE 9: Language and Literacy for the Young Child</td>
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<tr>
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<td>Attention Deficit Hyperactivity Disorder (ADHD) in the Classroom</td>
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<td>1004</td>
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<tr>
<td>Differentiated Learning</td>
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<tr>
<td>ECE: Brain Development in Early Childhood</td>
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<tr>
<td>ECE: CPR and First Aid</td>
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<tr>
<td>ECE: Creative Arts for the Young Child (Preschool Through Grade 3)</td>
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</tr>
<tr>
<td>ECE: Infant/Toddler Growth and Development</td>
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<td>4385</td>
</tr>
<tr>
<td>ECE: Principles of Infant/Toddler Caregiving</td>
<td>2.0</td>
<td>0437</td>
</tr>
<tr>
<td>ECE: Managing Behaviors That Are Challenging</td>
<td>2.0</td>
<td>3801</td>
</tr>
<tr>
<td>Math Development in Young Children</td>
<td>2.0</td>
<td>1122</td>
</tr>
<tr>
<td>Science Play: Inquiry-Based Learning Made Easy</td>
<td>1.0</td>
<td>5741</td>
</tr>
<tr>
<td>Introduction to the Common Core State Standards (K-12):</td>
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</tr>
<tr>
<td>What Counts as Common Core?</td>
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<td>30278</td>
</tr>
</tbody>
</table>

Certificate schedule outline of program curriculum and annual schedule are found online. From the homepage, select “Area of Study”; department; then certificate title as listed above.

**ENROLL EARLY!**

Enroll at least seven days prior to your course’s start date to save your seat and allow time to prepare for the first class meeting. Enrolling early also helps ensure that your course is not cancelled due to low enrollment.
ECE 6: Culture and Diversity in the Early Childhood Classroom
EDUC.X343.36 (3.0 quarter units)
This course explores diversity, values, culture, racism and oppression from the educators’ viewpoint and the impacts of these factors have on creating a positive multicultural classroom environment. The course covers various styles of communicating with parents, and provides the educator with role-play scenarios to practice handling awkward situations. Course assignments provide an opportunity for you to develop multicultural lesson plans that can be used in an early childhood classroom.

JUANITA CAMPBELL-RODRIGUEZ, M.A.T., M.Ed.
ONLINE | April 4–May 14
Fee: $470.
To enroll, use Section Number 2611.(038)

ECE 7: Practicum in Early Childhood Education
EDUC.X304.51 (5.0 quarter units)
This course provides early childhood education professionals with the opportunity to observe and evaluate children, applying theoretical and practical models from the field of early childhood education. Course activities include structured observation, analysis of the roles of adults, lesson planning, parent conferencing and reflective teaching.

Prerequisites: “ECE 4: The Young Child in the Family and Community,” “ECE 1: Development in Early Childhood,” and “ECE 3: Curriculum Development in Early Childhood Programs.”

MARILYN ARMSTRONG, M.Ed.
CLASSROOM WITH ONLINE MATERIALS
2 meetings | 9 am–12 pm | April 1, June 24
Fee: $690.
To enroll, use Section Number 0601.(033)

ECE 9: Language and Literacy for the Young Child
EDUC.X300.143 (3.0 quarter 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. There will also be a review of the reading process, along with various reading theories and issues.

JUANITA CAMPBELL-RODRIGUEZ, M.A.T., M.Ed.
ONLINE | May 16–June 25
Fee: $470.
To enroll, see Section Number 23230.(013)

Elective Courses

Differentiated Learning
For course description, see page 57.

ECE: Principles of Infant/Toddler Caregiving
EDUC.X306.10 (2.0 quarter units)
This course satisfies part of the State Licensing requirement for the application of infant/toddler caregiving principles. The course “Infant/Toddler Growth and Development” fulfills the remainder of the requirement.

This course is designed for those who work with children up to three years of age. The course focuses on understanding the principles of high-quality caregiving. You’ll learn 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.

MELISSA LE, B.A., Multi-Subject Teaching Credential CLASSROOM AND ONLINE (HYBRID)
3 meetings | 5:30–8:30 pm | April 24–May 22
Fee: $360.
To enroll, use Section Number 0437.(033)

Math Development in Young Children
EDUC.X313.30 (2.0 quarter units)
This course focuses on teaching math to young children and covers California math standards for early childhood. You’ll participate in hands-on activities and create exciting math games for young children. The course also addresses how young children recognize patterns in nature and how you can connect math to art. With 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 background in mathematics is not required.

MELISSA LE, B.A., Multi-Subject Teaching Credential CLASSROOM AND ONLINE (HYBRID)
3 meetings | 5:30–8:30 pm | April 17–May 15
Fee: $360.
To enroll, use Section Number 1122.(015)

Also of Interest

Introduction to the Common Core State Standards (K-12): What Counts as Common Core?
For Course description, see page 51.

Certificate Program

Early Childhood Education: Supervision and Administration

CERTIFICATE CONTACT
Education Department, (408) 861-3860, or email extensionprogram@ucsc.edu.

PROGRAM SUMMARY
In California, prospective directors of child-care centers require specialized training in administration and supervision to qualify for licensing. Once licensed, they also require ongoing professional development to renew permits.

The ECE Supervision and Administration Certificate program at UCSC Extension provides comprehensive preparation for this role. It is designed specifically for child-care professionals who aspire to run child-care centers. The curriculum delivers targeted instruction in budget administration, facilities management, and personnel recruitment and supervision.

Educators or working professionals interested in exploring careers as directors of private child-care centers will benefit from this program, as will parents interested in learning more about ECE administration.

CERTIFICATE REQUIREMENTS
To earn the Certificate in Supervision and Administration of Early Childhood Centers, you must first successfully complete the Certificate in Early Childhood Education or its equivalent, followed by 12 units of required courses and 6 units of ECE electives.

RECOMMENDED COURSE SEQUENCE
ECE 11 should be taken before ECE 12.

PREREQUISITES
You must complete the Certificate in Early Childhood Education or equivalent before registering for these courses.

Required Courses

ECE 11: Supervision and Administration of Early Childhood Centers, Part A
EDUC.X343.29A (3.0 quarter 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.

NINET MORADI, M.A.
ONLINE | May 15–June 18
Fee: $470.
To enroll, use Section Number 6290.(031)
### Course Descriptions

**Elective Courses**

**Differentiated Learning**  
For course description, see page 57.

**ECE: Principles of Infant/Toddler Caregiving**  
For course description, see page 54.

**Math Development in Young Children**  
For course description, see page 54.

Also of Interest

**Introduction to the Common Core State Standards (K-12): What Counts as Common Core?**  
For course description, see page 51.

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**Early Childhood Education:**  
Supervision and Administration Certificate

<table>
<thead>
<tr>
<th>REQUIRED COURSES</th>
<th>Units</th>
<th>Course</th>
</tr>
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<tbody>
<tr>
<td>ECE 10: Supervision and Administration: Parents as Partners in Education</td>
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<td>ECE 11: Supervision and Administration of Early Childhood Centers, Part A</td>
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<tr>
<td>ECE 12: Supervision and Administration of Early Childhood Centers, Part B</td>
<td>3.0</td>
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<tr>
<td>ECE 13: Supervision and Administration: Adult Supervision and Mentoring</td>
<td>3.0</td>
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<table>
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<tr>
<th>ELECTIVE COURSES (six units)</th>
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<th>Course</th>
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<tr>
<td>Attention Deficit Hyperactivity Disorder (ADHD) in the Classroom</td>
<td>3.0</td>
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<td>30278</td>
</tr>
</tbody>
</table>

Certificate schedule outline of program curriculum and annual schedule are found online. From the homepage, select: “Area of Study”; department; then certificate title as listed above.

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**Energize Your Teaching**

UCSC Silicon Valley Extension offers programs for educators who wish to meet credential requirements and strengthen their teaching with new ideas and skills. Thousands of Bay Area teachers list our courses on their résumés, advance on district salary schedules by earning academic units, clear their credentials with course work, and apply the latest innovations in their classrooms.

**Broad Curriculum for Professional Educators**

Professional educators will find training in a variety of curricular areas at UCSC Silicon Valley Extension, including reading methods, mainstreaming, technology in education, and online instruction. We also offer credential courses approved by the California Commission on Teacher Credentialing (CCTC) and the UCSC Education Department.

**Academic Units and Salary Increases**

Extension courses numbered X300 through X399 are designated as professional courses in education. Courses in this series have been approved by the Education Department on the UCSC campus and, when required, approved by the California Commission on Teacher Credentialing (CCTC). Courses with XSC numbers are UCSC courses.

**Course Substitutions**

If you have taken professional development courses within the past five years, you may be able to substitute one course in which you have received a grade of B or above. You are only able to substitute one course toward any Education Certificate.

**Attention Science Teachers**

Let UCSC Extension’s science courses help you bring cutting-edge science into your classroom and expand your knowledge of the ever-changing life sciences field. See the Biosciences section, page 10.
Educational Therapy

Certificate Program

EDUCATIONAL THERAPY

Educational Therapy

CERTIFICATE CONTACT
Education Department, (408) 861-3860, or email extensionprogram@ucsc.edu.

PROGRAM SUMMARY
In this program, you will learn how to work with young children, adolescents and adults who struggle with learning problems, and gain the latest instructional techniques and strategies in special education. The program covers administration and support of individual education plans, data collection and reporting, state and federal laws, and communication and family involvement. You will be trained in the most current and innovative approaches to providing resources and support for parents, guardians, and families of children with disabilities.

Our Educational Therapy program thoroughly prepares educational specialists and tutors to serve students with special needs, emphasizing practical application and experience. Our course work is in accordance with the Association of Educational Therapists’ requirements and culminates in an internship. Students who have established candidacy for the full certificate are encouraged to apply for an AET associate level membership.

CERTIFICATE REQUIREMENTS
To obtain the Certificate in Educational Therapy, you must successfully complete 26 units of required courses, and 4 units of elective courses. You must attain an overall average GPA of 3.0 to qualify.

As you make your way through the courses and internship, you will compile a portfolio for review by the program chair.

TO QUALIFY AS A CERTIFIED EDUCATIONAL THERAPIST
The Certificate in Educational Therapy issued by UCSC Extension is an important step. However, there are additional requirements to qualify as a professional member in the Association of Educational Therapists (AET), as well as more requirements to qualify as a Certified Educational Therapist with AET.

To learn more about the requirements, call (818) 843-1183 or visit www.aetonline.org.

Note: This certificate is not intended to meet the requirements for adult and vocational education credentials issued by the State of California. For information, consult the California Commission on Teacher Credentialing at www.ctc.ca.gov.

PROGRAM CHAIR
SHARMILA ROY, Ph.D., has over 27 years of experience in education; primarily in teaching, teacher training, program development, educational therapy, classroom interventions, and curriculum development for special education. Dr. Roy is the co-founder and director of MyndFlex, a nonprofit after-school program. At MyndFlex, Dr. Roy supervises therapists and interns who specialize in the areas of cognition, attention, learning, study skills and organization, and socioemotional skills. She has extensive experience working one-on-one with exceptional students, facilitating in-service seminars for teachers.

Required Courses

Assessment for Educational Therapists—Using Formal and Informal Approaches
EDUCX347.14 (3.0 quarter units)

This course introduces the assessment tools and procedures used in educational therapy settings. In addition to classroom activities, you’ll gain field experience using specific assessment instruments and will be assisted in your fieldwork placement. Testing is limited to educational assessment tools, which are used by educational therapists and do not require authorization to administer. You’ll get a chance to review psycho-educational reports and other allied professional assessments in order to develop an effective treatment plan. The course offers insight into how to administer tests used by educational therapists.

Prerequisites: “Principles of Educational Therapy,” and “Educational Therapy: Reading I.”

DEBORAH CRIM, M.Ed.
CLASSROOM WITH ONLINE MATERIALS
5 meetings | 9 am–4 pm | April 22–May 20
Fee: $590.

To enroll, use Section Number 5642.(035)

Principles of Educational Therapy
EDUCX347.11 (3.0 quarter units)

This course provides an interactive overview of the educational therapist’s role, including discussions of ethical practices, state and federal laws related to professional responsibilities and the therapist’s limitations. The responsibilities of the therapist, including case management, information gathering, assessment practices, goal setting and intervention strategies are also examined.

MICHAEULA DE SAPIO-YAZAR, M.S.
ONLINE | April 4–May 14
Fee: $560.

To enroll, use Section Number 5581.(038)

Strategies for Learning Differences in Mathematics
EDUCX300.141 (3.0 quarter units)

This course deals with two key areas of math learning: computation and problem solving. You will learn the background of “mathematics differences,” and strategies for dealing with math anxiety, risk factors, and the importance of developing “number sense.” Important elements of mathematical reasoning will also be addressed, including the role of attention, memory, and language in math. You’ll learn the use of multisensory math and gain strategies for improving long-term and working memory capacity through case studies of students with math learning differences.

ELIZABETH POWELL, M.A.
ONLINE | April 4–May 14
Fee: $590.

To enroll, use Section Number 30111.(009)

View each courses’ full schedule online at ucsc-extension.edu

Visit our website at ucsc-extension.edu for updated information and to enroll online.
## EDUCATIONAL THERAPY CERTIFICATE

### REQUIRED COURSES

<table>
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<tr>
<th>Course Name</th>
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<td>Principles of Educational Therapy</td>
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<tr>
<td>Strategies for Learning Differences in Mathematics</td>
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<tr>
<td>Assessment for Educational Therapists—Using Formal and Informal Approaches</td>
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<td>5642</td>
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<td>Assessment for Educational Therapists Practicum</td>
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### Elective Courses (four units)

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<td>Understanding Learning Differences</td>
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<tr>
<td>Psychology of Human Learning</td>
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<tr>
<td>ECE: Managing Behaviors That Are Challenging</td>
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<td>3801</td>
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</tbody>
</table>

Certificate schedule outline of program curriculum and annual schedule are found online. From the homepage, select "Area of Study"; department; then certificate title as listed above.

### Elective Courses

#### Differentiated Learning

**EDUCX358.003 (1.5 quarter units)**

Differentiated instruction maximizes learning for all students with student-centered best practices that allow teachers to create different pathways responding to the needs of diverse learners. This course will highlight strategies and techniques to implement a feasible and successful differentiated learning program for your classroom. Topics include knowing the learner, instructional delivery and best practices, assessment/evaluation/grading, quality teacher, flexible teaching and learning time resources, quality curriculum and classroom learning environment.

**INSTRUCTOR TBA**

**CLASSROOM WITH ONLINE MATERIALS**

- 2 meetings  | 9 am–5 pm  | April 8, 15
- Fee: $295.

To enroll, use Section Number 30397.(006)

#### Psychology of Human Learning

**EDUCX347.10 (2.0 quarter 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.

**MICHAELA DE SAPIO-YAZAR, M.S.**

**ONLINE**  | May 22–June 25
- Fee: $415.

To enroll, use Section Number 3536.(041)

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**INFO SESSION**

**Educational Therapy**

This free evening event provides a short overview of the five Education certificate programs for new or returning students. Education department staff and instructors will be available to answer individual questions and recommend course sequences. You’ll also have the opportunity to network with fellow students and discuss career options for educators in various fields. We encourage you to register early to reserve your space.

**CLASSROOM**

- Tuesday | 6:30–8:30 pm  | March 28
- No fee, but enrollment required.

To enroll, use Section Number 0726.(077)

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**ACCESS TO ONLINE COURSES AND MATERIALS**

If you are enrolling for the first time in an Online course, or a classroom course with Online Materials, you will receive an account for UCSC Extension Online via email within 12 hours. If you have previously taken a course with online materials, you should use your existing account. Course sites will open one day prior to the official start date.

For more information, including help retrieving your account info, please visit [ucsc-extension.edu/online-faqs](http://ucsc-extension.edu/online-faqs).

For information on textbooks, see page 100 or visit [ucsc-extension.edu/bookstore](http://ucsc-extension.edu/bookstore).
Instructional Design and Delivery

Certificate Program

Instructional Design and Delivery

CERTIFICATE CONTACT
Education Department, (408) 861-3860, or email extensionprogram@ucsc.edu.

PROGRAM SUMMARY
This program will develop your capacity to organize and deliver learning using methods that take into account learner needs, learning styles, organizational goals and effective evaluation practices. The principles and practices apply in traditional settings ranging from K-12 classrooms to colleges and universities, as well as professional training settings in corporations and government.

The certificate is recommended for K-12 teachers and subject-matter experts, current and future adult educators in university, community college, preparatory school, and adult education settings; and government and business trainers, consultants, and human resource professionals.

Instructors model the best of instructional design, starting with assessments of each participant’s needs, and then coach toward the next developmental stage. Instructors work from the premise that each participant will develop or expand existing skills, building on natural talents and strengths. Assessments reveal areas in need of special attention, such as facilitating group discussions or setting up company-wide evaluation schemes. Throughout the program, participants build practical approaches to online learning, facilitation, the use of emerging technologies, intercultural communication, and the evaluation of curriculum and training vendors.

Note: This certificate is not intended to meet the requirements for adult and vocational education credentials issued by the State of California. For information, consult the California Commission on Teacher Credentialing at www.ctc.ca.gov.

CERTIFICATE REQUIREMENTS
To obtain the Certificate in Instructional Design and Delivery, you must successfully complete 6 units of required courses and 8 units of elective courses.

RECOMMENDED COURSE SEQUENCE
"Introduction to Instructional Design and Delivery" should be in the first quarter of your program.
"Practicum–Instructional Design and Delivery" should be taken in the final quarter of your program.

PROGRAM CO-CHAIR
ALAN TSUDA, M.B.A., Yale University, has taught for UCSC Extension in the Project Management and Instructional Design programs since 1999. He has over 15 years of industry experience as a consultant in technology and corporate training and is the founder of ResultWorks, a Silicon Valley consultant firm. A veteran of the computer and tech industries, Mr. Tsuda specializes in the application of technology to learning. As a consultant, he focuses on helping clients learn. Mr. Tsuda has assisted with the development of technical training programs for two consulting firms, and served on advisory boards for curriculum review and program redesign projects at UCSC Extension and UC Berkeley Extension. He has worked with many current and emerging instructors at UCSC Extension, some of whom have become colleagues and collaborators in developing and delivering instruction.

HOLLY CORNELISON HOPLA, M.Ed., has worked in public and private institutions for over two decades as an instructor, teacher trainer, curriculum developer, and program manager. Ms. Cornelison Hopla holds Single and Multiple Subject teaching credentials in California, and her credentials in Washington are endorsed in English Language Arts and English Language Learners. She has also earned certificates in both Instructional Design and Delivery and Online Teaching through UCSC Extension. She taught elementary school, high school and continuing education in top performing schools in California and Washington. As a master teacher, she has mentored new teachers in the classroom, helping them to develop their craft as instructors and classroom managers. As a consultant for her academic coaching business, Holly Hopla, Educational Coaching, LLC, she supports students with academic needs such as organization, motivation, advocacy, and self-confidence.
INSTRUCTIONAL DESIGN AND DELIVERY CERTIFICATE

14-unit minimum

REQUIRED COURSES (six units) | Units | Course
--- | --- | ---
Instructional Design and Delivery, Introduction | 1.0 | 30396
Learning Theories and Styles | 1.0 | 3967
Cultural Proficiency | 2.0 | 6475
Practicum—Instructional Design and Delivery | 2.0 | 19049

ELECTIVE COURSES (eight units) | Units | Course
--- | --- | ---
Online Instruction | 2.0 | 22175
Introduction to Online Teaching | | 
Building Online Learning Communities | 2.0 | 23243
Designing Online Instruction | 2.0 | 23237
Instructional Design for Corporate Trainers | 2.0 | 0426
Facilitation Skills | | 
Designing Training Programs | 2.0 | 3132
Instructional Needs Assessment and Evaluation | 1.5 | 1659
Improving Your Business Presentation Skills | 2.0 | 0913
Role of the Project Manager | 1.5 | 0306

Certificate schedule outline of program curriculum and annual schedule are found online. From the homepage, select: “Area of Study”, department; then certificate title as listed above.

Electives

Building Online Learning Communities
EDUC.X300.154 (2.0 quarter units)
The virtual classroom presents unique challenges for instructors who want to create a positive and collaborative learning environment. In this course, you’ll 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.
Prerequisite(s): “Instructional Design and Delivery, Introduction.”

ALAN TSUDA, M.B.A.
ONLINE | May 1–June 18.
Fee: $460.
To enroll, use Section Number 23243.(011)

Designing Training Programs
BUSAD.X450. (2.0 quarter units) Professional Credit: HRCI–PHR, SPHR and GPHR general recertification credit, 20.0 hours.
This course offers an introduction to designing training events and programs for professionals entering the field. Topics include needs analysis, adult learning theory with a focus on learning goals and objectives, experiential methods, organization and evaluation. The course emphasizes using design skills to create a learning activity. You’ll design training activities for the individuals and groups you serve, and you’ll gain valuable feedback on your training design.
Prerequisite(s): “Instructional Design and Delivery, Introduction.”

PURNIMA KRISHNAMURTHY, M.B.A.
CLASSROOM WITH ONLINE MATERIALS
4 meetings | 6–9:30 pm | June 6, 13; and 9 am–5 pm | June 10, 17
Fee: $660.
To enroll, use Section Number 3132.(059)

Role of the Project Manager
For course description, see page 43.

ACCESS TO ONLINE COURSES AND MATERIALS
If you are enrolling for the first time in an Online course, or a classroom course with Online Materials, you will receive an account for UCSC Extension Online via email within 12 hours. If you have previously taken a course with online materials, you should use your existing account. Course sites will open one day prior to the official start date.
For more information, including help retrieving your account info, please visit ucsc-extension.edu/online-faqs.
For information on textbooks, see page 100 or visit ucsc-extension.edu/bookstore.
Teaching English to Speakers of Other Languages (TESOL)

Certificate Program

Teaching English to Speakers of Other Languages (TESOL)

CERTIFICATE CONTACT
Education Department, (408) 861-3860, or email extensionprogram@ucsc.edu.

PROGRAM SUMMARY
Teachers of English as a second language generally work with immigrants and foreign nationals living in English-speaking countries. TESOL teachers need special preparation to meet the unique challenges in settings where students have had some exposure to English but are still struggling. UCSC Silicon Valley Extension offers a specialized sequence of courses in linguistics and education to prepare instructors to enter the TESOL field. The program provides teachers with the knowledge, strategies, and practice they need to feel comfortable teaching English classes to students of various levels and backgrounds. Join the hundreds of students who have completed this certificate and gone on to rewarding careers.

CERTIFICATE REQUIREMENTS
To obtain the TESOL Certificate, you must successfully complete 23 units of core courses and 4 units of electives. You must have a bachelor’s degree to enroll in the program. In order to be eligible for this certificate, you must maintain an overall 3.0 grade point average (GPA) for all required and elective courses.

RECOMMENDED COURSE SEQUENCE
The practicum course is taken at the end, but the other courses can be taken in any order. We also recommend that you attend the Info Session.

PROGRAM CHAIR
JESSE GILLISPIE, Ph.D., has a doctorate in Education with an emphasis in Applied Linguistics and Language in Social Interaction. She has written about and conducted research on the relationship between language, identity, and learning. Dr. Gillispie has worked with a diverse group of English Language Learners from elementary students to postdoctoral researchers. She has presented her work at numerous conferences including ethnography forums, the American Anthropological Association, the American Educational Research Association, and the American Association of Applied Linguistics. Her publications and conference presentations span topics covering identity development and second language learning, teaching and learning in everyday classroom interaction, and the role of classroom management in student success and identity development. A native Northern Californian, Dr. Gillispie lived in Germany and France before settling in the Bay Area.

Required Courses

First and Second Language Development
EDUCX366.9 (3.0 quarter units)
Linguistics and cognitive psychology have rendered theoretical models of first- and second-language learning and acquisition. This course examines how these theories apply to TESOL and bilingual education. You’ll analyze the critical factors affecting language development, drawing upon your own language learning and teaching experience for examples that relate theory to practice.
REBECCA LOVIN, Ed.D.
CLASSROOM WITH ONLINE MATERIALS
4 meetings | 6–9 pm | April 13–May 11
Fee: $590.
To enroll, use Section Number 3219.(109)

Methodology of Bilingual and English Language Development
EDUCX366.6 (4.0 quarter units)
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 of delivering bilingual education and English language development. Topics include program design, instructional strategies and current methods and approaches.
MICHAEL SMITH, M.Ed.
CLASSROOM AND ONLINE (HYBRID)
5 meetings | 9 am–12:30 pm | April 8–June 3
Fee: $780.
To enroll, use Section Number 0633.(108)

TESOL Practicum
LINGX417. (5.0 quarter units)
This practicum provides an opportunity to apply theory and methodology to the ESL classroom through supervised student teaching. Certificate candidates meet with their instructor for 10 hours, work with a master teacher and teach 25 hours in a classroom setting. Candidates prepare a lesson plan, including teaching objectives, learner outcomes, methodologies, and assessment tools. Observation and feedback sessions with the instructor are arranged individually. Candidates organize a portfolio of their coursework, sample student work, and evidence of professional achievement in the TESOL program. Portfolio review is part of the certificate evaluation.
Prerequisite(s): All required courses in the certificate program should be completed before enrolling in the TESOL Practicum.
REBECCA LOVIN, Ed.D.
CLASSROOM WITH ONLINE MATERIALS
4 meetings | 6–9 pm | March 23, June 8; and 10 am–3 pm | April 15, May 13
Fee: $810.
To enroll, use Section Number 3181.(093)
**TEACHING ENGLISH TO SPEAKERS OF OTHER LANGUAGES**

**TESOL CERTIFICATE**

27-unit minimum

<table>
<thead>
<tr>
<th>REQUIRED COURSES (23 units)</th>
<th>Units</th>
<th>Course</th>
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<td>Language Structure</td>
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<td>First and Second Language Development</td>
<td>3.0</td>
<td>3219</td>
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<tr>
<td>Methodology of Bilingual and English Language Development</td>
<td>4.0</td>
<td>0633</td>
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<tr>
<td>Culture and Cultural Diversity</td>
<td>4.0</td>
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<tr>
<td>Fundamentals of English Grammar for ESL Teachers</td>
<td>2.0</td>
<td>30089</td>
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<tr>
<td>Assessment, Evaluation and Placement</td>
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<td>TESOL Practicum</td>
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<table>
<thead>
<tr>
<th>ELECTIVE COURSES (four units)</th>
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<th>Course</th>
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<tbody>
<tr>
<td>English as a Second Language Through Music and Movement</td>
<td>2.0</td>
<td>30000</td>
</tr>
<tr>
<td>Instructional Design and Delivery, Introduction</td>
<td>1.0</td>
<td>30396</td>
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<tr>
<td>Teaching Beginning ESL Students: Principles and Practices</td>
<td>1.5</td>
<td>5818</td>
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<tr>
<td>Teaching Writing</td>
<td>1.0</td>
<td>5174</td>
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<tr>
<td>Teaching Grammar, Level II</td>
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<td>7015</td>
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<tr>
<td>Teaching Grammar, Level II</td>
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<td>20088</td>
</tr>
</tbody>
</table>

Certificate schedule outline of program curriculum and annual schedule are found online.

From the homepage, select: "Area of Study"; department; then certificate title as listed above.

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**Elective Courses**

**Instructional Design and Delivery, Introduction**
For course description, see page 58.

**Teaching English to Asian Students, U.S. and Abroad**

**EDUC.X332.21 (1.0 quarter units)**
This course is designed for educators currently teaching or planning to teach ESL to Asian students. It focuses on critical differences in student and parent expectations, teacher roles, and cultural patterns that support or hinder teacher success. The course covers the types of ESL teaching positions available in the U.S. and abroad. Educators who teach other cultural groups can also benefit from the principles presented in this course.

**INSTRUCTOR TBA**

**CLASROOM WITH ONLINE MATERIALS**
2 meetings | 9 am–3 pm | June 3, 10
Fee: $295.
To enroll, use Section Number 5174.(024)

**Teaching Grammar, Level II**

**EDUC.X300.094 (2.0 quarter units)**
All ESL students bring special grammatical challenges to the learning process, which requires ESL teachers to be fully aware of grammatical details we normally ignore. Truly effective ESL teachers must assist students in overcoming these grammatical hurdles. This course offers a strong foundation in these new teaching patterns.

**Prerequisite(s):** “Fundamentals of English Grammar for ESL Teachers.”

**FRAUKE UHLENBRUCH, Ph.D.**

**CLASROOM WITH ONLINE MATERIALS**
6 meetings | 6–9 pm | May 10–June 14
Fee: $395.
To enroll, use Section Number 20088.(014)

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**ENROLL EARLY!**
Enroll at least seven days prior to your course’s start date to save your seat and allow time to prepare for the first class meeting. Enrolling early also helps ensure that your course is not cancelled due to low enrollment.
Before arriving in Silicon Valley, Poc Hsu had an established career as a software developer in Taiwan. During the final two years of his five year long tenure in the field, he developed a passion for Web development, and made the decision to switch careers. He began to look for work, but soon realized that job prospects in his native Taiwan were scarce. Hsu began to look abroad, and eventually decided to work in the US.

“I wanted to work in America,” he says. “As a foreigner, you have to get an OPT to work. I learned about UCSC Extension’s programs online and found that this was the shortest way to get an OPT visa.”

Skills Put to Immediate Use
While planning his course schedule, Hsu applied his programming skills to develop an application for the Extension website designed to help international students plan their academic course schedule. The application was so helpful that it caught the attention of Extension’s Director of Engineering, who collaborated with Hsu on further iterations.

“The course planning tool is designed to help students find course details on the website, such as day of week, time of day, cost and units,” Hsu says. “I hope to help future students with their course planning.”

Courses Translate to the Workplace
Hsu has been able to leverage his skills to land an internship with Cloud Landing, while still completing his certification.

“I intern as a full-stack developer at Cloud Landing, using REACT and Redux on the front-end,” he says. “I took the ‘Web Application Development Using React and Flux’ course, which is really helping me for the position.”

The ability to work and attend school simultaneously has provided Hsu with the opportunity to learn from a cultural standpoint as well.

“One of the benefits of doing an internship while I study is that I gain a lot of experience working with people from different cultures and different countries,” he says. “Silicon Valley is a great place to expose us to people from around the world.”

Tell Us Your Story

We’d love to hear how you applied new skills in the workplace, or how your new credentials led to exciting job opportunities. Share your latest achievements by submitting your Extension story to extensionfeedback@ucsc.edu.
Hardware Systems and VLSI Engineering

Certificate Program

Embedded Systems

CERTIFICATE CONTACT
Engineering and Technology Department, (408) 861-3860, or email extensionprogram@ucsc.edu.

PROGRAM SUMMARY
Embedded systems refer to a growing range of function-specific computer and communication systems, including mobile devices, Internet of Things, networking equipment, industrial controllers and military electronics. This certificate program offers a comprehensive curriculum in Embedded Systems that will help new engineers gain experience in the field and benefit practitioners who want to keep up with changing technology. Instruction is geared to working professionals in a wide variety of fields, including:

- **Hardware design**: System architecture, board design, protocols and components
- **FPGA implementation**: Logic design, verification and system implementation
- **Firmware and device programming**: CPU architecture, IO and memory interface
- **Embedded software development**: Real-time embedded programming, Linux-based systems

PROGRAM BENEFITS
- Wide variety of advanced topics helps students develop areas of specialization
- Courses taught by working professionals
- Board and programming projects for hands-on learning
- Courses frequently updated to reflect changing technology and industry needs

CERTIFICATE REQUIREMENTS
To obtain the Certificate in Embedded Systems, you must successfully complete a total of **14 units**, including one of the five core courses. One related outside elective or “Also of Interest” course may be counted toward certificate upon department approval.

PREREQUISITES
You will need a degree in a technical field or equivalent knowledge acquired through training and experience in system design and development. C programming knowledge is recommended.

RECOMMENDED COURSE SEQUENCE
Students should follow the recommended prerequisites or skills needed of each course. The sequence may vary based on student background and professional interest.

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

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**Courses**

**C Programming for Beginners**
For course description, see page 74.

**C Programming, Advanced**
For course description, see page 74.

**Embedded Design with Xilinx FPGAs**
CMPE.X400.411 (3.0 quarter units)
This hands-on course will introduce you to embedded microprocessor design using field programmable gate arrays (FPGAs). The course provides an architectural overview of the Xilinx Zynq family and an in-depth look at the ARM 9 cores. You will use the Vivado Design Suite and software development kit (SDK) to develop your code, as well as the cross assembler. Design examples will be used extensively in class. You will also learn practical approaches to debugging and ‘bringing the system up’. A project report is required at the end of the course.

**Prerequisite(s):** "Practical Design with Xilinx FPGAs." Understanding and experience with basic FPGA design. C or C++ programming experience is required.

JESSE JENKINS, Ph.D.

**CLASSROOM WITH ONLINE MATERIALS**
10 meetings | 6:30–9:30 pm | April 10–June 19
Fee: $980.
To enroll, use Section Number 30417.(003)

**Embedded Firmware Essentials**
CMPE.X407.4 (2.0 quarter units)
This course provides practical knowledge and coding exercises in firmware development and reviews the embedded system architecture and hardware configurations, including the ARM Cortex-M instruction set. You’ll learn to use C codes to enable or disable hardware features, gain hands-on experience through a board project, and practice with clock, timing, delays, and latency when working with different SoC, memory and IO interfaces. You will also learn to write efficient ROM code with limited memory and timing budget.

**Prerequisite(s):** "C Programming for Beginners," and "Linux, Introduction." Prior experience with C programming and Linux is required.

SIRI WEEASOORIYA, Ph.D.

**CLASSROOM WITH ONLINE MATERIALS**
8 meetings | 6:30–9:30 pm | April 6–May 25
Fee: $740.
To enroll, use Section Number 4357.(012)

**Embedded Linux Design and Programming**
For course description, see page 72.

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**Engineering and Technology**

HARDWARE SYSTEMS AND VLSI ENGINEERING

**Embedded Systems and VLSI Engineering Programs**
This free event is an informal session for new or returning students who are interested in our Embedded Systems and VLSI Engineering certificate programs. You’ll learn the program objectives, requirements and the technical skills you’ll gain by studying with us. In addition to general Q&A, program staff will be available to answer your questions, help you select courses and plan a course sequence that fits your goals.

This is an excellent opportunity to receive course counseling for upcoming quarters. Enroll early to reserve your space.

**CLASSROOM**
Monday | 6:30–8:30 pm | March 27
No fee, but enrollment required.
To enroll, use Section Number 22403.(022)

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**IN THIS SECTION**

- Hardware Systems & VLSI Engineering 63
- Embedded Systems 63
- VLSI Engineering 66
- Information Technology 69
- Linux Programming and Administration 72
- Software Development 74
- Computer Programming 74
- Internet Programming and Development 78
- Mobile Application Development 79
- Software Engineering and Quality 80
- Database and Data Analytics 82
- User Experience and Web Design 86
EMBEDDED SYSTEMS CERTIFICATE

14-unit minimum

* Choose one of these five core courses

<table>
<thead>
<tr>
<th>Course</th>
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<td>System Design</td>
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<td>*Embedded Systems Hardware Architectures, Introduction</td>
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<td>21319</td>
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<tr>
<td>IO Concepts and Protocols:</td>
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<td>PCI Express, Ethernet, and Fibre Channel</td>
<td>3.0</td>
<td>22177</td>
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<td>IO Design Fundamentals</td>
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<td>Printed Circuit Board Design</td>
<td></td>
<td></td>
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<td>for Signal Integrity and EMC Compliance</td>
<td>1.5</td>
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<td>Jitter Essentials</td>
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<td>Comprehensive Signal and Power Integrity</td>
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<td>Design Overview of High Efficiency Switch-mode Power Supply</td>
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<td>System Design for Low Power Management</td>
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<td>Wireless Communication and Mobile Antenna Design, Introduction</td>
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<td>FPGA Design</td>
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<td>*Practical Design with Xilinx FPGAs</td>
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<td>The Internet of Things:</td>
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<td>Sensors, Platforms, Communications, and Applications</td>
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<td>The Internet of Things: Big Data Processing and Analytics</td>
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</tbody>
</table>

Certificate schedule outline of program curriculum and annual schedule are found online. From the homepage, select: “Area of Study”; department; then certificate title as listed above.

Embedded Systems Hardware Architectures, Introduction
EE.X400.083 (1.5 quarter units)

This course covers the hardware components and interfaces in a typical embedded system. The course begins with an inside look at some typical embedded systems and the functional blocks within those systems. The course addresses design considerations for such systems and several approaches to system building. Also covered are the various types of memory commonly used in embedded systems, basic concepts in microprocessors, microcontrollers and DSP, and an introduction to the typical buses used at the system level.

Prerequisite(s): Some familiarity with the hardware components of a computer system is required.

MICHAEL WANG, M.B.A., M.S.

CLASSROOM WITH ONLINE MATERIALS
5 meetings | 6:30–9:30 pm | April 3–May 5
Fee: $555.
To enroll, use Section Number 22177.(020)

IO Concepts and Protocols: PCI Express, Ethernet, and Fibre Channel
CMPE.X400.409 (3.0 quarter units)

This course focuses on IO technologies and walks students through the complexities of IO subsystems in modern computers, and the networking and storage subsystems to which they are attached. After an introduction to the basic concepts of IO, we will delve into the details of PCI Express, Ethernet and Fibre Channel. Discussion will include operation and protocols and an exploration of how these technologies work. We will follow an application’s IO request all the way from the system call, to when the data actually makes it out of the wire.

Prerequisite(s): An introductory course or practical experience with operating systems internals, an introduction to computer architecture and organization, and systems programming experience.

AJIT NATARAJAN, M.S.

CLASSROOM WITH ONLINE MATERIALS
6:30–9:30 pm | April 3–June 5
Enrollment accepted through April 5.
Fee: $950.
To enroll, use Section Number 22177.(019)
System Design for Low Power Management  
CMPE.X495.2 (1.0 quarter units)  
This course takes a practical learning approach to designing low-power systems with the ultimate goal of attaining zero power (defined by the international standard IEC 62301 as less than 5mW). The course covers key design techniques covering the different modes of system operation, power optimization of different system blocks, design with energy harvesting, and power management of power conversion stages. Lectures will be supplemented with hardware demonstrations and waveform observations of power management implementations in power conversion stages.  
Prerequisite(s): Students should have some system engineering background or experiences.  
EDWARD ONG, M.S., DBA  
CLASSE ROOM WITH ONLINE MATERIALS  
4 meetings | 9 am–12 pm | April 29–May 20 Fee: $420.  
To enroll, use Section Number 30237.(011)

Wireless Communications and Mobile Antenna Design, Introduction  
For course description, see page 71.

Printed Circuit Board Design for Signal Integrity and EMC Compliance  
EE.X400.101 (1.5 quarter 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) for both experienced and entry-level engineers. Design and layout techniques are introduced in a simple, step-by-step presentation that allows plenty of opportunities to address specific questions. Emphasis is placed on real-life examples that demonstrate good layout practices that can be incorporated immediately for high-performance designs and products.  
Prerequisite(s): Prior experience with printed circuit board and system level design and testing is highly desired. A solid foundation in basic electrical engineering principles helps one understand fundamental design concepts. This course targets the spectrum of designers, from entry level to senior engineers, including EMC engineers.  
MARK MONTROSE, M.S.  
CLASSE ROOM WITH ONLINE MATERIALS  
2 meetings | 9 am–5 pm | May 13–20 Fee: $580.  
To enroll, use Section Number 21943.(020)

Digital Logic Design Using Verilog  
For course description, see page 68.

SystemVerilog Essentials: Functional Verification and Simulation  
For course description, see page 68.

TCP/IP Essentials  
For course description, see page 71.

The Internet of Things: Big Data Processing and Analytics  
CMPE.X400.007 (3.0 quarter units)  
This course introduces data and analytic flows with a specific focus on the Internet of Things (IoT), including an overview of IoT data and its unique requirements for data security, device identity, huge data volume, and real-time processing. The course reviews current architectures of IoT data collection to the cloud and offers a hands-on approach to build a messaging and data streaming system with Apache Spark, Storm and Kafka. You’ll perform a real-time pattern analysis utilizing the Hadoop ecosystem, gaining predictive insights to set up actionable triggers with IoT data.  
Prerequisite(s): “Python Programming for Beginners.” Software installation and some programming experience in C, Java or Python (one of the three) is required.  
HINKMOND WONG, M.S.  
CLASSE ROOM WITH ONLINE MATERIALS  
10 meetings | 6:30–9:30 pm | April 4–June 6 Fee: $910.  
To enroll, use Section Number 30454.(002)

Linux Device Drivers  
For course description, see page 73.

Also of Interest

Digital Logic Design Using Verilog  
For course description, see page 68.

SystemVerilog Essentials: Functional Verification and Simulation  
For course description, see page 68.

TCP/IP Essentials  
For course description, see page 71.
Certificate Program

VLSI Engineering

CERTIFICATE CONTACT
Engineering and Technology Department, (408) 861-3860, or email extensionprogram@ucsc.edu.

PROGRAM SUMMARY
UCSC Silicon Valley Extension offers the VLSI (Very Large Scale Integration) Engineering Certificate Program for professionals working in the integrated circuit, ASIC, semiconductor, EDA, device and system industries. With more than 20 UC-quality courses, our VLSI program is the most complete integrated circuit curriculum available in Silicon Valley. Students gain practical experience using the latest EDA tools on Linux in our state-of-the-art VLSI Lab. Our expert faculty teaches hardware specification, logic design, verification, synthesis, physical implementation, circuit design, and testing of integrated circuit products. We keep you up-to-date with the latest design methodology and tools. This program has served Silicon Valley VLSI professionals for over 20 years.

CERTIFICATE REQUIREMENTS
To obtain the Certificate in VLSI Engineering, you must successfully complete a total of 14 units, including two of the five core courses. One related outside elective or “Also of Interest” course may be counted in certificate upon department approval.

PROGRAM BENEFITS
- Learn from VLSI experts
- Practice with real EDA tools
- Access labs integrated with lectures
- Learn using real-world test cases
- Keep up-to-date with trends in the chip industry

PREREQUISITES
You will need a degree in a technical field or equivalent knowledge acquired through training and experience in hardware design and development. Experience with Linux or UNIX is required for the lab sessions. Knowledge of a programming language (e.g., C, Perl or Bash Shell) may be helpful.

RECOMMENDED COURSE SEQUENCE
Students should follow the recommended prerequisites or skills needed of each course. The sequence may vary based on student background and professional interest. Some courses may be listed in more than one program. However, only one course may be shared between two Engineering and Technology certificate programs unless otherwise noted.

Certificate schedule outline of program curriculum and annual schedule are found online. From the homepage, select: “Area of Study”; department; then certificate title as listed above.

View each courses’ full schedule online at ucsc-extension.edu

Visit our website at ucsc-extension.edu for updated information and to enroll online.

VLSI ENGINEERING CERTIFICATE

14-unit minimum

*Choose two of these five core courses.

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
<th>Course</th>
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<tbody>
<tr>
<td>Design Methodology</td>
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<tr>
<td>Developing the Nanometer ASIC: From Spec to Silicon</td>
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<td>3497</td>
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<td>Practical Design with Xilinx FPGAs</td>
<td>3.0</td>
<td>30413</td>
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<tr>
<td>Logic and Functional Design</td>
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<td>*Digital Logic Design Using Verilog</td>
<td>3.0</td>
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<tr>
<td>Logic Synthesis, Introduction</td>
<td>3.0</td>
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<td>*Practical DFT Concepts for ASICs:</td>
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<tr>
<td>With Nanometer Test Enhancements</td>
<td>3.0</td>
<td>5373</td>
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<tr>
<td>IO Concepts and Protocols</td>
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<tr>
<td>PCI Express, Ethernet, and Fibre Channel</td>
<td>3.0</td>
<td>22177</td>
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<td>Digital Design with FPGA</td>
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<td>SystemVerilog and Verification</td>
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<td>SystemVerilog Essentials:</td>
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<td>Functional Verification and Simulation</td>
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<td>SystemVerilog for ASIC and FPGA Design</td>
<td>3.0</td>
<td>20095</td>
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<td>SystemVerilog Assertions and Formal Verification</td>
<td>3.0</td>
<td>20062</td>
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<tr>
<td>*Advanced Verification with SystemVerilog OOP Testbench</td>
<td>3.0</td>
<td>18966</td>
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<tr>
<td>System and Functional Verification Using UVM</td>
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<tr>
<td>(Universal Verification Methodology)</td>
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<td>0027</td>
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<tr>
<td>Physical Design and Timing Closure</td>
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<tr>
<td>*Physical Design Flow from Netlist to GDS-II</td>
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<td>ASIC Physical Design, Advanced</td>
<td>3.0</td>
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<tr>
<td>Timing Closure in IC Design</td>
<td>3.0</td>
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<tr>
<td>Circuit Design</td>
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<tr>
<td>Low-Power Design of Nano-Scale Digital Circuits</td>
<td>3.0</td>
<td>21941</td>
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<td>*Analog IC Design, Introduction</td>
<td>3.0</td>
<td>3799</td>
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<tr>
<td>IO Design Fundamentals</td>
<td>3.0</td>
<td>30170</td>
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<tr>
<td>Wireless Communication and</td>
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<tr>
<td>Mobile Antenna Design, Introduction</td>
<td>3.0</td>
<td>30448</td>
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<tr>
<td>Jitter Essentials</td>
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<tr>
<td>Comprehensive Signal and Power Integrity for High-Speed Digital Systems</td>
<td>3.0</td>
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</table>

Certificate schedule outline of program curriculum and annual schedule are found online. From the homepage, select: “Area of Study”; department; then certificate title as listed above.

Visit our website at ucsc-extension.edu for updated information and to enroll online.
Courses

Advanced Verification with SystemVerilog
OOP Testbench
CMPE.X400.292 (3.0 quarter units)
This course focuses on the use of advanced verification features in SystemVerilog. Students will gain experience developing an industrial-strength object-oriented programming (OOP) testbench. The course starts with building flexible testbench components and continues with functional coverage to round up the development of a complete verification environment. The objective is for students to become familiar with the flexibility of an OOP-centric technique, the power of constrained random verification and the use of functional coverage tools. It is also the prerequisite to "System and Functional Verification Using UVM (Universal Verification Methodology)" (course #0027). Concepts introduced in class are reinforced in the lab.
Prerequisite(s): “SystemVerilog Essentials: Functional Verification and Simulation” and “SystemVerilog for ASIC and FPGA Design.” A course in SystemVerilog and knowledge of VHDL, Verilog, C/C++, and some hardware verification experience. Ability to install and configure open-source software on own computers.
BENJAMIN TING, M.S.E.E.
LAB WITH ONLINE MATERIALS
10 meetings | 6:30–9:30 pm | April 4–June 6
Fee: $1020.
To enroll, use Section Number 18966.(035)

Analog IC Design, Introduction
CMPE.X428.6 (3.0 quarter units)
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.
Prerequisite(s): Basic knowledge of microelectronics circuits, semiconductor devices and physics. Experience with UNIX/Linux systems and commands required for the lab.
MIN "ADAM" CHU, Ph.D.
LAB WITH ONLINE MATERIALS
8 meetings | 8 am–12 pm | April 8–June 3
Fee: $880.
To enroll, use Section Number 3799.(028)

ASIC Physical Design, Advanced
CMPE.X446.9 (3.0 quarter units)
This lab-based course covers advanced topics of ASIC front-to-back design automation. It provides a 28nm library for students to practice techniques learned in class. The instructor covers UPF-based synthesis and placement, and gives an example of congestion analysis and reduction. Students will learn the CTS and how to optimize timing sign-off. The course also introduces the hierarchical design flow, power mesh synthesis, and IR drop analysis. The course further develops the students’ advanced ASIC design skills with state-of-the-art EDA back-end design tools and methodology.
Prerequisite(s): “Physical Design Flow from Netlist to GDS-II,” and “Timing Closure in IC Design.” 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.
SHAHROKH SHAKOURI, M.S.
LAB WITH ONLINE MATERIALS
10 meetings | 6:30–9:30 pm | April 14–June 16
Fee: $980.
To enroll, use Section Number 0634.(027)

Developing the Nanometer ASIC:
From Spec to Silicon
CMPE.X402.9 (2.0 quarter units)
This 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. The course includes hands-on “quick tour” labs to familiarize students with the use of EDA tools. The focus is on mostly-digital ASICs with multiple IP cores, low-power goals, and on-chip RF-CMOS/analog blocks.
Prerequisite(s): General understanding of digital logic. Lab exercises require some knowledge of Linux.
CHARLES DANCAK, M.S.E.E.
LAB WITH ONLINE MATERIALS
8 meetings | 6:30–9:30 pm | April 20–June 8
Fee: $750.
To enroll, use Section Number 3497.(099)

Embedded Systems and VLSI Engineering Programs
For course description, see page 63.
Digital Logic Design Using Verilog
CMPE.X467. (3.0 quarter units)
This course prepares students to implement Verilog modeling of digital logic. Students learn Verilog constructs and hardware modeling techniques. The course covers Verilog language elements and data types. Students tackle key challenges and learn structural, dataflow and behavioral modeling in Verilog, including common constructs and coding considerations. Instruction in the coding and testing of digital logic includes examples of combinational circuits (gates, mux/ demux, encoders/decoders, and Boolean expression), sequential circuits (latches, flip-flops, shift registers, counters, RAMs and ROMs), and complex logic (flavors of ALU and FSM).

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

JAGADEESH VARDE, MSEE
CLASSROOM WITH ONLINE MATERIALS
6 meetings | 6:30–9:30 pm | April 5–June 7
Fee: $980.
To enroll, use Section Number 0120.(080)

Easy to read and understand book. Great summaries and lecture slides. Instructor helps explain concepts. Highly recommend this course.

System and Functional Verification Using UVM (Universal Verification Methodology)
CMPE.X439.8 (3.0 quarter units)
Universal Verification Methodology (UVM) is the industry standard for functional verification methodology. This course introduces the UVM architecture; its core set of base-classes and utility methods, and associated factory automation techniques. The main base classes covered are the UVM test classes, sequence classes, component classes, messaging and reporting mechanism, factory, configuration database, transaction-level modeling (TLM), scoreboard, and coverage and phasing mechanism. Through labs, take-home assignments, and a team project, you’ll learn the power of UVM for successfully designing complex constraint-random coverage driven verification projects.

Prerequisite(s): “Developing the Nanometer ASIC; From Spec to Silicon.” Linux/Unix skills are required for lab exercises.

SAM HUYNH, Ph.D.
LAB WITH ONLINE MATERIALS
10 meetings | 6:30–9:30 pm | April 5–June 7
Fee: $980.
To enroll, use Section Number 1427.(038)

This course is challenging but worth it. Instructors are very helpful.

View each courses’ full schedule online at ucsc-extension.edu
The IT Certificate includes five major areas of study: counted in certificate upon department approval.

1. Networking and the Internet: These fundamental courses build essential knowledge and are designed for students who are new to the field or changing careers.
2. Linux Administration: This track is designed for those who work on the most popular server and device platform operating system.
3. Data Center and Cloud Computing: This series of courses in virtualization, storage networking, data centers, cloud computing, server performance tuning and network design covers the core IT innovations in recent years.
4. IT Security Technologies: We offer a series of high-impact courses in IT security technologies such as cryptography and e-commerce security.
5. IT Automation: For those interested in IT automation, database management and programming applications, we offer electives that will enhance your marketable skills.

For additional requirements, go to ucsd-extension.edu.

PREREQUISITES
Students enrolled in this program are expected to be familiar with the Internet, and possess basic knowledge of computer networking and communications. You should be familiar with at least one modern computer operating system. Many of the courses in this program have specific prerequisites that are listed in the course descriptions.

RECOMMENDED COURSE SEQUENCE
For those new to IT, we recommend that you begin with Network Fundamentals courses, such as "Computer Networking Essentials" and "TCP/IP Essentials." To gain a solid understanding of the entire industry, students should consider taking all fundamental courses, though they are not required. For those on the Linux Administration track, it is strongly recommended that you take courses in the order listed. For those interested in Data Center Technologies and Systems Security, courses may be taken based on your interests and background. Each advanced course has specific prerequisites that you should consider before enrolling.

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

14-unit minimum

<table>
<thead>
<tr>
<th>Network Fundamentals</th>
<th>Units</th>
<th>Course</th>
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<tbody>
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<td><em>Computer Networking Essentials</em></td>
<td>3.0</td>
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<tr>
<td>TCP/IP Essentials</td>
<td>2.0</td>
<td>0661</td>
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<td>Switching and Routing</td>
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<td>Wireless Communication and</td>
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<tr>
<td>Mobile Antenna Design, Introduction</td>
<td>3.0</td>
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<table>
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<tr>
<th>Linux Systems Administration</th>
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<tr>
<td>Linux, Introduction</td>
<td>2.5</td>
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<tr>
<td>*Linux System and Network Administration</td>
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<td>13515</td>
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<tr>
<td>Linux System Performance in the Cloud and Data Center</td>
<td>3.0</td>
<td>5632</td>
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<td>Linux Systems Programming</td>
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<td>*Relational Database Design and SQL Programming</td>
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<td>30215</td>
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<tr>
<td>Python for Programmers</td>
<td>3.0</td>
<td>3064</td>
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<tr>
<td>Perl Programming, Comprehensive</td>
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<thead>
<tr>
<th>Data Center Technologies</th>
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<tbody>
<tr>
<td>*System Virtualization Fundamentals</td>
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<td>30032</td>
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<tr>
<td>Storage Technology in Data Centers</td>
<td>3.0</td>
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<td>Cloud Computing, Introduction</td>
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<td>Programming for Cloud Computing: Amazon Web Services</td>
<td>3.0</td>
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<tr>
<td>VMware vSphere: Configuration and Management [v6.0]</td>
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<td>30415</td>
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<tr>
<td>VMware vSphere: Optimize and Scale [v6.0]</td>
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<td>IO Concepts and Protocols:</td>
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<td>PCI Express, Ethernet and Fibre Channel</td>
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<th>Systems and Internet Security</th>
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<tbody>
<tr>
<td><em>Information Security Essentials</em></td>
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<tr>
<td>Mobile Payments, e-Commerce Security, and Cryptocurrency</td>
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</table>

*Choose two of these five core courses from different tracks.

Certificate schedule outline of program curriculum and annual schedule are found online. From the homepage, select: “Area of Study”; department; then certificate title as listed above.

Courses

Cloud Computing, Introduction
For course description, see page ___.

Computer Networking Essentials
CMPE.X416.6 (3.0 quarter units)
This foundation course introduces computer networking, networking technologies, and the Internet. It provides a comprehensive survey of the data and computer communications field. Emphasizing both the fundamental principles and the critical role of performance in driving protocol and network design, it explores the technical areas in data communications, wide-area networking, local-area networking, and protocol design. Participants will also gain a strong foundation in networking protocols, hardware, cabling, industry standards, and connectivity solutions. Topics include introduction to the OSI and TCP/IP models of Internet-working; physical layer fundamentals; connectors and cabling; the medium access sublayer and data-link layers; bridging and switching; the network, transport, and upper layers; and network management techniques and technologies.

Prerequisite(s): Some experience with computers.

STEVE ARNOLD, M.B.A.

CLASSROOM WITH ONLINE MATERIALS
10 meetings | 6:30–9:30 pm | April 5–June 14
Fee: $910.
To enroll, use Section Number 2458.(135)

IO Concepts and Protocols: PCI Express, Ethernet, and Fibre Channel
For course description, see page 64.

Linux System Performance in the Cloud and Data Center
For course description, see page 73.

Linux Systems Programming
For course description, see page 72.

Linux, Introduction
For course description, see page 72.

Mobile Payments, e-Commerce Security, and Cryptocurrency
CMPS.X483 (3.0 quarter units)
This introductory course covers advancements in the mobile payment and transaction security fields and will prepare you to engage in platform and application development or pursue new market opportunities. You will learn the fundamentals of secure chip-card processing mandated by the major payment brands. The course discusses various mobile payment technologies and emphasizes the pros and cons of Near Field Communication (NFC), secure element, Host Card Emulation (HCE), Bluetooth, QR codes, tokens and eWallets. You’ll also learn about online transaction security risks such as Heartbleed; fraud prevention methods including multi-level authentication, biometrics, cloud-based security and Fast Identification Online (FIDO); and the role of cryptocurrency and future trends.

Prerequisite(s): General understanding of e-commerce and some programming experience.

IMRAN HAJIMUSA, M.S.

CLASSROOM WITH ONLINE MATERIALS
10 meetings | 6:30–9:30 pm | April 4–June 6
Fee: $910.
To enroll, use Section Number 30319.(007)

Perl Programming, Comprehensive
For course description, see page 77.

Python for Programmers
For course description, see page 77.

Relational Database Design and SQL Programming
For course description, see page 85.

System Virtualization Fundamentals
CMPE.X46.135 (2.5 quarter units)
This course covers virtualization at various levels. For applications in computer systems, the course covers 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.

Prerequisite(s): A basic understanding of storage systems and networking concepts.

JUAN GOMEZ, Ph.D.

CLASSROOM WITH ONLINE MATERIALS
9 meetings | 6:30–9:30 pm | April 12–June 7
Fee: $833.
To enroll, use Section Number 30032.(012)
TCP/IP Essentials
CMPE.X413.9 (2.0 quarter units)

TCP/IP has become the primary protocol for connectivity on the Internet and enterprise networks. This course presents an overview of the TCP/IP protocol suite, IP addressing, and subnetting. Participants will also learn about routing concepts, planning and configuring IP address assignment, name-resolve process, and troubleshooting. The course will provide network professionals with the essential knowledge needed to apply the skills on the job. It is intended as a fundamental course for students who are interested in the fields of network engineering, systems administration, network security, and embedded systems.

Many network programming and security analysis tasks utilize the knowledge gained here.

Prerequisite(s): “Computer Networking Essentials,” may be taken concurrently.

SIVA PRASAD, M.B.A., M.S.
ONLINE | April 11–July 18
Enrollment accepted through May 23.
Fee: $750.
To enroll, use Section Number 0661.(806)

VMware vSphere: Configuration and Management [v6.0]
CMPE.X400.431 (3.5 quarter units)

Server virtualization has become a critical technology to reduce IT costs and support the rise of cloud computing. The VMware vSphere 6.0 course includes lectures and hands-on labs covering the installation, configuration, and management of VMware ESXi 6.0 and vCenter Server 6.0. In hands-on lab sessions, each student has his/her own ESXi host, vCenter Server, and SAN storage to perform labs. Students learn to create standard virtual switches, establish storage access, and apply access controls. Virtual machines are created and used for resource monitoring, vMotion, load balancing, and high availability. This course helps prepare students for the VMware Certified Professional 6 - Data Center Virtualization (VCP6-DCV) exam and satisfies the VCP6-DCV course requirement.

Prerequisite(s): An understanding of basic system administration (OS installation) and networking, including IP addressing and the role of switches and network adapters.

ARMOND INSELBERG, M.B.A., Ph.D.
ONLINE | April 12–June 28
Enrollment accepted through April 26.
Fee: $1100.
To enroll, use Section Number 30422.(806)

Wireless Communications and Mobile Antenna Design, Introduction
CMPE.X407.3 (3.0 quarter units)

This course presents a fundamental approach to understanding wireless communications. It reviews modulation concepts, which are essential to understanding IQ modulation used in virtually all modern radios (WiFi, OFDM, CDMA, TDMA, 4G, 5G, etc.). You will examine industry digital wireless standards, including but not limited to IS-136, IS-95, Bluetooth, 4G, 802.11 and LTE. The course discusses trade-off considerations of antenna size versus range on various configurations, including dipoles, dish, beams, phase arrays, and slotted antennas. Discussions include examples of the practical designs used in the Apple iPhone and Samsung Galaxy.

Prerequisite(s): A general background in electrical engineering and networking.

EDISON FONG, Ph.D.
CLASSROOM WITH ONLINE MATERIALS
10 meetings | 9 am–12 pm | April 8–June 10
Fee: $775.
To enroll, use Section Number 30448.(003)

Also of Interest

C Programming for Beginners
For course description, see page 74.

Java Programming for Beginners
For course description, see page 77.

Linux Based Web Application Development - Apache, MySQL, PHP
For course description, see page 73.

Python Programming for Beginners
For course description, see page 77.
Certification Program

Linux Programming and Administration

Certificate Contact

Engineering and Technology Department, (408) 861-3860, or email extensionprogram@ucsc.edu.

Program Summary

Linux is the operating system (OS) of choice for today's servers, network infrastructure, embedded systems, and mobile devices. The Certificate Program in Linux Programming and Administration consists of two fields of study:

- The administrator track provides a solid foundation in configuring, operating, and administrating these open, multi-user, multi-tasking Linux operating systems.
- The development track is for developers and system programmers to customize and optimize the processes, I/Os and kernel modules.

Our program offers training at all levels, from basic installation and tools, network administration, programming drivers for devices, developing applications or services, to kernel customization for advanced systems. Many of our courses are not available in traditional colleges, yet they are highly applicable in a real-world work environment.

Certificate Requirements

To obtain the Certificate in Linux Programming and Administration, you must complete 14 units, including one of three core courses. One related outside elective or "Also of Interest" course may be counted in the certificate upon department approval.

Prerequisites

Each course has different prerequisites. Please review the course descriptions on our website to ensure that you meet the requirements, whether through education or job experience.

Recommended Course Sequence

If you have limited or no UNIX or Linux experience, we strongly recommend that you begin with "Linux, Introduction." The sequence may vary based on student background and professional interest.

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

Courses

Linux, Introduction

(CMPS.X472. (2.5 quarter units))

This course introduces the Linux operating system. Linux is gaining popularity on personal computers, devices, embedded systems and enterprise servers. The course gives students an opportunity to use Linux for personal or professional purposes. Students will learn basic Linux administration, Linux file and directory structure, basic network configuration, shell programming, and various utilities available in Linux. The course provides students with a hands-on approach for learning Linux through assignments and projects.

SULEMAN SAYA, B.S.

LAB WITH ONLINE MATERIALS

9 meetings | 6:30–9:30 pm | April 19–June 14
Fee: $840.

To enroll, use Section Number 2215.(176)

C Programming for Beginners

For course description, see page 74.

Cloud Computing, Introduction

For course description, see page 79.

Computer Networking Essentials

For course description, see page 70.

Embedded Linux Design and Programming

(CMPS.X467.2 (3.0 quarter units))

This course covers the fundamentals of building and installing a custom embedded Linux for an ARM 9 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 the embedded Linux applications.


SULEMAN SAYA, B.S.

CLASSROOM WITH ONLINE MATERIALS

10 meetings | 6:30–9:30 pm | April 13–June 15
Fee: $980.

To enroll, use Section Number 3364.(091)
Linux Based Web Application Development - Apache, MySQL, PHP
CMPS.X400.510 (3.0 quarter units)

Linux, Apache, MySQL and PHP, collectively known as LAMP, comprise the majority of servers, databases and scripting languages on the Internet today. LAMP belongs to open-source and is very robust, available free, easily configured, deployed and maintained. This course teaches LAMP basics including installation, deployment and development of a website. You will learn the basics of programming MySQL (a popular Web database) and PHP (Hypertext Preprocessor, a website scripting language). Teaching method includes theory, practices and case studies. You will be able to develop basic to intermediate level 3-tier websites and applications with a database in the back-end.

Prerequisite(s): “Linux, Introduction” and basic knowledge and experience with website development on Linux or Windows. Some programming experience will be helpful. Students have the option of learning Apache, MySQL and PHP on Windows platform. Linux platform is preferred.

TARAL OZA, M.S.
ONLINE | April 11–July 18. Enrollment accepted through May 23. Fee: $980.

To enroll, use Section Number 21958.(806)

Linux Device Drivers
CMPE.X435.5 (3.0 quarter units)

This course briefly reviews architecture and driver concepts and discusses the design and implementation of Linux device drivers in both datacenters and embedded systems environments. You will learn about kernel resource management for device drivers, their allocation and deallocation, interfaces to context management and building custom kernels. Topics include character device interfaces, time and timing, memory and address management, interrupt handling and debugging techniques. The instructor will share code samples and real-world experiences of device and kernel porting.

Prerequisite(s): A basic knowledge of C language programming, “Linux Kernel Architecture and Programming” or equivalent experience is recommended.

RAGHAV VINJAMURI, B.S.E.E.
CLASSROOM WITH ONLINE MATERIALS
10 meetings | 6:30–9:30 pm | April 7–June 23 Fee: $1200.

To enroll, use Section Number 2470.(127)

Linux Kernel Architecture and Programming
CMPS.X458.5 (3.0 quarter units)

This course provides an introduction to kernel-level programming in Linux and writing kernel modules. Core kernel is covered at both the conceptual and practical/coding levels. The course starts with the kernel source code organization and how it functions. It covers topics in memory management, process creation and scheduling, interrupts, kernel synchronization, device drivers, and performance tuning. Discussion addresses various data structures and algorithms used in the Linux kernel. Students gain hands-on experience with kernel programming as part of the class work.

Prerequisite(s): “Linux Systems Programming.” Proficient knowledge of Linux system programming and C programming language is required.

ANAND PAI, M.S.
CLASSROOM WITH ONLINE MATERIALS
10 meetings | 6–9 pm | April 3–June 12 Fee: $980.

To enroll, use Section Number 1397.(085)

Linux Kernel Programming, Advanced
CMPS.X400.560 (2.5 quarter units)

For Linux projects that demand high performance or custom features from the kernel, developers must work at a much deeper level. After a brief review of key topics, this course covers the data structures and inter-workings of the kernel with respect to file system creation, process scheduling, memory management, and network stack management. Students will also learn multicore, multi-threaded management techniques and inter-processor scheduling at the kernel and process level. Either Linux kernel 2.6 or 3.x can be used in project. The instructor will present practical examples of each topic throughout the course.

Prerequisite(s): “Linux Kernel Architecture and Programming,” and “Linux Systems Programming.” Proficiency in C programming and an understanding of networking basics is required.

ANAND PAI, M.S.
CLASSROOM WITH ONLINE MATERIALS
6 meetings | 8:30 am–1:30 pm | April 22–June 3 Fee: $920.

To enroll, use Section Number 23103.(016)

Linux System Performance in the Cloud and Data Center
CMPS.X455.2 (3.0 quarter units)

This course covers Linux workload characterization, system profiling, performance management and benchmarking in the cloud and data centers. The course begins with measurement and tuning concepts. It reviews how the components of Linux kernel and application API interact and work together seamlessly as scalable solutions. You will learn how to identify resource contention issues and how to simulate production workload for problem isolation and benchmarking. You will gain hands-on experience using the rich set of basic and advanced monitoring and tracing tools offered by Linux.

Prerequisite(s): “Linux System and Network Administration” and “Linux Systems Programming.”

AMER AHER, B.S.E.E.
CLASSROOM WITH ONLINE MATERIALS
10 meetings | 6:30–9:30 pm | April 19–June 21 Fee: $980.

To enroll, use Section Number 5632.(044)

Linux Systems Programming
CMPS.X496. (3.0 quarter units)

System calls are functions called from within a C program, which provide access to the lowest level resources of the OS. Topics covered in this course will enable a C programmer to understand and implement standard utilities (e.g. ls, wc, cat). It includes conceptual background, functional interfaces and topics on I/O control, file systems, access, and locking; signal handling; process and threads management; IPC using pipes and TCP/IPDUD sockets; and related discussions on makefiles, man pages and rpm packaging utilities. This course covers the development of a complete ftp package, including the client-side interface and the server-side components.

Prerequisite(s): “Linux, Introduction.” A basic knowledge of C language programming and a working knowledge of the Linux/LINUX operating environment are required.

RAGHAV VINJAMURI, B.S.E.E.
CLASSROOM WITH ONLINE MATERIALS
11 meetings | 6:30–9:30 pm | April 11–June 20 Fee: $735.

To enroll, use Section Number 3493.(114)

Perl Programming, Comprehensive

For course description, see page 77.

Python for Programmers

For course description, see page 77.

System Virtualization Fundamentals

For course description, see page 70.

VMware vSphere: Configuration and Management [v6.0]

For course description, see page 71.

VMware vSphere: Optimize and Scale [v6.0]

For course description, see page 71.

ACCESS TO ONLINE COURSES AND MATERIALS

If you are enrolling for the first time in an Online course, or a classroom course with Online Materials, you will receive an account for UCSC Extension Online via email within 12 hours. If you have previously taken a course with online materials, you should use your existing account. Course sites will open one day prior to the official start date.

For more information, including help retrieving your account info, please visit ucsc-extension.edu/online-faqs.

For information on textbooks, see page 100 or visit ucsc-extension.edu/bookstore.
Software Development

If you’re looking for training in software engineering principles or the latest programming languages, you’ll find it at UCSC Silicon Valley Extension. We offer classroom and online courses in a variety of programming languages and platforms, including Java, .NET, and open sourced frameworks. We also offer certificates and courses in software engineering and in today’s most popular OS platforms, including Linux, OSX and Windows. Our courses and certificates are designed to help Bay Area technical professionals stay competitive throughout their careers.

Certificate Program

Computer Programming

CERTIFICATE CONTACT
Engineering and Technology Department, (408) 861-3860, or email extensionprogram@ucsc.edu.

PROGRAM SUMMARY
Software applications are deployed in nearly every facet of modern life. The result is a growing demand for technical professionals who can create, code, maintain and enhance software applications. UCSC Extension's certificate in Computer Programming can help you build a strong foundation in software development and apply coding skills across a wide range of platforms, from computers and mobile devices, to Web development and the cloud. The certificate covers all major programming languages used in the industry. Each language has its application environment. We offer two levels of courses to suit students with different backgrounds and needs. Many courses use open-source tools in a lab environment to give students hands-on programming experience. This is among the longest running and successful programs at UCSC Extension.

CERTIFICATE REQUIREMENTS
To obtain the Certificate in Computer Programming, you must complete 14 units, including two of the core courses. One related outside elective or “Also of Interest” course may be counted in certificate upon department approval.

PROGRAM AUDIENCE
• Software developers who want to enhance their programming knowledge
• Entry-level or career changers looking to enter the software field
• Non-software professionals who need programming training
• Individuals learning programming for personal applications
• Project managers who work with programmers or manage software projects

PREREQUISITES
Each course has different prerequisites. Please review the course details on our website to ensure that you meet the requirements, whether through education or job experience.

RECOMMENDED COURSE SEQUENCE
Students should follow the recommended prerequisites or skills needed of each course. The sequence may vary based on student background and professional interest. Some courses may be listed in more than one program. However, only one course may be shared between two Engineering and Technology certificate programs unless otherwise noted.

Courses

C Programming for Beginners
CMPS.X409.1 (2.0 quarter units)
This course will benefit individuals who want to learn the C programming language but have little or no programming background. The course begins with an overview of programming and tools. It introduces the functions, data types, input/output, strings, operators, precedence, and expressions. It also demonstrates the use of control statements, arrays, and pointers for problem solving. You will receive assignments to write non-trivial programs and learn to create modular programs with efficiency and readability.

Prerequisite(s): Technical aptitude and experience with a computer operating system or equivalent knowledge.

BINEET SHARMA, M.S.C.S.

LAB WITH ONLINE MATERIALS
8 meetings | 6:30–9:30 pm | April 10–June 12
Fee: $620.
To enroll, use Section Number 5208.(151)

ONLINE
April 11–July 18
Enrollment accepted through May 23.
Fee: $620.
To enroll, use Section Number 5208.(806)

C Programming, Advanced
CMPS.X401.7 (3.0 quarter units)
This course will broaden your skills as a C language programmer by introducing sophisticated problem-solving techniques, including the advanced use of pointers, abstract data types, data structure concepts and optimization techniques. The course delves into the design, implementation, and use of advanced data structures, based on primitive data types. Students will solidify their understanding of strings, arrays, structures, unions and bit manipulation. Emphasis will be on programming that employs and improves upon a variety of data structures. You will learn to write efficient programs by understanding the complexities of various algorithms.

Prerequisite(s): “C Programming for Beginners.”

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

RAJINDER YELDANDI, M.S.C.S.

CLASSROOM WITH ONLINE MATERIALS
10 meetings | 6:30–9:30 pm | April 13–June 22
Fee: $800.
To enroll, use Section Number 3948.(087)

ONLINE
April 11–July 18
Enrollment accepted through May 23.
Fee: $800.
To enroll, use Section Number 3948.(806)
### COMPUTER PROGRAMMING CERTIFICATE

**14-unit minimum**

*Choose two of these core courses.

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
<th>Course</th>
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<tr>
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<tr>
<td>C Programming for Beginners</td>
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<td>* C Programming, Advanced</td>
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<tr>
<td>C++ Programming</td>
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<td>*C++ Programming, Comprehensive</td>
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<tr>
<td>Data Structures and Algorithms Using C++</td>
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<td>Java Programming</td>
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<td>Data Structures and Algorithms Using Java</td>
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<td>C# .NET Programming, Advanced</td>
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<td>Mobile Device Programming</td>
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<td>21938</td>
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<td>Developing Applications for iPhone and iPad, Introduction</td>
<td>2.0</td>
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<td>Developing Applications for iPhone and iPad, Advanced</td>
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<td>Developing Applications for Android Mobile Devices</td>
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<td>Advanced Programming</td>
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<td>*Object-Oriented Analysis and Design</td>
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<td>Architectures and Design Patterns, Advanced</td>
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<td>Machine Learning and Data Mining, Introduction</td>
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<td>Hadoop: Distributed Processing of Big Data</td>
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<td>Computational Intelligence, Introduction</td>
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</table>

Certificate schedule outline of program curriculum and annual schedule are found online. From the homepage, select: “Area of Study”; department; then certificate title as listed above.

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**C# .NET Programming, Comprehensive**

*CMPS.X459.1 (3.0 quarter units)*

This course introduces beginning and intermediate programmers to .NET programming using Microsoft’s C# programming language. The instructor explains the Visual Studio development environment and reviews the basic constructs of C# language with detailed explanations of the C# regular expressions, delegates, events, generics and collections. The course also covers exception handling, threading and synchronization. Sample applications will be used to illustrate core concepts and the instructor will present real-world code examples in class.

**Prerequisite(s):** Some programming experience with a high-level language such as C, C++, Java or Visual Basic. C# knowledge is not required.

**TARAL OZA, M.S.**

**CLASSROOM AND ONLINE (HYBRID)**

5 meetings | 6:30–9:30 pm | April 7–June 2

Fee: $910.

**To enroll, use Section Number 5408.(083)**

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**ACCESS TO ONLINE COURSES AND MATERIALS**

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For more information, including help retrieving your account info, please visit [ucsc-extension.edu/online-faqs](http://ucsc-extension.edu/online-faqs).

For information on textbooks, see page 100 or visit [ucsc-extension.edu/bookstore](http://ucsc-extension.edu/bookstore).
C# .NET Programming, Advanced
CMPS.X400.376 (3.0 quarter units)
For students who have learned the basic C# language and the C# .NET integrated development environment, this course provides an opportunity to expand C# and .NET skills by learning advanced C# features and programming techniques. The course introduces the components of the .NET framework, database connectivity and Web application development.
Prerequisite(s): “C# Programming for Beginners.”
TARAL OZA, M.S.
ONLINE
April 11–July 18
Enrollment accepted through May 23.
Fee: $910.
To enroll, use Section Number 19026.(082)

C++ Programming, Comprehensive
CMPS.X400.348 (3.0 quarter units)
C++ is a general-purpose object-oriented programming language that offers portability, speed, and modularity, as well as compatibility with C and other languages. Because most automation, embedded applications, gaming, and many large data processing applications are written in C++, it is essential that software developers understand and master it. Topics include object-oriented concepts, structure and input/output streams, declarations, identifiers, pointers, and arguments; memory management, constructors, and destructors; enumeration type, as constructor parameter; character strings, file I/O, functions; inheritance, and interaction diagrams; and exception handling, pointers, and functions.
Prerequisite(s): “C Programming for Beginners.” Experience with a high level programming language such as C.
SULEMAN SAYA, B.S.
CLASSROOM WITH ONLINE MATERIALS
9 meetings | 9 am–1 pm | April 15–June 17
Fee: $1020.
To enroll, use Section Number 18344.(065)

Data Structures and Algorithms Using Java
CMPS.X400.008 (3.0 quarter units)
This course discusses how to efficiently use algorithms with powerful data structures in Java, covering 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—then write algorithms on these objects using techniques such as recursion, greedy, divide and conquer, back tracking and dynamic programming. The course discusses searching and sorting, union find problems, knapsack problems and NP complete problems. You will also learn to compute the worst case complexity of algorithms in terms of time and space.
Prerequisite(s): “Java Programming for Beginners.” Working knowledge of Java or C/C++.
JAGADEESH VASUDEVAMURTHY, Ph.D.
CLASSROOM WITH ONLINE MATERIALS
10 meetings | 9 am–12 pm | April 8–June 17
Fee: $980.
To enroll, use Section Number 30412.(004)

Developing Applications for Android Mobile Devices
CMPS.X400.507 (2.0 quarter units)
Android is an open-source platform for smartphones, tablets and the increasingly popular Internet-enabled devices (wearables, TV, etc.). This course offers an overview of the Android development platform. You will learn through a simple application that demonstrates how to build applications for the platform step by step. The course covers the platform architecture and basic mobile building blocks. The instructor provides interaction and guidance in programming assignments. You will learn how to implement the user interfaces, and use optional APIs and Google libraries to enrich the application.
Prerequisite(s): “Java Programming for Beginners.” Java programming experience is required to program Android.
TARAL OZA, M.S.
CLASSROOM WITH ONLINE MATERIALS
7 meetings | 6:30–9:30 pm | April 25–June 6
Fee: $730.
To enroll, use Section Number 21938.(039)

Developing Applications for iPhone and iPad, Advanced
CMPS.X400.577 (3.0 quarter units)
This advanced course offers a hands-on approach to help beginning iOS developers take their skills to the next level. You will learn advanced debugging techniques using Xcode, Instruments, unit testing, and UI testing. Also covered are the Swift Standard Library, the Apple App Store Guidelines, and at least one advanced technology of your choosing. The course then goes into Grand Central Dispatch and iOS technologies that support animation, internationalization, accessibility, and persisting data. Students will do their own projects under instructor guidance.
Prerequisite(s): “Developing Applications for iPhone and iPad, Introduction.” Familiarity with the Xcode, iOS SDK, Objective C, and/or Swift language, and application development process. Lessons do not repeat the basics.
MICHAEI ELLARD, M.A.
LAB WITH ONLINE MATERIALS
10 meetings | 6:30–9:30 pm | April 20–June 22
Fee: $980.
To enroll, use Section Number 23592.(013)

Hadoop:
Distributed Processing of Big Data
For course description, see page 83.

Introduction to Machine Learning and Data Mining
For course description, see page 84.
JUnit Test Framework
For course description, see page 81.

Java Programming for Beginners
CMPS.X439.3 (2.0 quarter units)
This course is an introduction to Java programming, starting 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 includes programming exercises.
Prerequisite(s): Students should have experience using logic. Some programming experience will be helpful. Ability to install and configure open-source software on own computers.
BINEET SHARMA, M.S.C.S.
LAB WITH ONLINE MATERIALS
8 meetings | 6:30–9:30 pm | April 14–June 16 Fee: $625.
To enroll, use Section Number 5185.(103)
ONLINE | April 11–July 18 Enrollment accepted through May 23. Fee: $625.
To enroll, use Section Number 5185.(806)

Java Programming, Comprehensive
CMPS.X471.2 (3.0 quarter units)
Java is the premier language for Web servers, enterprise servers, network applications, embedded devices, appliances and wireless applications. This course covers the Java fundamentals, including language syntax, constructs, and the development environment. It also extends to the Java platform, including client/server communication and managing XML data. The course begins with Java’s implementation of object-oriented concepts such as classes, data and function access controls and inheritance. Students build graphical user interfaces and program in the Java event-handling model. Additional topics include the Java class library, collection frameworks, Internet communication, and multithreaded programming.
Prerequisite(s): “Java Programming for Beginners” is recommended for those new to Java. Experience in a programming language such as C or C++ may also help with learning Java.
BINEET SHARMA, M.S.C.S.
CLASSROOM WITH ONLINE MATERIALS
10 meetings | 6:30–9:30 pm | April 5–June 14 Fee: $1020.
To enroll, use Section Number 6634.(106)
RADIKA GROVER, Ph.D.
ONLINE | April 11–July 18 Enrollment accepted through May 23. Fee: $1020.
To enroll, use Section Number 6634.(806)

Object-Oriented Analysis and Design
For course description, see page 82.

Perl Programming, Comprehensive
CMPS.X486.9 (2.0 quarter units)
This comprehensive hands-on course covers all the basic Perl syntax and programming constructs. Students will develop programs in class and as homework assignments. In addition to the basics, the course covers the file handle, filters, testing and system interface. It also includes an introduction to the object-oriented features in Perl, standard libraries, and how to package and modularize Perl programs. By the end of the course, students should be able to develop sophisticated Perl scripts in several applications.
Prerequisite(s): Recent programming experience in any language is required.
LAMBERT LUM, B.S.C.S., M.B.A.
LAB WITH ONLINE MATERIALS
6 meetings | 6:30–9:30 pm | April 4–May 9 Fee: $770.
To enroll, use Section Number 2110.(068)

Python for Programmers
CMPS.X461.9 (3.0 quarter units)
Because of its clear and elegant syntax, dynamic typing, automatic memory management, and straightforward module architecture, Python enhances program correctness and increases efficiency. Its code is easy to read, write, extend, and modify. This lab-based course builds proficiency in Python, and the skills and knowledge for creating applications using task-specific Python libraries. Topics include the Python environment and code introspection, syntax, flow control, function protocols, exception handling and functional programming. Also covered are object-oriented features, classes, inheritance and overriding as well as building applications, packages, and libraries.
Prerequisite(s): “Python Programming for Beginners.” Significant experience in any programming language.
SRIDEVI PUDIPEDDI, Ph.D.
LAB WITH ONLINE MATERIALS
10 meetings | 6:30–9:30 pm | April 3–June 12 Fee: $1020.
To enroll, use Section Number 3064.(129)

Python Programming for Beginners
CMPS.X460.43 (1.5 quarter units)
This hands-on lab-based course is intended for newcomers to programming. The course covers the important concepts and programming mechanisms that exist in all programming languages: reading and writing to standard I/O, using operators, controlling the flow of execution, using functions, reading and writing files, and, object-oriented programming concepts, etc. It also includes Python specific facilities such as code re-use, built-in sequence types, and iteration. Interactions and expert help are available.
DONALD KEIDEL, Ph.D.
LAB WITH ONLINE MATERIALS
6 meetings | 6:30–9:30 pm | May 1–June 12 Fee: $580.
To enroll, use Section Number 20776.(057)

XML Essentials
CMPS.X468.4 (2.0 quarter units)
This course is an introduction to the power of XML and its importance to the Web. The course begins with the history and background of XML and the advantages of moving toward the XML standard. The course introduces basic tags as well as syntax rules for XML and XML environments. Practical examples will be used to demonstrate the basics of working with XML, cascading style sheets and document-type definitions. The course briefly addresses the Document Object Model (DOM) concept and the data manipulation capability.
Prerequisite(s): Web page creation skills and a basic understanding of cascading style sheets.
AHMAD NOURI, M.S.
ONLINE | April 11–July 18 Enrollment accepted through May 23. Fee: $625.
To enroll, use Section Number 3279.(806)

ACCESS TO ONLINE COURSES AND MATERIALS
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For more information, including help retrieving your account info, please visit ucsc-extension.edu/online-faqs.
For information on textbooks, see page 100 or visit ucsc-extension.edu/bookstore.
Internet Programming & Development

Engineering and Technology Department, (408) 861-3860, or email extensionprogram@ucsc.edu.

PROGRAM SUMMARY
Keep pace with the rapid evolution of Web technologies by studying with the experts at UCSC Extension. Our Internet Programming and Development certificate program offers comprehensive training geared to developers working on e-commerce, enterprise applications, interactive websites and cloud applications. Courses cover all major platforms and frameworks, including Java Enterprise Edition, Microsoft ASP.NET, as well as major open source options, such as LAMP, Ruby on Rails, and MEAN stack. We offer training on Internet programming languages, server development, Rich Internet Applications (RIA) or dynamic Web technologies, and cloud services. Our Web app testing and e-commerce security courses are also relevant to industry professionals. Developers can acquire new skills through hands-on instruction and sharing insight with our expert instructors.

This program shares some courses with our certificates in Computer Programming, User Experience and Web Design, and Linux Programming.

It is the one place where important Internet development and application programming courses are combined in a single, rich curriculum.

CERTIFICATE REQUIREMENTS
To obtain the Certificate in Internet Programming and Development, you must complete a minimum total of 14 units, including one of the three core courses. One related outside elective or *Also of Interest* course may be counted in certificate upon approval.

PROGRAM AUDIENCE
This certificate program is for professionals who want to:
- Keep up with emerging Internet technologies
- Develop interactive and dynamic websites
- Develop enterprise and commercial applications
- Study for Java EE and ASP.NET certifications
- Enter the field of Internet programming and development with confidence

PREREQUISITES
Familiarity with a programming language is required. General knowledge of databases, browsers, and the Web is assumed.

RECOMMENDED COURSE SEQUENCE
Students should follow the recommended prerequisites or skills needed of each course. The sequence may vary based on student background and professional interest.

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

INTERNET PROGRAMMING AND DEVELOPMENT CERTIFICATE

14-unit minimum

*Choose one of these three core courses

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<tr>
<th>Course</th>
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<tr>
<td>JavaScript, Comprehensive</td>
<td>3.0</td>
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<tr>
<td>Python Programming for Beginners</td>
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<td>Perl Programming, Comprehensive</td>
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<td>Ruby Programming for Beginners</td>
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<td>HTML Fundamentals</td>
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<td>HTML5: The Living Language</td>
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<td>XML Essentials</td>
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</table>

Certificate schedule outline of program curriculum and annual schedule are found online. From the homepage, select: "Area of Study"; department; then certificate title as listed above.
Courses

C# .NET Programming, Comprehensive
For course description, see page 75.

C# .NET Programming, Advanced
For course description, see page 76.

Cloud Computing, Introduction
CMPS.X400.527 (0.5 quarter units)
This course introduces students to the concepts and technologies involved in cloud computing, which refers to scalable and virtualized computing over the Internet. The course begins with surveys of technologies deployed by Amazon, Google, Microsoft, and various academic and open-source providers. It explains how cloud computing services can provide on-demand access to data storage, computing resources, and messaging. It also introduces the enabling technologies: Web 2.0, virtualization, grid and utility computing that comprise the infrastructure behind a cloud computing service. The course examines various case studies and technical-business models.
Prerequisite(s): A basic understanding of the Internet, databases, messaging and programming experience sufficient to follow code examples.
JEFF MILLER, B.S.

CLASSROOM WITH ONLINE MATERIALS
1 meeting | 10 am–5 pm | June 10
Fee: $350.
To enroll, use Section Number 22413.(017)

Designing with Cascading Style Sheets: Fundamentals
For course description, see page 87.

Developing Enterprise Java Applications with Spring Boot and Microservices
CMPS.X400.399 (3.0 quarter units)
This course introduces modern tools and methodology for developing Java enterprise applications and covers the core concepts of Spring framework, including Inversion of Control (IoC) and dependency injections. You will learn by building a sample Java enterprise application that creates RESTful Web services, as well as creating microservices applications using Spring Boot and Hibernate. You will gain hands-on experience with open-source tools, servers and databases. Students are required to bring laptops to class.
Prerequisite(s): “Java Programming, Comprehensive” or an equivalent course.
RAHUL AGARWAL, M.S.
CLASSROOM WITH ONLINE MATERIALS
10 meetings | 6:30–9:30 pm | April 4–June 13
Fee: $1020.
To enroll, use Section Number 20063.(032)

Developing JavaScript-based Rich Web UI with JQUERY
CMPS.X400.549 (2.0 quarter units)
JQUERY is a JavaScript library that simplifies the rapid development of rich Web applications. JQUERY can be used in Web applications regardless of the language or technology employed on the server side. After an overview of the JQUERY framework, this course goes into the inner workings of document object model (DOM) and HTML content, including traversal, modification, user interactions and event handling. Students learn to leverage the browser event model, perform AJAX requests, add effects and animations, use JQUERY plugins, and work with CSS and form data.
Prerequisite(s): Some knowledge of HTML, CSS, and JavaScript. Must have recent programming experience.
SUBHADEEP CHATTERJEE, M.S.
LAB WITH ONLINE MATERIALS
8 meetings | 6:30–9:30 pm | April 21–June 9
Fee: $760.
To enroll, use Section Number 22865.(016)

HTML Fundamentals
For course description, see page 88.

HTML5: The Living Language
For course description, see page 88.

Introduction to Web Programming: JavaScript and PHP
CMPS.X482 (2.0 quarter units)
This introductory course covers basic concepts and programming skills that you need to know to program dynamic Web pages. The course showcases and analyzes demos of dynamic Web pages that use JavaScript and PHP. It covers basic programming syntaxes such as variables, data types, expressions and operators, and strings. You’ll discuss functions, events, decision making and repetition, and you’ll learn to build forms and objects, take inputs and reset forms. When using PHP for server-side scripting, you’ll also learn to handle user input and process form data, creating an all-in-one form.
Prerequisite(s): “Designing with Cascading Style Sheets: Fundamentals,” and “HTML Fundamentals,” HTML and CSS coding experience are required. If you have experience with object-oriented languages such as Java or C++, the pace of the course may be slow. You may consider “JavaScript and AJAX, Comprehensive” (course 1500) instead.
TERESA HARDY, M.A.
LAB WITH ONLINE MATERIALS
8 meetings | 6:30–9:30 pm | April 21–June 16
Fee: $710.
To enroll, use Section Number 30298.(011)

Java Programming for Beginners
For course description, see page 77.

Java Programming, Comprehensive
For course description, see page 77.

Professional Award
Mobile Application Development

CONTACT
Engineering and Technology Department,
(408) 861-3860, or email extensionprogram@ucsc.edu.

AWARD SUMMARY
Mobile application development is attracting the attention of corporations, the media and most importantly, software developers. While our mobile courses appear in several traditional certificate programs, the Professional Award in Mobile Application Development is designed for those who are primarily interested in developing mobile apps. These courses include programming for the major mobile platforms, interface design and cross-platform programming. This award serves as recognition for students who have accumulated a focused body of knowledge in the field. It may help you pursue career opportunities in this growing industry.

AWARD REQUIREMENTS
To obtain the Professional Award in Mobile Application Development, you must successfully complete 8 units with a minimum GPA of 3.0.

RECOMMENDED COURSE SEQUENCE
While courses can be taken based on individual interest and level of experience, you must meet the prerequisites of individual courses. Prerequisite language courses cannot be counted toward the award.

MOBILE DEVICE PROGRAMMING
Developing Applications for iPhone and iPad, Introduction 2.0 units
Developing Applications for iPhone and iPad, Advanced 3.0 units
Developing Applications for Android Mobile Devices 2.0 units
Developing Applications for Android Mobile Devices, Advanced 2.0 units

MOBILE INTERFACE DESIGN
Mobile Interface Design 3.0 units
Designing User Experience for Smart Things, VR, and Wearable Technology 3.0 units

MOBILE SYSTEM DESIGN
Wireless Communications and Mobile Antenna Design, Introduction 3.0 units

CLOUD PROGRAMMING AND MOBILE PAYMENT
Programming for Cloud Computing: Amazon Web Services 3.0 units
Mobile Payments, e-Commerce Security, and Cryptocurrency 3.0 units

See uccs-extension.edu/MobileAppsPA for details.
JavaScript and AJAX, Comprehensive
CMPS.X438.5 (3.0 quarter units)

This comprehensive course covers JavaScript as a programming language for creating dynamic Web pages. After getting up to speed with the language syntax, data types, operators, and programming constructs, you will learn how to create and manipulate objects and write functions to handle user-initiated events such as mouse rollovers, clicking on a link, or submitting a form. You will learn the Document Object Model and how to walk the W3C DOM tree, manage nodes, and use event listeners. Topics include JS frameworks and AJAX to create asynchronous calls to the Web for fast interactivity.

Prerequisite(s): “Introduction to Web Programming: JavaScript and PHP.” Familiarity with basic programming constructs (of a language such as C, C++ or Perl) and a working knowledge of HTML are required.

VIVEK SHARMA, B.S.

LAB WITH ONLINE MATERIALS
10 meetings | 6:30–9:30 pm | April 13–June 15
Fee: $960.
To enroll, use Section Number 1500.(068)

Linux Based Web Application Development - Apache, MySQL, PHP
For course description, see page 73.

Mobile Payments, e-Commerce Security, and Cryptocurrency
For course description, see page 70.

Perl Programming, Comprehensive
For course description, see page 77.

Python Programming for Beginners
For course description, see page 77.

Python for Programmers
For course description, see page 77.

Responsive Web Design with Open Source Frameworks
For course description, see page 88.

Ruby and Ruby on Rails
CMPS.X400.489 (2.0 quarter units)

Ruby on Rails (RoR) is an open-source Web application framework optimized for programmer productivity and software sustainability. This course introduces the Ruby language and the RoR architecture. You will learn to develop a fully-featured Web application using this framework that has all major Web features, including Model-View-Controller (MVC), AJAX, jQuery, CSS, JavaScript, Atom, session management, and authentication. By the conclusion of the course, you will be able to develop, test and deploy your own robust and interactive Ruby on Rails Web applications with efficient code quickly.

Prerequisite(s): 1-2 years of object-oriented programming experience. Familiarity with Web-based applications will aid you in learning Rails. Understanding of technologies such as the HTTP protocol, HTML, CSS, JavaScript, and SQL will enhance your ability to learn Rails.

BUTCH ANTON, Ph.D.

CLASSROOM WITH ONLINE MATERIALS
8 meetings | 6:30–9:30 pm | May 18–July 6
Fee: $760.
To enroll, use Section Number 21342.(041)

User Experience Design Fundamentals
For course description, see page 88.

Web Applications Testing, Comprehensive
For course description, see page 82.

Web Framework Using JavaScript: The MEAN Stack
CMPS.X400.580 (3.0 quarter units)

The MEAN stack (MongoDB, ExpressJS, AngularJS, and Node.js) is an emerging Web framework that uses JavaScript to build Web applications from front to back. This course explains the four components and the role each has in building a modern Web application, and then covers the configuration, implementation and programming details. You will learn to build the Node.js server, include Express in the app, interface with the document-oriented database MongoDB, and use Angular directives and services on the client side. Additionally, you’ll interact with JSON, Model-View-Controller, Web services and HTML.

Prerequisite(s): “JavaScript and AJAX, Comprehensive.”

VIVEK SHARMA, B.S.

CLASSROOM WITH ONLINE MATERIALS
10 meetings | 6:30–9:30 pm | April 3–June 12
Fee: $980.
To enroll, use Section Number 30377.(007)

XML Essentials
For course description, see page 77.
SOFTWARE ENGINEERING AND QUALITY CERTIFICATE

14-unit minimum

*Choose one of these three core courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
<th>Course</th>
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<tr>
<td>Software Engineering</td>
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<td>Object-Oriented Development Architectures</td>
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<td>Data Structures and Algorithms Using C++</td>
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<td>Designing, Building and Integrating RESTful API</td>
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<td>Machine Learning and Data Mining, Introduction</td>
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<td>Software QA and Testing</td>
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<td>Software Testing: Techniques, Tools and Practices</td>
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<td>Virtual Reality, and Wearable Technology</td>
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<td>Refresher for Software Professionals</td>
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<tr>
<td>Managing Software Projects</td>
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Earn Credit toward an M.S. in Engineering

The Engineering and Technology Department has secured a transfer agreement with the University of Wisconsin–Platteville. This agreement specifically assists students who have completed either an Embedded Systems Certificate or a Software Engineering and Quality Certificate, and would like to pursue an online Master of Science in Engineering degree. Applicants to the master’s degree program must hold a bachelor’s degree from an accredited institution and fulfill the school’s admissions requirements.
Object-Oriented Analysis and Design
CMPS.X431.2 (3.0 quarter units)
Object-oriented design involves transforming the descriptive analysis models into computational models for coding. During an object-oriented analysis, a descriptive model of the problem domain is developed. Instruction uses the notation specified by the Unified Modeling Language (UML). Students will learn Agile and Iterative Development methodologies and use case design and requirements driven design. 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 documenting design using different UML diagrams.

Prerequisite(s): Programming experience required in an object oriented language (e.g. Java, C++, C#, Python, etc.).
EDWIN MACH, M.S.

CLASSROOM AND ONLINE (HYBRID)
3 meetings | 9 am–12 pm | April 8–June 3
Fee: $980.
To enroll, use Section Number 0774.(085)

Perl Programming, Comprehensive
For course description, see page 77.

Python Programming for Beginners
For course description, see page 77.

Relational Database Design and SQL Programming
For course description, see page 85.

User Experience Design Fundamentals
For course description, see page 88.

Web Applications Testing, Comprehensive
CMPS.X400.006 (3.0 quarter units)
This course provides the knowledge and skills needed to test Web apps. 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 performance. The Selenium tool is used to interact with browsers and automate UI testing. You’ll 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, and includes performance testing of Web applications.

MIN WU, Ph.D.

CLASSROOM WITH ONLINE MATERIALS
10 meetings | 6:30–9:30 pm | April 20–June 22
Fee: $910.
To enroll, use Section Number 30355.(005)

Certificate Program

Database and Data Analytics

CERTIFICATE CONTACT
Engineering and Technology Department, (408) 861-3860, or email extensionprogram@ucsc.edu.

PROGRAM SUMMARY
UCSC Extension’s certificate in Database and Data Analytics consists of two fields of study:

- The Database focus is designed for enterprise data professionals who are involved in designing, administering and using shared databases, including building business intelligence.
- The Data Analytics focus offers a comprehensive introduction to the field, including the algorithms, tools, frameworks and practices in managing Big Data and performing data mining.

The industry of business intelligence and analytics has undergone major shifts in fundamental technologies. This certificate program offers up-to-date training for data scientists, analysts, administrators and managers who want to apply analytics to business decision-making. Expert instructors present the latest technologies and developments through a hands-on approach to facilitate learning.

CERTIFICATE REQUIREMENTS
To obtain the Certificate in Database and Data Analytics, you must complete a minimum total of 14 units including one of two core courses. For additional requirements, visit our website. One related outside elective or “Also of Interest” course may be counted in certificate upon department approval.

PREREQUISITES
Each course has different prerequisites. Please review the course descriptions on our website to ensure that you meet the requirements, whether through education or job experience. Programming knowledge is helpful.

RECOMMENDED COURSE SEQUENCE
We recommend that students begin with one of the two core courses, and follow the recommended prerequisite for each course. The sequence may vary based on student background and professional interest.

Courses

Big Data: Overview, Tools and Use Cases
CMPS.X460.367 (3.0 quarter units)
Big Data has emerged as a powerful new technology paradigm. In order to manage the massive data generated by social media, online transactions, Web logs, and sensors, Big Data has to incorporate innovative technologies in data management. This course provides an overview of Big Data concepts, its technological landscape and deployment patterns. You will learn data management, including how to acquire, cleanse and normalize Big Data, and discuss practical use cases. The course explores the key concepts, schema, data access and methodology of NoSQL, a database management system designed to handle Big Data. You will also learn the technology infrastructure, Hadoop and SMAQ (Storage, MapReduce and Query) stacks in Big Data. The course concludes with Data Visualization Tools (DVT), analytics tools, and deployment patterns in various industries.

ALAKV VERMA, M.S.

CLASSROOM WITH ONLINE MATERIALS
10 meetings | 6:30–9:30 pm | April 18–June 20
Fee: $910.
To enroll, use Section Number 30122.(014)

Business Intelligence Solutions
CMPS.X434.B1 (2.0 quarter units)
This course takes a hands-on approach to the fundamentals of business intelligence, using the Microsoft BI stack as an example. You will learn the features of PivotTables, Power Pivot and Power View, including how to load data from SQL Server and create Power View dashboards, charts and maps. You will use Visual Studio to build an Online Analytical Processing (OLAP) cube and dimensions. The industry of business intelligence and analytics has undergone major shifts in fundamental technologies. This certificate program offers up-to-date training for data scientists, analysts, administrators and managers who want to apply analytics to business decision-making. Expert instructors present the latest technologies and developments through a hands-on approach to facilitate learning.

CERTIFICATE REQUIREMENTS
To obtain the Certificate in Database and Data Analytics, you must complete a minimum total of 14 units including one of two core courses. For additional requirements, visit our website. One related outside elective or “Also of Interest” course may be counted in certificate upon department approval.

PREREQUISITES
Each course has different prerequisites. Please review the course descriptions on our website to ensure that you meet the requirements, whether through education or job experience. Programming knowledge is helpful.

RECOMMENDED COURSE SEQUENCE
We recommend that students begin with one of the two core courses, and follow the recommended prerequisite for each course. The sequence may vary based on student background and professional interest.

Prerequisite(s): *Relational Database Design and SQL Programming

VICTOR EYDUS, Ph.D.

LAB WITH ONLINE MATERIALS
8 meetings | 6:30–9:30 pm | May 30–July 25
Fee: $740.
To enroll, use Section Number 30322.(007)

Visit our website at ucsc-extension.edu for updated information and to enroll online.
Hadoop Analytics:
A Case-Study Approach

CMPS.X440.011 (3.0 quarter units)

The analytic tools for Hadoop form a principal platform for the next generation of data analysis. This course provides an introduction to Hadoop analytical tools. We will use case studies from computational biology and quantitative finance to explore methods for delving into the data using Hive, Pig, SparkSQL, SparkML, and R. The course focuses on creating a workflow to produce practical insights. You will learn to apply machine learning algorithms to large datasets without programming, as well as how to apply R to statistical analysis of Big Data on Hadoop.

Prerequisite(s): Experience with SQL and R is required. SQL and R will not be taught in this course. Some knowledge of Spark and Spark are recommended but not required. Basic understanding of database, SQL, and distributed computing is helpful.

ELIZABETH COREY, M.S., Ph.D.

LAB WITH ONLINE MATERIALS
10 meetings | 6:30–9:30 pm | April 10–June 19
Fee: $960.

To enroll, use Section Number 30475.(002)

Hadoop: Distributed Processing of Big Data

CMPS.X440.020 (3.0 quarter units)

Hadoop is an open-source platform for distributed processing of large amounts of data across clusters of servers. This course provides an overview of the MapReduce frameworks and Hadoop Distributed File System (HDFS). You will learn how to write MapReduce code and optimize data processing applications. The course also covers Hadoop’s ecosystem, including the data warehouse and query service Hive, the data-flow programming language Pig, the distributed scalable NoSQL database HBase, and the distributed processing coordination system Zookeeper. The course consists of interactive lectures, lab exercises and programming assignments.

Prerequisite(s): “Java Programming, Comprehensive” or equivalent experience with Java Programming is required for this course. Assignments need to be written in Java. An understanding of database, SQL, parallel or distributed computing is recommended.

ELIZABETH COREY, M.S., Ph.D.

LAB WITH ONLINE MATERIALS
10 meetings | 6:30–9:30 pm | April 13–June 15
Fee: $960.

To enroll, use Section Number 30088.(028)
Introduction to Apache Spark with Scala
CMPS.X400.581 (3.0 quarter units)
Apache Spark is the latest data processing engine that supports batch, interactive, iterative and graphing data processing. Its elegant APIs and fast computing system makes it attractive for companies to leverage for data processing. This course introduces its architecture, the execution model. It includes a short introduction to the functional programming language Scala. You'll learn how to manipulate Apache Spark’s programming model Resilient Distributed Dataset (RDD) through its APIs for data processing and how to build Spark applications with Scala. The course covers its stream processing capability and how to develop streaming applications with Apache Spark.
Prerequisite(s): "Java Programming, Comprehensive." Programming experience with Java is required. Knowledge of Hadoop is recommended.
HIEN LUU, M.S.
LAB WITH ONLINE MATERIALS
10 meetings | 6:30–9:30 pm | April 7–June 16
Fee: $980.
To enroll, use Section Number 30389.(006)

Introduction to Data Analysis
CMPS.X471.7 (3.0 quarter units)
This course examines different approaches to a data analysis project, with a framework for organizing an analytical effort. R will be used primarily in class examples to carry out analysis. The course covers how to obtain and manipulate the raw data for use. It covers 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.
Prerequisite(s): Some programming experience is recommended. (R will be covered in class and used in examples, and Python experience can be helpful.) Basic knowledge of probability and statistics is required (at the level of most basic statistics textbooks).
PRAMOD GUPTA, Ph.D.
CLASSROOM WITH ONLINE MATERIALS
10 meetings | 6:30–9:30 pm | April 6–June 8
Fee: $910.
To enroll, use Section Number 30211.(013)

Introduction to Machine Learning and Data Mining
CMPS.X470.3 (3.0 quarter units)
In this course, you will learn machine learning concepts, terms and methodology. This course establishes a basic understanding of supervised learning and Bayesian classifiers using the histogram as a starting point. It then covers the design and application of practically useful classifiers such as k-nearest neighbors, linear machines and decision trees. You will also learn concepts in unsupervised learning and clustering algorithms such as expectation maximization and k-means clustering. The course concludes with the application of neural networks in machine learning.
Prerequisite(s): Moderate level of computer programming ability (Python, R, C++, Java, Matlab), elementary understanding of probability and statistics.
SHASHI SATHYANARAYANA, Ph.D.
CLASSROOM WITH ONLINE MATERIALS
10 meetings | 6:30–9:30 pm | April 19–June 21
Fee: $950.
To enroll, use Section Number 2612.(019)

Introduction to NoSQL Databases
CMPS.X480.2 (3.0 quarter units)
This course gives you a hands-on overview of the two most popular NoSQL databases, MongoDB and Cassandra. It covers installation, DB shell usage, programmatic access, data modeling, scaling/clustering, categories of NoSQL databases (column-based, document-based, key-value-based, or graph-based), the CAP Theorem, and BASE semantics. You will complete a course project that involves setting up, populating, and using a NoSQL of your choice. By the end of the course, you will understand NoSQL concepts and learn to use popular NoSQL databases.
Prerequisite(s): Experience using a programming language such as Python, Ruby, Java, etc. Ability to set up open-source software, databases, tools, and development environments on personal computers.
JEFF MILLER, B.S.
CLASSROOM WITH ONLINE MATERIALS
6 meetings | 10:30 am–4:30 pm | April 22–June 3
Fee: $910.
To enroll, use Section Number 30213.(010)

MySQL Database for Developers and Designers
CMPS.X400.547 (2.0 quarter units)
MySQL is a reliable database engine commonly used for storing and serving data as Web content. This course begins by reviewing the basic SQL queries and the types of storage engines. It 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 performance tuning strategy, server configuration, loading techniques and the application architecture for efficient database design.
Prerequisite(s): "Linux Based Web Application Development - Apache, MySQL, PHP," and "Relational Database Design and SQL Programming." Students should have prior knowledge of the installation and basic operation of MySQL. "Relational Database Design and SQL Programming" is recommended.
MOHAMMAD NAVEED, M.B.A., M.S.
LAB WITH ONLINE MATERIALS
7 meetings | 6:30–9:30 pm | April 21–June 9
Fee: $740.
To enroll, use Section Number 22632.(016)

Oracle 12c: Enterprise Architecture and Administration on Linux
CMPS.X400.377 (3.0 quarter units)
Oracle Database 12c is designed for cloud environments. In this course, you will learn how to install and configure an Oracle 12c instance and gain hands-on experience with the tools and interfaces required of a database administrator. The course emphasizes approaches for sustaining DB administration, performance, backup and recovery. You’ll learn via real-world examples, especially for DBA situations relating to resource management, job scheduling, performance tuning and DB infrastructure reports, and you’ll learn how to install, work on, and administer databases in the cloud. The course utilizes cloud accounts provided by Amazon Web Services to install and configure Oracle Database 12c on Linux. The course prepares you for the Oracle Certified Associate exam.
Prerequisite(s): "Relational Database Design and SQL Programming." Linux experience. "Introduction to Linux" is recommended, but not required.
RAGHAV VINJAMURI, B.S.E.E.
LAB AND ONLINE (HYBRID)
5 meetings | 9 am–5 pm, April 1; and 9 am–1 pm | April 8–June 10
Fee: $600.
To enroll, use Section Number 19069.(026)
Oracle 12c: Administration on Linux II
CMPS.X400.378 (3.0 quarter units)
This course extends the architectural concepts and DBA practices beyond the “Oracle Database 12c Administration I” course and covers the advanced administration of multitenant container database and pluggable databases. The course focuses on installation, configuration, and Recovery Manager (RMAN), emphasizing the advanced backup and recovery options to ensure 24/7 database operations. You will learn the Oracle flashback technology used in recovery, as well as advanced resource management and real-world solutions to improve database performance. The instructor will share additional optimization techniques used in high-performance, high-availability and real-world environments. The course prepares you for the Oracle Certified Professional exam.
Prerequisite(s): “Oracle 12c: Enterprise Architecture and Administration on Linux.” Linux experience “Introduction to Linux” is recommended, but not required.
RAGHAV VINJAMURI, B.S.E.E.
LAB AND ONLINE (HYBRID)
5 meetings | 9 am–5 pm | April 22; and 9 am–1 pm | April 29–June 17.
Fee: $680.
To enroll, use Section Number 19070.(026)

Oracle PL/SQL, Introduction
CMPS.X400.481 (2.0 quarter units)
This course is applicable to Oracle8i, Oracle9i, Oracle 10g, and Oracle 11g users. It introduces students to PL/SQL and helps them understand the benefits of this powerful programming language. Students learn to create PL/SQL blocks of application code that can be shared by multiple forms, reports, and data management applications, as well as anonymous PL/SQL blocks, stored procedures, functions, packages and database triggers. Students will also learn to manage PL/SQL program units, use dependencies, manipulate large objects, and use some of the Oracle-supplied packages. The lab uses 1*SQLPLUS to develop these program units. Demonstrations and hands-on practice reinforce the fundamental concepts.
Prerequisite(s):”Relational Database Design and SQL Programming” or equivalent experience
MOHAMMAD NAVEED, M.B.A., M.S.
LAB WITH ONLINE MATERIALS
7 meetings | 6:30–9:30 pm | April 19–May 31
Fee: $740.
To enroll, use Section Number 21320.(015)

Predictive Analytics: Applications of Machine Learning
CMPS.X400.2 (3.0 quarter units)
The course provides a broad introduction to machine learning methods including regression, classification, clustering and recommender systems, and their application to practical scenarios. The course reviews the steps involved in building predictive models, including data collection, feature selection, algorithms, and evaluation. You will learn how to fine tune the performance of these predictive models, and plan for practical implementation issues. Important topics will be demonstrated using real-world applications and case studies. This course includes hands-on exercises and a project.
Prerequisite(s): “Introduction to Data Analysis.” Some programming experience is recommended. R will be used in class examples, and Python experience can be helpful. Basic knowledge of probability and statistics is required. Prior machine learning knowledge is recommended but not required.
PRAMOD GUPTA, Ph.D.
CLASSROOM WITH ONLINE MATERIALS
10 meetings | 6:30–9:30 pm | April 11–June 13
Fee: $950.
To enroll, use Section Number 30331.(009)

Relational Database Design and SQL Programming
CMPS.X480.3 (3.0 quarter units)
This course covers the concepts and design for Relational Database Management Systems (RDBMS) and the Structured Query Language (SQL) needed to define and manipulate data. You will learn how to create conceptual, logical and physical designs of relational databases. You will use an Oracle database to design the entity-relationship diagrams (ERD) and implement a working database. The course covers 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.
Prerequisite(s): Familiarity with general database concepts and ability to install software or databases on a personal computer.
NIKET PATWARDHAN, M.S.
LAB WITH ONLINE MATERIALS
10 meetings | 6:30–9:30 pm | April 3–June 12
Fee: $910.
To enroll, use Section Number 30215.(035)

The Internet of Things: Big Data Processing and Analytics
For course description, see page 65.

Also of Interest

Java Programming for Beginners
For course description, see page 77.

Java Programming, Comprehensive
For course description, see page 77.

Python Programming for Beginners
For course description, see page 77.

Python for Programmers
For course description, see page 77.

XML Essentials
For course description, see page 77.
USER EXPERIENCE AND WEB DESIGN CERTIFICATE

17-unit minimum (Certificate students should complete two of the core courses**, and the required final design project.)

RECOMMENDED PREREQUISITE COURSES | Units | Course
--- | --- | ---
Adobe Illustrator, Introduction* | 1.5 | 6497
Adobe Photoshop, Introduction* | 1.5 | 5307
*The Illustrator and Photoshop Introduction courses may not be applied toward the certificate.

COURSES | Units | Course
--- | --- | ---
Visual Design
Graphic Design Fundamentals | 2.0 | 20025
** Visual Design for the Interactive Web | 2.5 | 30030
Graphical Production for the Web | 1.5 | 1262
Adobe Photoshop, Comprehensive | 2.0 | 30414

User Experience Design
** User Experience Design Fundamentals | 3.0 | 30031
User Experience Design, Advanced | 3.0 | 30408
Mobile Interface Design | 3.0 | 30126
Designing User Experience for Smart Things, Virtual Reality and Wearable Technology | 3.0 | 30477

Design Implementation
Web Technologies, Introduction | 1.0 | 22623
** HTML Fundamentals | 2.0 | 20816
** Designing with Cascading Style Sheets: Fundamentals | 2.0 | 6673
Introduction to Web Programming: JavaScript and PHP | 2.0 | 30298
Designing with Cascading Style Sheets: Advanced | 2.0 | 21317
HTML5: The Living Language | 3.0 | 30046
Responsive Web Design with Open Source Frameworks | 2.0 | 30485

Site and Content Management
** Introduction to Website Hosting and Optimization | 1.0 | 30452
Building E-Commerce Websites with Wordpress | 2.0 | 30451

Design Project
** Capstone User Experience and Web Design Project | 2.0 | 30490

Certificate schedule outline of program curriculum and annual schedule are found online. From the homepage, select: “Area of Study”; department; then certificate title as listed above.
Recommended Prerequisites

Adobe Illustrator, Introduction  
ART.X476.8 (1.5 quarter 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. Other topics include using the Pen tool to draw curved, corner and cusp points; using templates; selection techniques; layers; color swatches; transformation tools; moving dialog boxes; painting objects; gradients and blends; gradient Mesh tool; transparency; type basics: point, area, path; patterns and brushes; and compound paths and masks.
Prerequisite(s): Working familiarity with the Mac and/or Windows operating system including the fundamentals of file management and navigation.
VICKI WINTERS, M.A.
LAB WITH ONLINE MATERIALS  
4 meetings  |  5:30–9:30 pm  |  April 13–May 4  
Fee: $550.
To enroll, use Section Number 6497.(111)

Courses

Adobe Photoshop, Comprehensive  
ART.X491.9 (2.0 quarter units)
This course will help you take your image editing skills to the next level. The skills covered can be used to create effects that make your image or graphics stand out. You will learn to handle image challenges in Photoshop that professionals face. New skills include the power of non-destructive image editing, high dynamic range, camera RAW, photo restoration, portrait enhancement and the use of the pen tool. Each session includes a lecture and demo of specific skills, plus you will have the opportunity to work hands-on with in-class exercises.
Prerequisite(s): “Adobe Photoshop, Introduction.” Familiarity with basic features of Photoshop is required.
JEANETTE SMITH, B.A.
LAB WITH ONLINE MATERIALS  
8 meetings  |  6:30–9:30 pm  |  April 18–June 6  
Fee: $680.
To enroll, use Section Number 30414.(002)

Designing User Experience for Smart Things, Virtual Reality and Wearable Technology  
CMPS.X485 (3.0 quarter units)
In this hands-on course, you will learn the user-interface design guidelines for smart things, virtual reality, and wearable technology. Also, you will learn the principles for creating effective user interfaces for Apple Watch and Android Wear. You will also learn to use rapid prototyping tools. The course covers flat design, responsive design, parallax design, and home automation. The course emphasizes product coherence among multiple devices and covers new lean models that will help you cultivate new design processes and solve problems for your products. At the end of this course you will have a design portfolio and prototype that you can showcase to employers.
Prerequisite(s): “Mobile Interface Design.” Familiarity with a drawing tool is required to complete class exercises (e.g. Adobe Illustrator, Photoshop, Fireworks or Sketch).
ERIC DORF, B.F.A., DMBA
LAB WITH ONLINE MATERIALS  
5 meetings  |  9 am–3:30 pm  |  May 6–June 10  
Fee: $980.
To enroll, use Section Number 30477.(003)

Designing with Cascading Style Sheets: Fundamentals  
FILM.X406.4 (2.0 quarter units)
Cascading style sheets (CSS) is an essential and mandatory coding language for controlling the presentation of a modern website. Combined with proper HTML markup, CSS allows for precise control over a Web page’s appearance without the use of tables. This beginning course will provide demonstration and hands-on exercises covering the application and syntax of CSS; hand-coding CSS properties for font, text formatting and backgrounds; the box model; creating vertical and horizontal navigation menus and two and three column page-layouts.
All techniques covered adhere to current CSS specifications.
Prerequisite(s): “HTML Fundamentals” or equivalent experience.
AUDREY BLUMENEAU, M.Ed.
ONLINE | April 11–July 18  
Enrollment accepted through May 23.  
Fee: $660.
To enroll, use Section Number 6673.(802)

Graphic Design Fundamentals  
ART.X403.16 (2.0 quarter units)
If you need to make design decisions for presentations, Web pages or printed materials and you want your final product to be professional and effective, this is the course for you. This course will provide you with the basic skills used by designers everywhere. Students will learn to set a strategy for any given project, ideate via thumbnail sketches, select appropriate imagery and typeface, all while keeping the brand and project constraints in focus. Topics include typography, color theory, layouts and grids, and image selection. It is highly recommended as a foundation for anyone interested in taking Web design courses. This course emphasizes visual problem solving skills and not computer instruction.
Prerequisite(s): “Adobe Photoshop, Introduction,” and “Adobe Illustrator, Introduction.”
RUSSELL LEONG, B.A.
CLASSROOM WITH ONLINE MATERIALS  
7 meetings  |  6:30–9:30 pm  |  April 19–June 14  
Fee: $630.
To enroll, use Section Number 20025.(020)
Graphical Production for the Web
ART.X460.18 (1.5 quarter units)
This course covers the creation of Web graphics using professional digital imaging tools. Photoshop is the primary focus of the course, but other programs, including Adobe Edge Reflow and Illustrator, will be explored. Students learn to use the workflow for creating graphic components—from page layouts to navigation to animations—along with efficient production techniques. Topics include GIF vs. JPEG compression; color, type, and background images; layers, layer groups, layer comps, and layer styles; slicing images and creating rollovers; creating animated GIFs and SWFs; integration with Dreamweaver and the website design process.
Prerequisite(s): "Adobe Photoshop, Introduction." Familiarity with HTML and hands-on working knowledge of the Mac and/or Windows environment are required. This advanced course assumes that the student has mastered foundation skills as noted on the Photoshop Skills list. Competency in these skills will be essential to completing assignments and keeping up with the pace of the class.

VICKI WINTERS, M.A.
LAB WITH ONLINE MATERIALS
6 meetings | 6:30–9:30 pm | May 11–June 15
Fee: $580.
To enroll, use Section Number 1262.(064)

HTML Fundamentals
CMPS.X430.467 (2.0 quarter units)
In this hands-on course, students learn to code HyperText Markup Language (HTML) to meet the most current standards and practices of coding as set by the World Wide Web Consortium (W3C). It covers all the major topics of coding and validating HTML, including meeting accessibility mandates and improving search engine optimization (SEO). The course also examines the new elements introduced by HTML5, including how to choose a domain name and Web hosting platform. You will review and evaluate some popular e-commerce and content management systems. The course also covers the hands-on skills necessary to administer domains, monitor website performance with analytics, and get sites and pages listed by search engines. The course is for students interested in launching a website. Your hands-on assignments will require using cloud hosting services.
Prerequisite(s): Ability to surf the Web, working knowledge of standard text editors like SimpleText, TextEdit, NotePad, WordPad, or BBEdit. Basic Web-development concepts are recommended.
AUDREY BLUMENEAU, M.Ed.
LAB WITH ONLINE MATERIALS
5 meetings | 9 am–4 pm | April 22–May 20
Fee: $880.
To enroll, use Section Number 30046.(027)

Introduction to Website Hosting and Optimization
FILM.X402.5 (1.0 quarter units)
This course covers the decision points and practical challenges of launching and administering a website, including how to choose a domain name and Web hosting platform. You will review and evaluate some popular e-commerce and content management systems. The course also covers the hands-on skills necessary to administer domains, monitor website performance with analytics, and get sites and pages listed by search engines. The course is for students interested in launching a website. Your hands-on assignments will require using cloud hosting services.
Prerequisite(s): "Web Technologies, Introduction," and "HTML Fundamentals."
VICKI WINTERS, M.A.
LAB WITH ONLINE MATERIALS
2 meetings | 9 am–4 pm | June 10 and 24
Fee: $540.
To enroll, use Section Number 30452.(003)

Responsive Web Design with Open Source Frameworks
CMPS.X430.009 (2.0 quarter units)
This course provides an overview of the current state of open source design patterns and libraries for fast-track production website design with dynamic interactivity. It covers techniques for building engaging websites that work on a full range of devices, and includes basic interactivity such as image sliders, date pickers, and animation. You will learn the naming conventions within Bootstrap and Foundation frameworks and explore their capability for building semantically correct and cross-browser compatible websites. You will also learn to evaluate and select the right library base on the design requirements.
Prerequisite(s): “HTML Fundamentals,” “Designing with Cascading Style Sheets: Fundamentals,” and “HTML Fundamentals.”

TERESA HARDY, M.A.
LAB WITH ONLINE MATERIALS
8 meetings | 6:30–9:30 pm | May 10–June 28
Fee: $720.
To enroll, use Section Number 30485.(002)
Online Courses for High School and Middle School Students

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Participating in this educational program does not in itself provide preference in admission to the University of California. Students interested in applying to UC should refer to the UC Admissions Web site or the admissions office of the UC campus they wish to attend for details about the admissions process.

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DISCOVER
Environmental Health and Safety Management

Discover the possibilities.

RECERTIFICATION

*Environmental Health and Safety Management*

Many of UCSC Extension’s Environmental Health and Safety courses qualify for credit toward professional recertification.

**ABIH:** American Board of Industrial Hygiene. The indicated courses qualify for ABIH certification maintenance points (www.abih.org).

**CSP:** Board of Certified Safety Professionals. Indicated courses qualify for Certified Safety Professional (CSP) certification maintenance points (www.bcsp.org).


Visit our website at [ucsc-extension.edu](http://ucsc-extension.edu) for updated information and to enroll online.
Environmental Health and Safety

Environmental Safety and Health Management Courses

UCSC Extension offers individual courses to meet the interest and needs of Bay Area professionals currently working in or planning for a transition into the environmental health and safety field. Courses in environmental safety and health, hazardous materials, and occupational safety and health are designed to help EH&S professionals meet regulatory and certification requirements as well as advance their careers. We also regularly offer HAZWOPER and one-day updates. Taught by experienced professionals, our EH&S courses develop the hands-on skills as well as the advanced management techniques needed to elevate performance to the highest level.

Areas of interest include: Hazardous Materials Management, Occupational Safety and Health Management, and Environmental Safety and Health Management

CONTACT
Applied and Natural Sciences Department, (408) 861-3860, or email extensionprogram@ucsc.edu.

PREREQUISITE
Completion of at least one college-level chemistry course.

FOR MORE INFORMATION
Current and future course schedules can be found at ucsc-extension.edu/ehs. For more information on this program or to be added to our mailing list, please call (408) 861-3860 or contact extensionprogram@ucsc.edu.

Important notice about:
EH&S Management Certificate Programs

As of July 1, 2016

UCSC Extension no longer accepts new applications for entry into the Environmental Safety and Health Management, Hazardous Materials Management and Occupational Safety and Health Management Certificate Programs. Students who took courses before July 1, 2016, will have an opportunity to complete the requirements for the certificate. However, to be eligible to receive a certificate, students must complete all required coursework by June 30, 2017.

Students who formally applied for candidacy before the July 1, 2016 deadline, should proceed to complete all required coursework by the end of June 2017.

Although new certificate applications are not being accepted, all scheduled EH&S courses are open for enrollment. We will continue to offer the Environmental Health & Safety One-Day Updates. Learn more on our website.

CONTACT
If you have questions or would like assistance with planning the completion of your program, please call (408) 861-3860 or email extensionprogram@ucsc.edu.

Be Prepared…

Emergency Preparedness, Response and Planning
NATSC.X422.4 (3.0 quarter units)

This course provides practical guidance for developing effective emergency response programs. Topics include: governmental requirements for and basic components of emergency response and contingency plans; personnel; equipment and protective devices; organization and implementation of the ERT; pre-incident assessment; hazard evaluation; action strategies and response procedures; and coordination among private companies and public agencies. In addition to discussions of response training, there will be demonstrations and actual field training.

JAY JAMALI, B.S., CSP, CHCM, CHMM
CLASSROOM WITH ONLINE MATERIALS
4 meetings | 8 am–5 pm | March 4–25
Fee: $625.
To enroll, use Section Number 30478.(001)
Courses

Environmental Fate of Pollutants
NATSC.X424. (3.0 quarter units) Professional Credit: CSPs can claim COC points 3.99

This course is an overview of the movements, dispositions and transformations of chemical pollutants within and between environmental compartments, such as air, soil, water and biota. Topics include major sources of environmental pollution, distribution mechanisms between and within environmental compartments, and the physical and chemical properties that affect the movement of pollutants through the environment. Also covered are the chemical reactions that pollutants undergo in the environment and major factors that influence those reactions, as well as site characteristics and process technologies that may have significant effects on the environmental fate of pollutants.

Prerequisite(s): At least one college-level chemistry course.
RONALD TJEERDEMA, Ph.D., DABT
ONLINE | April 4–June 30
Enrollment accepted through May 25.
Fee: $625.
To enroll, use Section Number 5475.(085)

Occupational Health and Safety Annual Regulatory Update
ENVS.859. (0.6 CEUs) Professional Credit: CSPs can claim COC points 0.6; MCLE–Minimum Continuing Legal Education State Board of CA –6 hours. This event contains 0.6 CEUs or 6 hours of technical contact time and is eligible for ABIIH CM credit.

This one-day seminar will review newly adopted and proposed Cal/OSHA and Fed-OSHA regulations. Topics include GHS/Hazcom, lockout tagout (LOTO), forklift safety, personal protective equipment, electrical safety and NFPA 70E, combustible dust, injury reporting requirements, fall protection, machine guarding, safe patient handling, PEL changes and a review of the most common Cal/OSHA citations.
JAY JAMALI, B.S., CSP, CHCM, CHMM
CLASSROOM WITH ONLINE MATERIALS
1 meeting | 9 am–4 pm | April 21
Fee: $395.
To enroll, use Section Number 3809.(024)

Safety and Health Program Development and Implementation
EARTX.422. (3.0 quarter units) Professional Credit: CSPs can claim COC points 3.99. This event contains 3 units or 30 hours of technical contact time and is eligible for ABIIH CM credit.

This course provides the framework to plan, maintain and administer safety management elements as part of a proactive safety and health program. Topics include ergonomics, radiation and laser safety, process safety, fall protection, OSHA inspections, indoor air quality, machine guarding, electrical safety, contractor safety, selling safety, and asbestos management.
JAY JAMALI, B.S., CSP, CHCM, CHMM
CLASSROOM WITH ONLINE MATERIALS
4 meetings | 8 am–5 pm | May 2–23
Fee: $625.
To enroll, use Section Number 1424.(020)

Toxicology, Principles
NATSC.X422.3 (3.0 quarter units) Professional Credit: CSPs can claim COC points 3.99. CA BRN/LVN Credit–Provider #CEP13114, 30.0 hours.

This course details the adverse effects resulting from the interaction of chemical agents with living systems. Lectures integrate theoretical and practical aspects of toxicology as they address topics including criteria and mechanisms of toxicity; dose-response relationships; factors influencing toxic action; acute and chronic effects; kinetics; metabolism; toxicity testing; epidemiology and predictive toxicology; local and systemic toxicity; reproductive toxicity; and teratogenesis, mutagenesis and carcinogenesis. Applications of toxicology in both environmental and occupational settings are also discussed.
Prerequisite(s): At least one college-level chemistry course.
RONALD TJEERDEMA, Ph.D., DABT
ONLINE | April 4–June 30
Enrollment accepted through May 25.
Fee: $625.
To enroll, use Section Number 6330.(104)

Toxics Laws Legislative and Regulation Update
ENVS.809. (0.6 CEUs) Professional Credit: CSPs, CPEAs, can claim COC points 0.6. MCLE–Minimum Continuing Legal Education State Board of CA–6.0 hours.

This one-day workshop covers new and pending changes in environmental health and safety (EHS) legislation, regulations, and judicial developments. A number of EHS policy initiatives have emerged from recent state legislative actions. Notable developments include bills that impact air quality, hazardous materials and hazardous waste, water quality, solid waste, cleanup, green chemistry, climate change, and health and safety. You’ll learn about these and other new EHS laws and regulations, as well as their compliance implications. This workshop is intended for EHS professionals and managers in government and industry, as well as attorneys, elected officials, and policy makers.
GARY LUCKS, B.S., J.D.
CLASSROOM WITH ONLINE MATERIALS
1 meeting | 9:30 am–4 pm | April 7
Fee: $395.
To enroll, use Section Number 0486.(027)

HAZWOPER
CERTIFICATION CONTACT
Applied and Natural Sciences Department, (408) 861-3860, or email extensionprogram@ucsc.edu.

8-Hour Annual HAZWOPER Refresher
ENVS.828. (0.8 CEUs) Professional Credit: CSPs can claim COC points 0.8. This event contains 0.8 CEUs or 8 hours of technical contact time and is eligible for ABIIH CM credit.

Professionals who have completed the “40-Hour Hazardous Waste Operations and Emergency Response Training” course must attend an annual eight-hour refresher course. This course is designed to meet the Cal-OSHA GISO 5192 and 29 CFR 1910.120 requirements. Students are required to bring to the class their valid certificate for the “40-Hour Hazardous Waste Operations and Emergency Response Personnel.”

JAY JAMALI, B.S., CSP, CHCM, CHMM
CLASSROOM WITH ONLINE MATERIALS
1 meeting | 8 am–5 pm | June 16
Fee: $265.
To enroll, use Section Number 5363.(100)

Hazardous Waste Handling and Awareness Training
ENVS.844. (0.7 CEUs) Professional Credit: CSPs can claim COC points 0.6

Businesses that store or use hazardous materials must provide annual training for all employees in the safe and proper handling of hazardous waste under Title 22, Section 66265.16, California Code of Regulations. This training program was designed to meet the personnel training in hazardous waste management requirement in the California Code of Regulations. Topics include federal and state regulatory structure; steps for identifying a hazardous waste; documentation, manifesting and labeling; on-site handling requirements for hazardous wastes; contingency planning, emergency response, and spill reporting and recording procedures; and liabilities for improperly handling hazardous waste.
DAVID KEENAN, B.S.
CLASSROOM WITH ONLINE MATERIALS
1 meeting | 9 am–5 pm | April 27
Fee: $265.
To enroll, use Section Number 1993.(090)
OUR ONLINE COURSES have helped many busy professionals complete certificate programs and reach their career goals.

Our online courses offer the opportunity to study with accomplished instructors and prepare for career advancement. Our online courses may be eligible for your company's tuition reimbursement program.

WHAT TO EXPECT:

- Instructors are involved via discussion boards and/or email throughout your course.
- Courses have fixed start and end dates. In some cases, you can complete modules anytime within those dates. Assignments, exams and projects are usually due on specific dates. Check with the instructor.
- Students enrolling in one of these courses for the first time will be able to log in to the UCSC Extension Online Learning Center. However, access to course resources will be granted one day prior to the course’s start date.
- When the course ends, you’ll receive a grade—as with any Extension course.

HERE’S WHAT YOU’LL NEED:

- Our online courses are best viewed on a desktop computer. Tablets and handheld devices may be used, but are not recommended. For those taking Engineering and Technology courses, programming software is primarily Windows or Linux-based.
- **SOME APPLICATIONS ARE AVAILABLE ON MAC OS.**
- For some courses, you may need a PC on which additional software can be installed as recommended by the instructor.
- Online instructors may ask you to install software for programming projects. Most recommended software is open-source and commonly used in the industry. No purchase is required. Instructors will provide instructions for download and installation. Exceptions are noted in the full course descriptions on our website.
Online  
Spring courses include:

**Biosciences**

**Cellular Biology**
For course description, see page 15.
ONLINE | April 4–June 30

**DNA Microarrays: Principles, Applications and Data Analysis**
For course description, see page 15.
ONLINE | April 4–June 30

**Experimental Methods in Molecular Biology**
For course description, see page 12.
ONLINE | April 4–June 30

**Clinical Research: The Study Site Perspective**
For course description, see page 17.
ONLINE | April 4–June 30

**Statistics**
For course description, see page 12.
ONLINE | April 4–June 30

**Toxicology Basics for Biotechnology**
For course description, see page 15.
ONLINE | April 4–June 30

**Business and Management**

**Advanced Paralegal Certificate Course**
For course description, see page 38.
ONLINE | May 1–June 16
ONLINE | June 26–August 11

**Applied Project Management**
For course description, see page 43.
ONLINE | April 4–June 17

**Building and Maintaining Your Technical Eminence**
For course description, see page 48.
ONLINE | May 1–June 11

**Business Statistics I**
For course description, see page 31.
ONLINE | April 10–June 5

**DITA Authoring, Introduction**
For course description, see page 48.
ONLINE | May 1–June 18

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The following Business and Management certificates can be completed entirely online:

**Project and Program Management**
See page 42.

**Technical Writing and Communication**
See page 46.

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**Final Project: Preparing Your Job Search**
For course description, see page 46.
ONLINE | April 10–May 15

**Information Architecture and Design Basics**
For course description, see page 46.
ONLINE | April 17–May 28

**Introduction to Accounting II: Managerial Accounting**
For course description, see page 26.
ONLINE | April 10–June 23

**Managing Technical Documentation Projects**
For course description, see page 48.
ONLINE | May 23–July 4

**Paralegal Core Certificate Course**
For course description, see page 38.
ONLINE | May 1–June 16
ONLINE | June 26—August 11

**Project Leadership and Communication**
For course description, see page 43.
ONLINE | April 12–June 21

**Project Procurement: Outsourcing and Contract Management**
For course description, see page 45.
ONLINE | May 1–June 5

**Role of the Project Manager**
For course description, see page 43.
ONLINE | April 17–May 22

**Technical Communication: An Introduction to the Profession**
For course description, see page 47.
ONLINE | March 20–April 23

**Technical Writers' Workshop**
For course description, see page 47.
ONLINE | April 10–May 14

**Education**

**Becoming a Professional Educator: Special Populations and Healthy Environments**
For course description, see page 52.
ONLINE | April 3–June 3

**Building Online Learning Communities**
For course description, see page 59.
ONLINE | May 1–June 18

**ECE 6: Culture and Diversity in the Early Childhood Classroom**
For course description, see page 54.
ONLINE | April 4–May 14

**ECE 9: Language and Literacy for the Young Child**
For course description, see page 54.
ONLINE | May 16–June 25

**ECE 11: Supervision and Administration of Early Childhood Centers, Part A**
For course description, see page 54.
ONLINE | May 15–June 18

**Instructional Design and Delivery, Introduction**
For course description, see page 58.
ONLINE | April 3–April 30

**Principles of Educational Therapy**
For course description, see page 56.
ONLINE | April 4–May 14

**Psychology of Human Learning**
For course description, see page 57.
ONLINE | May 22–June 25
Strategies for Learning Differences in Mathematics
For course description, see page 56.
ONLINE | April 4–May 14

Technology in Schools, Introduction (SB 2042 Standard 11)
For course description, see page 52.
ONLINE | April 24–May 26

The following Engineering and Technology certificates can be completed entirely online:

Computer Programming
See page 74.

Internet Programming and Development
See page 78.

Linux Programming and Administration
See page 72.

Low-Power Design of Nano-Scale Digital Circuits
For course description, see page 68.
ONLINE | April 11–July 18

Python for Programmers
For course description, see page 77.
ONLINE | April 11–July 18

Relational Database Design and SQL Programming
For course description, see page 85.
ONLINE | April 11–July 18

TCP/IP Essentials
For course description, see page 71.
ONLINE | April 11–July 18

VMware vSphere: Configuration and Management [v6.0]
For course description, see page 71.
ONLINE | April 12–June 28

VMware vSphere: Optimize and Scale [v6.0]
For course description, see page 71.
ONLINE | April 12–June 28

XML Essentials
For course description, see page 77.
ONLINE | April 11–July 18

Technical Writing and Communication
Bring your questions and join us for this free seminar about our renowned program for technical communicators. Learn what usability is and how it applies to information; what makes information usable; and how to contribute to your company’s success by ensuring information usability.

ANDREA AMES, B.A., M.S.
ONLINE | April 3–May 26
No fee, but enrollment required.
To enroll, use Section Number 0469.(033)
Our certificate programs can help you launch your career in Silicon Valley and beyond. Contact our international team to discover the benefits of enrolling as an international student, which include:

- Obtaining a student visa
- Learning business and technology skills
- Gaining internship experience at a Silicon Valley company
- Becoming eligible for one year of work authorization via Optional Practical Training (OPT) after completing the program
- Networking with instructors and fellow students

Thousands of Silicon Valley professionals have studied with us and gone on to successful careers. You can too.

**APPLICATION DEADLINES**

**BEGIN YOUR STUDIES IN ANY QUARTER.**

International student applications must be submitted by the following dates:

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Quarterly Start/End Dates</th>
<th>If you are IN THE U.S., forms are due:</th>
<th>If you are ABROAD, forms are due:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winter</td>
<td>January 1–March 31</td>
<td>December 15</td>
<td>November 15</td>
</tr>
<tr>
<td>Spring</td>
<td>April 1–June 15</td>
<td>March 15</td>
<td>February 15</td>
</tr>
<tr>
<td>Summer</td>
<td>June 16–August 31</td>
<td>May 15</td>
<td>May 1</td>
</tr>
<tr>
<td>Fall</td>
<td>September 1–December 31</td>
<td>August 15</td>
<td>July 15</td>
</tr>
</tbody>
</table>

**Where To Start:**

Once you have applied and been accepted, UCSC Extension will issue you an I-20, which can be used for initial entry, transfer, change of status, or reinstatement applications.

**Optional Practical Training (OPT)**

After completing your certificate program, you can apply for **Optional Practical Training** (OPT). OPT is available to students who have maintained their student status for three consecutive quarters (approximately nine months), and successfully completed a certificate program. With OPT authorization, you can apply your high-quality education toward one year of work experience in the U.S. Learn more at [ucsc-extension.edu/international-program/about](http://ucsc-extension.edu/international-program/about).

**Some of the most popular certificates for international students are:**

- Business
- Computer Programming
- Database and Data Analytics
- Software Engineering
- Project and Program Management
- Marketing
- Human Resources
- Biotechnology
- TESOL

Programs that are conducted entirely online are not eligible for a student visa.

See Areas of Study Certificate list on page 3.
**How to Apply**
Details on how to apply can be found on our website at [ucsc-extension.edu/international](http://ucsc-extension.edu/international).
Most students begin by setting up a meeting with one of our international student advisors.

**Admission Requirements**
- University diploma or equivalent
- English Proficiency Score (TOEFL 80 IBT, IELTS 6.5, TOEIC 760) or equivalent
- Bank statement (minimum $25,000*)
- Copy of passport
- Copy of visa (if applying in U.S.)
- Copy of Electronic I-94 (if applying in U.S.)
- Copy of I-20 (if transferring)

* $25,000 is the estimated cost of tuition and living expenses for one academic year.

**Contact us at:**
extensioninternational@ucsc.edu
(408) 450-4945
Ray Porras
International Student Advisor
Kathy Harrington
International Student Advisor, OPT Specialist
Diane Johansen
International Student Advisor, Internship Coordinator
Michael Mrache
Director of International and WDB Programs

**Internships**
As an international student enrolled in a certificate program, you are eligible to enroll in an unpaid internship in your field of study and have two options:
1. Arrange your own internship and enroll for the internship course for $200.
2. Consult with the Internship Coordinator, who will provide outreach and support in securing an internship. There is an additional $200 fee for this service which must be paid in advance. For details, email the Internship Coordinator at extensioninternational@ucsc.edu or call at (408) 450-4945.
You can earn a maximum of 3 units each quarter for an unpaid internship by enrolling in our internship course, "Business Practices for International Students." To receive 3 units you must volunteer a minimum of 90 hours during the quarter.

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**What Our Students Say:**

**When I was looking for work, it really helped that I could list experience in the US.**

**SHYLA JAIN**
Marketing student

**The program showed me how to develop the marketing techniques I need.**

**UTKU MAHINER**
Marketing student

**I learned how to work and act in new environments, which has helped me so much.**

**AFAG SHUKUROVA**
Project and Program Management student

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What to consider—

INTERESTED IN ENROLLING IN...

(A) individual courses?
Before enrolling, verify that you meet any prerequisite requirements as listed in the catalog and online. Please be aware that certificates have an overall higher GPA passing requirement.

or

(B) pursuing a certificate?
Most certificates consist of required courses and a minimum number of elective courses or units, through which a program can be tailored to meet an individual’s educational and career goals. Requirements for individual programs may vary. Please consult specific program descriptions for additional information.

In order to be eligible for a certificate,* you must:

• complete all course work within three years of declaring candidacy;
• achieve an overall 3.0 grade-point average (GPA) for all courses applicable to the certificate;
• receive a letter grade of "C-" or better in all courses.

*All courses applied to the certificate must have been successfully completed within five years.

CERTIFICATES:

1. We encourage you to declare candidacy in a certificate program early in your studies. This ensures that curriculum changes subsequent to receipt of your application will not affect your course requirements. Candidates will be notified of updates or special opportunities related to their program. Certificate applications can be submitted online at ucsc-extension.edu.

2. Verify that you meet the minimum prerequisite requirements before enrolling in a program or course. You can view prerequisites in the course descriptions, certificate requirements, and online. Prerequisites help to better ensure successful completion of courses.

3. See each certificate program requirement as outlined in each listing.

4. Participating in these educational courses or programs does not in itself provide preference in admission to the University of California. Students interested in applying to UC should refer to the UC Admissions website (admission.universityofcalifornia.edu) or the admissions office of the UC campus they wish to attend for details about the admissions process.

5. ENROLLMENT—Process and Policy
Please enroll early as this helps ensure a place in the course you want, and fulfills minimum enrollment requirements. Because UCSC Extension is a 501c nonprofit, it is completely self-supporting, which means there are no public funds available. If a course cannot meet its minimum enrollment requirement, it must be cancelled. Unpaid auditing is not permitted. Should you need to delay enrollment, please call (408) 861-3700 and visit our website to check for possible changes. Enrollment confirmation is sent via email to students who have an email address on file. All fees must be paid at time of enrollment.

WIRELESS ACCESS
Wireless Internet access is provided throughout our Santa Clara facility. The appropriate wireless network card is required. Any wireless connection is open to the Internet.

No protection against viruses, worms, intrusion, and other data vulnerabilities is provided by Extension. Protective software must be installed on the owner’s laptop.

LABS—You must retain your enrollment receipt for access to our computer labs. All labs are subject to IT security updates.

Concurrent Enrollment Process and Policy
See page 103.

International Students
See page 96.

PAYMENT METHODS

Enroll NOW

Online: Visit our website at ucsc-extension.edu.

Credit Card: We accept the following major credit cards: Visa, MasterCard, American Express and Discover.

By Phone: Call (408) 861-3700.

Don’t delay!
Early enrollment helps us meet minimum enrollment numbers so courses are less likely to be canceled due to low enrollments.

NOTE: Numbered footnotes refer back to topic numbers detailed in this section for General Information & Academic Policy.
TAXPAYER RELIEF ACT OF 1997
The Taxpayer Relief Act of 1997 may help you put money back in your pocket. Contact a tax consultant or accountant or visit www.irs.gov/uac/Tax-Benefits-for-Education:-Information-Center to determine how the Act may apply to you. Other pertinent tax information for students is available at www.1098t.com. The University is required by federal law to request Social Security numbers from all enrolled students who may qualify for tax credits.

GOVERNMENT TUITION ASSISTANCE
Displaced or disadvantaged workers may be eligible for federal assistance through the Workforce Investment and Opportunity Act (WIOA) or the Employment Development Department (EDD). For students who qualify, funds may be applied toward the cost of Extension course fees, books, and materials. For additional information or to determine eligibility, contact either your local WIOA Board or Extension’s coordinator at extensionwib@ucsc.edu. Funding eligibility must be determined prior to enrolling or participating in any course.

Contact your local Workforce Investment and Opportunity Board or Email Extension’s coordinator: extensionwib@ucsc.edu

FINANCIAL ASSISTANCE
As a UCSC Extension student, you may be eligible for private financial assistance. UCSC Extension does not endorse or otherwise recommend specific lending sources. Information about private lenders is provided for information purposes only and can be found on our website at ucsc-extension.edu/loans. Note: For lenders who require satisfactory academic progress to maintain loan status, satisfactory academic progress is defined as a minimum of 6 units per term for 2 terms per calendar year.

INCOME TAX DEDUCTIONS
You may be able to deduct expenses for education that is required by your employer, or by law or regulations, to keep your salary, status or job, or maintains or improves skills required in your present work. If your education qualifies, you may deduct the cost of items such as tuition, books, supplies, lab fees, travel, and transportation (Internal Revenue Service Publication 508, Rev. Nov. 86).

COURSE MATERIALS
Courses are available 24 hours before start of class. For full instructions go to ucsc-extension.edu/course-materials.

COURSE READERS, TEXTBOOKS12 AND OTHER INSTRUCTIONAL RESOURCES:
Students are responsible for obtaining the required instructional materials for each course they take. Students should purchase, order, or access their materials in time to bring them to (or have access to them during) the first class meeting.

UCSC Extension courses use a variety of media for instructional purposes. These vary depending on the curriculum and instructor. Information on required and recommended textbooks12 can be found in the section details of the course descriptions online at ucsc-extension.edu.

Instructors may specify any of the following:
• Electronic course materials from our online learning platform, UCSC Extension Online
• Textbooks12 (required and recommended)

ACCESS TO ONLINE COURSES AND MATERIALS
If you are enrolling for the first time in an Online course, or a classroom course with Online Materials, you will receive an account for UCSC Extension Online via email within 12 hours. If you have previously taken a course with online materials, you should use your existing account. Course sites will open one day prior to the official start date.

For more information, including help retrieving your account info, please visit ucsc-extension.edu/online-faqs.

For information on textbooks, see page 100 or visit ucsc-extension.edu/bookstore.

Look for this graphic reminder with instructions.
**12 TEXTBOOKS**

Most textbooks can be purchased through Extension’s partnership with Amazon.com. Our website has a convenient search tool online at ucsc-extension.edu/bookstore.

**TEXTBOOKS—AMAZON**

partnership information

ucsc-extension.edu/bookstore

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**13 TRANSFER OF UCSC EXTENSION CREDIT**

Some Extension courses may be applied toward degrees. We strongly encourage students to obtain confirmation of acceptance of Extension credit by the admissions office of the degree-granting university or college prior to enrolling.

**ACADEMIC CREDIT AND COURSE NUMBERING**

The following information can be located under each course title in the catalog: academic number (usually preceded by the letter X), academic discipline in which credit is granted, and the quarter-unit value of the course.

<table>
<thead>
<tr>
<th>COURSE NUMBERS ARE CLASSIFIED AS FOLLOWS:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1–99:</td>
<td>Lower division</td>
</tr>
<tr>
<td>100–199:</td>
<td>Upper division</td>
</tr>
<tr>
<td>200–299:</td>
<td>Graduate division</td>
</tr>
<tr>
<td><strong>300–399:</strong> Professional courses in Education</td>
<td>Professional courses in other departments</td>
</tr>
<tr>
<td><strong>400–499:</strong> Professional courses in other departments</td>
<td>800 series or non-numbered courses</td>
</tr>
<tr>
<td><strong>All professional courses are deemed to be equivalent in academic rigor and faculty vetting as upper division courses on UCSC Main Campus.</strong></td>
<td>letter grade not applicable.</td>
</tr>
</tbody>
</table>

**ALL CREDIT IS OFFERED IN QUARTER-SYSTEM UNITS; SEMESTER EQUIVALENTS ARE:**

| Quarter: 1  1½  2  3  4  5  | Semester: ½  1  1½  2  2½  3  3½ |

Some courses bear the designation “credit approval pending” after the X-number listed under the course title. When this catalog went to press, these courses were in the review process leading to approval for academic credit. The credit status of the course can be obtained by calling our staff at (408) 861-3700.

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**CONTINUING EDUCATION UNITS (CEUS)**

Continuing Education Units were established by a national task force of educational associations and are intended for use where employers, relicensing agencies, or others require a specified number of hours of study, and noncredit study is acceptable for fulfillment of those requirements. One CEU is awarded for each 10 hours of contact participation. Because CEUs are related to contact time, grading is not appropriate.

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**14 GRADING—Policy**

**GRADE REPORTS**

Instructors assign grades on the basis of a student’s performance on the activities outlined in their course syllabi. Grades are available online at ucsc-extension.edu within a month after a course ends. Those students who complete a certificate program with a grade-point average of 4.0 will earn a Certificate with Honors.

**OUR GPA CALCULATOR:**

www2.ucsc.edu/gpalc

**GRADING OPTIONS**

When students enroll, letter grading is the default. The Credit or No Credit options are available only to students in good academic standing. Students may elect to take courses for a letter grade, Credit or No Credit.

The alternate Grade Request Form for Credit or No Credit grades must be emailed to extensiongrades@ucsc.edu before the last scheduled day of the course. A passing letter grade of "C-” or higher is required in order for a course to be applicable to a certificate.

**ALTERNATE GRADE REQUEST FORM:**

www.ucsc-extension.edu/content/student-services-forms

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**INCOMPLETE GRADES**

Under certain circumstances, an “incomplete” (“I”) may be authorized for students who are unable to complete a course within the prescribed time due to unforeseen extenuating circumstances. Students must have completed a minimum of 70 percent of the course work and it must be of passing quality in order to qualify for an incomplete grade.

To be considered for an incomplete, the student must send an alternate Grade Request Form by email to extensiongrades@ucsc.edu before the last scheduled day of the course.

If approved, the instructor and student will agree upon the terms of the incomplete, including the specific work required and the deadline for clearing the incomplete. Once the necessary work has been submitted, the “I” will be changed to the appropriate grade. Incomplete grades must be cleared by the agreed-upon deadline or the “I” will convert to an “F.”

**GRADE CHANGES**

Per policy, changes to a final recorded course grade can be made only when there is evidence of a clerical or procedural error and never on the basis of re-examination or completion of additional work.

For more information, including the formal grade appeals policy and process, visit ucsc-extension.edu/grievance-resolutions.

Grade appeals must be filed within one month of the date grades are posted on your online student record.

**TRANSCRIPT REQUEST INFORMATION**

To order an official transcript, use the Transcript Request form found at www.ucsc-extension.edu/student-services/transcript-info.

Email, fax, or mail completed forms:
- Records Office
- UCSC Silicon Valley Extension
- Email: extensiontranscripts@ucsc.edu
- Fax: (408) 342-0164
- 3175 Bowers Avenue
- Santa Clara, CA 95054

*Transcript processing

Please allow up to three weeks for standard processing. Rush transcript processing (two business days priority processing) may be obtained by adding the rush service fee to the request; however, no priority mail service is available. Please complete all information requested on the form. For assistance ordering transcripts or with your user name and password, call (408) 861-3700.

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**NOTE:** Numbered footnotes refer back to topic numbers detailed in this section for General Information & Academic Policy.
**DROPS AND TRANSFERS**
—Deadline Restrictions apply**

Students may drop a course at any time before the final class meeting, or the end date of an online course, by completing the online form found at ucsc-extension.edu/drops. You will only be eligible for a refund if your drop request is received three business days** before the start date of a course. A $40 processing fee will be withheld for all drop requests.

Transferring to another section of the same course is considered a drop. The three business day deadline and same processing fee applies. Students who enroll in a course but do not attend must drop the course prior to the final class meeting to avoid having a negative academic impact on their official record. Instructors do not have the authority to drop a student.

**Business days are Monday through Friday, not including holidays.

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**INSTRUCTORS DO NOT HAVE THE AUTHORITY TO DROP A STUDENT.**

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**REFUND—Process and Policy**

All refunds are put on account toward future enrollment, unless otherwise requested. As noted above, a $40 processing fee will be withheld for all drop requests. Certificate and award application fees and special requests are non-refundable.

If the refund deadline for a course has passed, an Exception Petition may be submitted using the online form found at ucsc-extension.edu/drops. The petition must be supported by special circumstances such as a personal or family illness, injury, or hospitalization. Proper documentation of the special circumstance is required. UCSC Extension reserves the right to approve or deny any such request.

**COURSE CANCELLATIONS**

UCSC Extension reserves the right to cancel course, postpone or combine courses, and to change instructors without notice. If a course is cancelled, you may request an official transfer to another course or a full refund of the enrollment fee. UCSC Extension also reserves the right to discontinue entire programs, or make significant changes in their structure without prior notice.

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**GENERAL CODE OF CONDUCT**

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**TAPE RECORDING, FILMING, AND VIDEOTAPEING OF CLASSES**

Regulations do not permit tape recording, filming, videotaping or any other recording of any Extension program without the express written permission of UCSC Extension.

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**STUDENT POLICY**

ucsc-extension.edu/student-services

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**STUDENT CONDUCT**

UCSC Extension, as a unit of the University of California, Santa Cruz, has high standards for academic integrity and student conduct. Extension students are expected to conform to a code of conduct that is appropriate and considerate of our highly diverse adult learning environment. Disruption of teaching, learning, research or administration through such activities as, but not limited to, disorderly conduct, physical or verbal abuse, threats of violence, academic dishonesty (including all forms of plagiarism and cheating), forgery, theft, unsanctioned use of alcohol, unlawful use of controlled substances, or any other action that might threaten UCSC Extension property or the health and safety of any person on UCSC Extension property or attending any UCSC Extension-sponsored event, will not be tolerated and is grounds for severe sanction including arrest and dismissal. See the Student Services page at ucsc-extension.edu/student-services for our full list of student policies.

**CRIME AWARENESS**

Federal law requires the reporting of crime statistics on college and university campuses. For help in obtaining crime incidence information relative to UCSC Extension, call Kevin McGowan at (408) 861-3700. UCSC’s annual security report includes statistics for the previous three years concerning reported crimes that occurred on campus, in certain off-campus buildings owned or controlled by UCSC, and on public property within, or immediately adjacent to and accessible from the campus. The report also includes institutional policies concerning campus security, such as policies concerning alcohol and drug use, crime prevention, the reporting of crimes, sexual assault, and other matters. You can obtain a copy of this report by contacting the UCSC Police Department or by accessing police.ucsc.edu/report/index.html.

**SEXUAL HARASSMENT**

The University cherishes the free and open exchange of ideas and enhancement of knowledge. Maintaining this freedom and openness requires objectivity, mutual trust and confidence; it requires the absence of coercion, intimidation or exploitation. The principal responsibility for maintaining these conditions must rest upon those members of the University community who exercise authority and leadership: faculty, managers and supervisors.

The University has therefore instituted a number of measures designed to protect its community from sexual and other forms of harassment. Information, advice, referrals and/or copies of UCSC’s Sex Offense Policy and Procedures for Reports of Sexual Assault and Sexual Harassment are available to all students, faculty and staff by contacting Tracey Tsugawa

Title IX Coordinator/Sexual Harassment Officer,

105 Kerr Hall, UC Santa Cruz Main Campus

ttsgawa@ucsc.edu

(831) 459-2462

The Title IX Coordinator is also available to investigate other violations of Title IX. Questions regarding discrimination may be directed to the Affirmative Action Office at (831) 459-1590.

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**OUR FACILITY IS A TOBACCO-FREE ZONE**

Our Santa Clara facility is a tobacco and smoke-free zone in accordance with UC system-wide policy. This policy includes exterior areas of our property including walkways, patios, and parking areas, and applies to cigarettes, cigars, pipes and any other delivery method including smokeless tobacco and e-cigarettes. Please help us provide a safe and healthy environment for work and study by refraining from the use of these products on our property. We understand that cessation can be a challenge. To find strategies that can help, visit the American Lung Association’s site at FFsonline.org.
GENERAL INFORMATION & ACADEMIC POLICY

ADMISSION—POLICY
Our programs are designed primarily for adult professional development. As required by federal and state law, the University of California does not discriminate on the basis of race, color, national origin, religion, sex, sexual orientation, disability or age in admission to or employment in the educational programs and activities which it operates. Inquiries concerning Titles VI and VII of the Civil Rights Act of 1964, Title IX of the Education Amendments of 1972, Sections 503 and 504 of the Rehabilitation Act of 1973, the Age Discrimination in Employment Act of 1967, the Age Discrimination Act of 1975, Section 402 of the Vietnam Era Veterans Readjustment Act of 1974, the Americans with Disabilities Act of 1990, and Section 12940 of the California Government Code should be addressed to the

Office of the Dean, UCSC Extension, (408) 861-3700
or to the

Equal Employment/Affirmative Action Office, UCSC, (831) 459-1590

The University is an affirmative action/equal opportunity employer.

Prior to enrolling in a class not specifically structured for children, a minor child must receive permission from the department sponsoring the course. A release form must be signed by the parent or guardian.

DISABLED STUDENT SERVICES:
Please call (408) 861-3700 at least two weeks prior to course or event.

ADA Compliance Officer and Registrar
can be reached at the above number or by emailing extensionregistrar@ucsc.edu

DISABLED STUDENT SERVICES—POLICY
In keeping with the Americans with Disabilities Act, UCSC Extension makes every effort to reasonably accommodate students with disability-related needs. If you require accommodation, contact our Student Services Office at least two weeks prior to the event or course. Our ADA Compliance Officer will work closely with you and the sponsoring department to ensure your access with reasonable accommodation. Please call (408) 861-3700.

Problems or grievances? Contact the number above or email extensionregistrar@ucsc.edu.

Follow these steps to get your issue resolved:
1. Verbal review/resolution (10-day response)
2. Written review/resolution if verbal fails (10-day response)
3. Contact the Dean if steps 1 and 2 are unsatisfactory or if your complaint is against the ADA Officer.

PRIVACY OF STUDENT RECORDS‡
The Registrar of UCSC Extension is responsible for maintaining Extension student records, and any questions about them should be addressed to the Registrar’s Office at extensionregistrar@ucsc.edu.

The policies governing the disclosure of information from student records, specifically the Federal Family Educational Rights and Privacy Act of 1974 and the University of California Policies Applying to the Disclosure of Information from Student Records, are available at our office in Santa Clara. The full text of the federal law is available at the Student Affairs Office, located at 245 Hahn Student Services on the UCSC campus, (831) 459-4446.

‡UC Policy—See legal on page 99: Item 10: Taxpayer Relief Act; column 2; paragraph 2.

GRIEVANCES
ucsc-extension.edu/grievance-resolutions

GRIEVANCE RESOLUTION PROCESS
UCSC Extension has a policy and process in place to facilitate and expedite the resolution of grade disputes and student complaints. Please refer to ucsc-extension.edu/grievance-resolutions.

NOTE: Numbered footnotes refer back to topic numbers detailed in this section for General Information & Academic Policy.
Concurrent Enrollment

Take UCSC Campus Courses to Expand Your Horizons

The Concurrent Enrollment Program administered by UCSC Silicon Valley Extension allows you to enroll in courses offered on the UCSC campus without being formally admitted to a degree program. As a Concurrent Enrollment student, you may take up to 5 units, or more by petition.

Studying on campus will expose you to cutting-edge research, new developments in your field, and the latest teaching methods. The experience will help you focus and refine your advanced education goals. Class participation and assignments are the same as for regular students.

Most students are able to take the campus courses they want, but admission is on a space-available basis, and may require prerequisites as well as consent of the instructor. Some courses are also available at UCSC Silicon Valley in Santa Clara. The Concurrent Enrollment Program is available during the fall, winter, and spring quarters.

This Is an Ideal Option for Those Who:
- Need only 1 course to complete degree requirements at another institution
- Are thinking about returning to school, but not sure if they want to become a full-time student
- Are advanced high school students who want to take a college course
- Wish to gain up-to-date information in their professional fields
- Are lifelong learners

Pursue Graduate-Level Studies
Students may take graduate-level courses with the approval of the Graduate Division. An additional signature is required on the instructor approval form. Students may also take undergraduate courses as prerequisites to graduate programs or second baccalaureate programs. Be aware that there may be restrictions on the total number of courses that may be taken through Concurrent Enrollment for any of the above. Check with department advisors regarding these restrictions.

Application and Enrollment Process
1. Obtain the application forms from UCSC Silicon Valley Extension. The forms are available on our website at ucsc-extension.edu/open-campus. Important forms include:
   - The application form
   - The instructor approval form
   - Concurrent Enrollment fees and schedule
2. You must file the application each quarter and submit the application form by the deadline date. Concurrent Enrollment is on a term-by-term basis. Because you are accepted for only one term at a time, you are not guaranteed acceptance in any future term.
3. Your application will be reviewed and you will be notified by email only if there is a problem with your application.
4. Attend the first class meeting of the course(s) in which you wish to enroll. Take your instructor approval form with you to this meeting and let the instructor know that you are a Concurrent Enrollment student. The instructor may ask you to wait until he/she can determine if there will be space in the course after regular students have enrolled.
5. Return the signed and completed instructor approval form(s) to UCSC Silicon Valley Extension and pay the appropriate course fee(s) by the deadline date. Enrollment is complete upon payment of all appropriate fees and charges.
6. If you have questions about any of the above steps, or have special circumstances not covered here, please feel free to contact Student Services at (408) 450-4920.

Participating in this educational program does not in itself provide preference in admission to the University of California. Students interested in applying to UC should refer to the UC Admissions website or the admissions office of the UC campus they wish to attend for details about the admissions process.

Ordering Transcripts
All grades and evaluations for course work completed through Concurrent Enrollment are kept at the Records Office of UCSC Silicon Valley Extension and NOT at the UCSC–Main Campus Records Office in Santa Cruz. You may request an official transcript of your Concurrent Enrollment course work at any time. If you indicate on your instructor approval form that this is your last class to graduate from UCSC, a copy of your transcript will automatically be sent to the UCSC–Main Campus Registrar’s Office free of charge. Otherwise, the transcript must be requested.

To order an official transcript, please go to our website, ucsc-extension.edu/content/faq-transcripts, and use the online order form.

Contact Student Services Today
One of our associates can enroll you in a fall, winter, or spring quarter class, on a space-available basis with approval of the instructor.

Request an Application and Information Package
Visit ucsc-extension.edu/open-campus.

Call (408) 450-4920 during Student Services’ regular business hours: 8:30 am–4:30 pm, Monday–Friday.

Email us at opencampus@ucsc.edu.
Instructor Biographies

A–B

RAHUL AGARWAL, M.S., has over ten years of experience in Java/Oracle stacks for enterprise, gaming and online transaction applications. Previously, he was a software engineer and a development manager at Electronic Arts, leading a team that delivered RESTful Web services, and now works as a senior software engineer at Intuit. Mr. Agarwal has worked extensively with frameworks such as Java, Spring, Tomcat, OSGI, and Hibernate, and also has experience with cross-platform mobile app development.

ANDREA L. AMES, M.S., program chair, see page 46.

FRANCIS (BUTCH) ANTON, JR., Ph.D., is a director of SAP Labs. Dr. Anton has held numerous technology leadership positions in the wireless, networking, and security realms during his 30-year career. He has created products in the fields of UNIX platforms, operating systems, wireless network and access control, mobile device and applications, and Web-based social media product and solutions.

MARILYN ARMSTRONG, M.Ed., has taught at UCSC Extension since 2001.

STEVE ARNOLD, M.B.A., is the owner of Custom Computer Services. He has taught at UCSC Extension since 1997. He has experience teaching courses in WAN, LAN, network administration, and online systems development.

AMER Ather, B.S., has nearly 20 years of industry experience in operating system technologies and performance analysis of enterprise system solutions. He also has extensive experience in writing and debugging low-level kernel drivers in Solaris and Linux environments. He has published several technical articles in trade publications.

KATIE ATKINSON, M.S., is owner of Synderesis Usability Consulting, providing manufacturers with comprehensive human factors services, including risk analysis and mitigation, requirement design, study design and execution, analysis of tasks and workflows, and definition of user needs. Ms. Atkinson has consulted on a variety of medical devices, including combination products. Prior to consulting, she worked at Intuitive Surgical, Inc. for seven years.

NATALIE BERNASCONI, Ed.D, has taught at the K-12 level for the past 20 years and undergraduate and master’s level courses at UCSC since 2010. Her research focus is on English learners and access to technology as a social justice issue. She is co-curator of the Digital ID Project.

LEON BEZDIKIAN, B.A., is an HR director with 32 years of experience in the high-technology industry. He has taught at UCSC Extension since 2002. Mr. Bezdiikian has demonstrated success in implementing innovative and cost-effective HR solutions to support business objectives.

SANJAY BHATIA, B.E., PMP®, has over 23 years of experience managing and developing large scale enterprise software applications. He has held senior management positions at various companies in Silicon Valley, where he regularly delivered complex projects involving global teams in fast paced environments with aggressive schedules.

RUSS BLAHEETKA, D.B.A., CFP, is founder and managing director for Vestnomics Wealth Management, LLC. He has taught at UCSC Extension since 2008. He was previously an advisor and manager with Waddell & Reed. Dr. Blahetka has over 15 years of domestic and international management experience, with responsibility for the profitable operation of support centers, capital investment analyses for automated systems, and business deployment projects.

AUDREY BLUMENEAU, M.Ed., runs a private consulting firm, which develops, implements and maintains websites for a diverse clientele that includes large businesses, small start-ups, nonprofits and regional associations. She has taught HTML, Cascading Style Sheets, and Dreamweaver courses at UCSC Extension since 1999. She has worked as a technology instructor as part of a Gender Equity Grant from the National Science Foundation.

TIM BOMBSCH, Ph.D. Stanford University, has more than ten years of experience managing documentation and training projects at various companies. His areas of expertise include biotech, medical devices, and consumer electronics. Dr. Bombsch is a frequent invited speaker and member of the Society for Technical Communications.

GUDIO BORDIGNON, Ph.D., M.S., is a professor in molecular biotechnology at the University of Venice, Italy. Dr. Bordignon was a visiting scholar at the Scripps Institute of Oceanography and Oregon Health Science University and completed three research expeditions to Antarctica with NOAA’s Antarctic Marine Living Resources program. He has consulted for the United Nations Industrial Development Organization’s International Centre for Science and High Technology.

WILLIAM BROOKS, M.A., MPM, CIPM, is a practicing senior program manager with over 35 years of experience in high technology, and over 20 years teaching project management courses at UCSC Extension. He has also worked as an engineering manager, senior vice president and general manager, leading teams and developing project managers, in large corporations and small start-ups. He is an APM-Certified Master Project Manager (MPM) and an APM-Certified International Project Manager (CIPM).

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JUANITA CAMPBELL-RODRIGUEZ, M.Ed., MA, M.A.T., program chair, see page 52.

CASEY CASE, Ph.D., is senior vice president of research and nonclinical development at Asterias Biotherapeutics, which is developing embryonic stem cell-based therapies for spinal cord injury and cancer. Dr. Case has served in leadership roles in research and development at SanBio Inc., Sangamo Biosciences, Tularik, and OSI Pharmaceuticals. Dr. Case has over 40 issued patents.

SUBHADEEP CHATTERJEE, M.S., has 12 years of experience developing Internet and Intranet products for Yahoo as well as a range of industrial and financial companies. He specializes in information architecture blueprints, wireframes, user interface design and toolkit development.

RAVISHANKAR CHITYALA, Ph.D., has extensive experience programming Python and Django. Dr. Chityala has been a researcher and consultant in scientific and medical image processing. He co-authored a book on image processing using Python. Dr. Chityala previously worked in the Minnesota Supercomputing Institute at the University of Minnesota.

DEBORAH CHOE, Ed.D., specializes in intercultural education and applied linguistics. In addition to teaching at UCSC Extension, she has taught language arts, linguistics and teacher education courses in colleges and universities in California. Her current research focuses on the language development of ESL students, their acculturation and their academic achievement in the United States.

MIN “ADAM” CHU, Ph.D., has held technical positions with Intel and SiBEAM, where he developed analog and RF ICs. He has authored a number of technical papers and several book chapters.

DIANNE V. CONRY, M.S., program chair, see page 25.

ELIZABETH COREY, Ph.D., has over 15 years of experience in computer science and software development. She has worked on machine learning, algorithm development, parallelization, multicore and distributed computing, Hadoop, MapReduce, and financial analysis. Dr. Corey has applied data analysis in bioinformatics, sentiment analysis, and financial engineering. She has taught at the Baskin School

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of Engineering at UCSC and UCSC Extension for over five years.

HOLLY CORNELISON HOPLA, M.Ed., program chair, see page 58.

JEFF COX, M.S., B.A., program chair, see page 30.

DEBORAH CRIM, M.S., BCET, trained as a special educator at Bank Street College in New York City. She has worked in diagnostic clinics, public and private schools, and private practice. She teaches structured, multi-sensory phonics, remedial mathematics, and written language, as well as study strategies. She belongs to the International Dyslexia Association, Association of Educational Therapists, and Learning Disabilities Association.

CHARLES DANCAK, M.S.E.E., is a consultant with 25 years of experience in the semiconductor and EDA industries. He has taught RTL design and debug using Verilog, SystemVerilog, and VHDL as well as DFT/ATPG. His expertise is drawn from years of experience at Synopsys and Intel. He has taught for UCSC Extension since 2002.

KETAN DAVE, M.S., M.B.A, PgMP, Certified Six Sigma Black Belt, has more than 12 years of experience working with high-tech industry leaders such as Intel, SAP, and HP. Mr. Dave specializes in global program and portfolio management in supply chain development, ERP (SAP R/3), enterprise information systems, new product introductions, emerging technologies, and Lean Six Sigma projects.

MARILYN DAVIS, Ph.D., is a well-regarded Python trainer for the industry and has taught Python at UCSC Extension since 1997. She has contributed software for computer-aided instruction, astronomy, statistics, environmental research, operations research, e-mail service, and electronic democracy.

CONNIE DEL BUONO, B.A., is a medical device and IVD regulatory and quality consultant. She is founder and director of regulatory and compliance requirements at Synoptx Inc. As a certified Notified Body auditor, she is trained to perform Medical Device Single Audit Program (MDSAP) audits. Ms. Del Buono is the former executive vice president of Immuo Concepts, Inc., and oversaw manufacturing, product development and operations. She is a former Notified Body senior project manager for DEKRA Certification BV. Ms. Del Buono earned a B.A in biology from SUNY Plattsburgh.

MICHAELA DE SAPIO-YAZAR, M.S. in education, E/T, has run her own educational therapy and tutoring practice since 1998. Ms. De Sapio-Yazar has been a certified educational therapist since 2011 and also works part-time at Myndflex, a nonprofit educational program for children. She works with children who have a range of learning differences and disabilities.

ERIC DORF, B.F.A., D.M.B.A., is principal user experience and interface designer and design manager at Startup Monthly. He has an M.B.A. in design strategy and has worked in the design of mobile, cloud, desktop and Web service products for a wide range of clients, including Autodesk, eBay, Intuit, Oracle, The Food Network and Sliced Bread Design.

MICHAEL PATRICK ELLARD, M.A., co-wrote and co-taught Swift training courses for Apple’s internal rollout of Swift prior to the public release of the language. He has been developing software for the iPhone and iPad since 2009 and has over 30 successful submissions to the Apple App Store. An award-winning iOS developer, Mr. Ellard has taught iOS development courses at UCSC Extension and around the world.

VICTOR EYDUS, Ph.D., has over 16 years of experience designing, developing, and managing complex software applications with an emphasis on agile project management, business intelligence, data warehouses, object-oriented analysis and database design, Web development, and systems integration. His software applications have been used in multiple industries. Dr. Eydus has ten publications, including the book Database Design.

PENELPO FAURE, M.B.A., has over 20 years of experience in the accounting industry. She is a practicing managerial accountant, QuickBooks ProAdvisor, teacher, business broker and businesswoman. She has numerous certifications and a doctorate-level business education. Ms. Faure has deep community involvement and has assisted many economically challenged businesses.

EDISON FONG, Ph.D., is a design consultant. He worked at Loral Space System, Microsoft and National Semiconductor. He has 25 years of experience in analog design for communications, data conversion and RF systems. Dr. Fong has 10 issued patents and has published more than 30 papers. He is a senior member of the IEEE.

JUAN JOSE FUNG, Ph.D. in molecular and cellular physiology from Stanford University, has over 10 years of extensive academic and biotech experience investigating membrane proteins. He did postdoctoral work in structural biology at Stanford and has worked as a researcher in the small-molecule, biotherapeutic and CRO industry sectors, focusing on cell physiology and drug discovery.

OLIVER GILDERSLEEVE, PMP®, M.S.E.E., is an instructor for Dynamics Research Corp, working remotely on a contract with the Department of Veterans Affairs. He has over 12 years of experience in project management. He was vice president of Project Governance for EPM Solutions and taught Microsoft Project and Project Server for Project Managers at companies across the U.S. He is also co-founder and past president of Microsoft Project Users Group’s Silicon Valley chapter.

IMRAN HAJIMUSA, M.S., has more than 20 years of experience in payment, security, authentication, connectivity, mobile, broadband, consumer and networking industries. He has held various leadership roles at Siemens, Infineon, Lantiq and NXP.

TERESA HARDY, M.A., B.S., has over 20 years of experience in marketing and engineering, and has worked as a Web and multimedia developer since 2005. She has worked extensively in Web programming and site management. Ms. Hardy develops websites for multiple small business clients and teaches Web designs at local universities in the San Francisco Bay Area.

ERIC C. HEILMANN, B.S., M.S., M.B.A., has over 20 years of experience in the aerospace, embedded systems and semiconductor industries. His major responsibilities include project management, new product introduction, product requirements definition, and customer engagement. Mr. Heilmann is a Certified Scrum Master and holds a PMP® certification from the Project Management Institute®.
BESS HO, M.S., is a founding partner at Archimedes Labs, a startup incubator. She started as a data science engineer before transitioning into user interface engineering. Ms. Ho has been involved in the development of iOS applications since Apple released the iOS SDK in 2008. She competed among a few hundred developers at iOS Dev Camp and her application designs won multiple times. She co-authored the Sams Teach Yourself Twitter API in 24 Hours book.

MICHAEL HUSTON, B.S., M.B.A., program chair, see page 16.

SAM HUYNH, Ph.D., is a principal member of technical staff and a senior manager at AMD. He has over 18 years of experience in the field of VLSI design including memory, IO, physical design implementation and full chip integration. He has three patents and 10 publications.

ARMOND INSELBERG, M.B.A., Ph.D., has extensive experience in start-ups and at large companies, and has held senior positions in product development and product management. He currently is a principal consultant for a local consulting firm. Mr. Inselberg holds VCP, CISSP, and CCNA certifications.

JENNIFER BILLY services in the Bay Area for 20 years and has been an instructor at UCSC Extension since 1990. Mr. Jamali has held senior positions in product development and product management. He currently is a principal consultant for a local consulting firm. Mr. Inselberg holds VCP, CISSP, and CCNA certifications.

JAY JAMALI, B.S., CSP, CHMM, CHCM, is the director of Enviro Safetech, Inc., an environmental, health and safety consulting company. He has been providing EHS services in the Bay Area for 20 years and has been an instructor at UCSC Extension since 1990. Mr. Jamali has worked at Superfund sites and has responded to more than 200 hazardous-materials emergencies.

JESSE JENKINS, B.S.E.E., M.S.E.E., Ph.D., was a product planning manager at Xilinx, Inc. He has 20 years of PLD experience, holds multiple patents and has written a beginning text on PLDs and FPGAs. He has taught for UCSC Extension since 1997.

IRV KALB, M.S., is a software consultant with 10 years of experience in the development of educational software. Mr. Kalb has contributed to a wide variety of classroom and e-learning products. He has taught entry-level programming courses using Python at a local college for four years. He is well-versed in video editing tools and Adobe’s Creative Suite, as well as scripting languages such as Python, ActionScript, SQL and XML.

RAVI KALLURI, M.S.E.E. from Stanford, M.B.A., PMP® and Certified Scrum Master, has more than 15 years of experience leading complex software development projects. He has four years of experience teaching project management.

GAIL KATSIR, Ph.D., has been a biochemist for over 10 years. Dr. Katsir has experience in both academia and industry. She has worked on signal transduction pathways in bacteria, and protein and gene analysis of cancer pathways. Dr. Katsir has also taught introductory chemistry and biochemistry at universities and community colleges.

GARY KATZ, M.S., is CEO of a marketing operations and a marketing communications company. He has more than 25 years experience as a marketing strategist, program director, project manager and communications professional. He is the four-term chair of the Henry Stewart Conference’s marketing operations track, sits on the BMA’s national board, and is VP of AMA’s.

DAVID J. KEENAN, B.S., is an environmental health and safety consultant with Performance Safety Associates. He has 34 years of experience in environmental health and safety. He has taught at UCSC Extension since 2001.

DONALD KEIDEL, Ph.D., has six years of software development and nine years of research experience in bioinformatics. He is proficient in Python, PHP, HTML, and shell scripting, and has worked in bioinformatics and technology companies. Dr. Keidel has development experience with object-oriented technology, search engines and databases. A former postdoctoral fellow at the Scripps Research Institute, he has three years of teaching experience at colleges and universities.

ROBERT KNIGHT, M.S., D.P.M., has more than 25 years of experience teaching mathematics. He is a pioneer in the use of technology in the teaching of statistics and mathematics. Dr. Knight’s innovative teaching has garnered awards from the Santa Clara Mathematics Association, the California State Chancellor’s Office, and the California Mathematics Council.

PURNIMA KRISHNAMURTHY, M.B.A., has over 14 years of high-tech industry experience, building and aligning technical talent and performance practices with strategic business objectives. She currently leads a team of training specialists and instructional designers in developing global scalable training curriculum. Ms. Krishnamurthy is also a graduate of UCSC Extension’s certificate program in Instructional Design and Delivery.

SATYA KRISHNASWAMY, M.B.A., is the founder and CEO of NextPrinciples, a social CRM startup. He has 20 years of experience in the enterprise software space, including 15 at SAP, where he held a variety of roles from product management to sales and consulting.

JUDY A. LaCROIX, M.A. in management, is a dynamic, innovative trainer and consultant. She has been involved in consulting, management, training and education for over 20 years. Her experience encompasses managing, consulting for organizations, facilitating management and employee development, and training in a variety of subject areas, including technical training. She has worked in the communications, high-tech, aerospace, education and retail industries.

ABIZAR LAKDAWALLA, Ph.D., is a molecular biologist with experience in first- and second-generation DNA sequencing technologies. He worked in product development at BioGenex and in product management at Applied Biosystems, and was the leader of a technology incubator at ABI. At Illumina, he worked on next generation sequencing products and applications. At Thermo Scientific, he builds applications for the Ion Torrent platform. Rr. Lakdawalla brings nearly 20 years of experience in genomics to his teaching.

THARAN J. LANIER, M.B.A., CPA, is in private practice and specializes in accounting and the tax needs of small business. He has taught for UCSC Extension since 1995. Mr. Lanier has worked in large industries and has taught graduate accounting courses.

ELLEN Y. LAU, M.B.A., CFP®, has over 10 years of experience as a CERTIFIED FINANCIAL PLANNER™ practicing in investment management, insurance, tax, retirement and estate planning. Prior to becoming a CFP®, Ms. Lau worked as a project manager helping companies implement financial and accounting systems. Ms. Lau manages her own firm and specializes in retirement income strategies and integrated financial planning.

BRETT LAYTON, M.S., CPA (inactive), works as a tax director for AMD, Inc. He has over thirty years of experience in corporate tax departments and big four accounting firms, working in all areas of income and transactional taxes. Mr. Layton has been active in tax policy with several industry groups and is a member of The Tax Executives Institute.

MELISSA LE, B.A., Multi-Subject Teaching Credential, program chair, see page 52.

RUSSELL LEONG, B.A. in graphic design, operates Russell Leong Design in Cupertino, serving a diverse range of Bay Area clients. He has more than 30 years of experience in design. Leong’s firm established its reputation with design work for major Silicon Valley tech companies, including Apple Computer, Hewlett-Packard, Symantec, and Sun Microsystems as well as non-tech clients such as Annieglass, Betelnut Restaurant and Diddams. The firm specializes in corporate brand identity, sales promotion/collateral and event branding.

REBECCA LEE LOVIN, Ed.D. in multicultural education, delivers teacher training in English as a second language. She has taught for UCSC Extension since 1997. Dr. Lovin’s research and practice include work in Korea, Mexico, and Egypt.

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LAMBERT LUM, B.S.C.S., M.B.A., is the organizer of Silicon Valley Perl User Group. He has worked in Silicon Valley for over 15 years as a software engineer and Web developer. He is familiar with Perl, PHP, JavaScript, HTML, CSS, and MySQL. He has delivered Perl training in corporations and user group meetings since 2012.
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EDWIN MACH, M.S., is a senior software engineer. His experience spans multiple companies in software engineering and development. He has extensive knowledge in Eclipse, Java, XML, and AJAX, among dozens of other technologies.

HAMI KAMHOOI, Ph.D., is an associate professor of electrical and computer engineering at San Francisco State University. He has taught for UCSC Extension since 2008. His research interests include low-power, reliable, high-performance circuit design for nano-scale technologies. He was a recipient of the 2008 SRC Inventor Recognition Award and the Best Paper Awards at 2006 IEEE Circuits and Systems Society VLSI Transactions.

PAT MAHONY, M.A., M.S., HROD, is an HR director for a high-tech company. She has taught for UCSC Extension since 1997. She has more than 15 years of experience in employment, worker relations, training, compensation and organizational development.

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FRANCES ANN MCKENNEY, M.S., is a quality and compliance consultant for Mckenny Consulting, LLC. She has more than 20 years of experience in the pharmaceutical and biotechnology industry and has hosted inspections by the FDA and EMA. Ms. Mckenny has taught for UCSC Extension since 2002. She has worked at pharmaceutical and biotechnology companies such as Affymax, Genentech, and Syntex/Roche Bioscience, as well as the USDS Food Science and Inspection Service.

JEFF MILLER, B.S., has over 20 years of experience as a software developer, architect, consultant, business owner, and instructor. Mr. Miller’s major areas of expertise include iOS and Mac development, cloud computing, .NET, C#, C++, Windows development, database, distributed and Web-based application architecture and implementation, and Android development. Mr. Miller has taught at UCSC Extension since 1994.

MARK MONROSE, M.S., specializes in electromagnetic compatibility with nearly 30 years of experience in printed circuit board and system design. He has taught for UCSC Extension since 2008. He authored four books on EMC, plus presented numerous papers at IEEE International EMC Symposia worldwide. He is a member of both the Board of Directors of the IEEE and the IEEE EMC Society.

NINET MORADI, M.A. in psychology, is an early childhood education professional advisor and a court-appointed child advocate. She has over 14 years of experience in early childhood education, counseling, university teaching, and research. Ms. Moradi received her Child Development Program Director Permit from California Community Child Care Licensing.

DEANNA J. MOUSER, J.D., L.L.M., is an attorney in employment law. She has taught for UCSC Extension since 1997. She is well versed in offering practical solutions to employment law issues. Dr. Mouser has authored articles and chapters on employment law topics, including defamation, arbitration and workplace violence.

SHELDON MULLINS, M.B.A., is a senior regulatory affairs professional who has worked on the development of biologics, small molecules and gene therapy products for a variety of therapeutic areas. He has taught for UCSC Extension since 2007. He has developed regulatory strategies from pre-IND to license application submission and approval.

AJIT NATARAJAN, M.S., is a senior software engineer at Google. Previously, he worked on networking, virtualization, and storage software for enterprise servers running HP-UX and 3PAR enterprise storage arrays at Hewlett-Packard. He has worked with PCI, PCI-X, PCI Express, and proprietary IO technologies and written Token Ring, Ethernet, and Fibre Channel drivers for HP-UX.

MOHAMMAD NAVEED, M.S., M.B.A., is a technical lead for a data management software development company. He has been instrumental in the design, development and creation of innovative software modules for the company’s flagship product. He specializes in SQL, PL/SQL, database administration, data quality and data analysis.

NANCY NELSON, B.A., SPHR-CA®, GPHR®, program chair, see page 35.

AHMAD NOURI, M.S., has more than 15 years of experience designing and developing client/server software products at IBM and NetFrame using WebSphere, Java EE, Java SE, EJB, XML, and databases. He has expertise in client-server, OO design pattern, EJB development, JPA, EJB query and SQL development.

LAURENCE F. O’CONNELL, M.B.A., M.S., has over 30 years of experience in the corporate, government and nonprofit sectors. His major responsibilities included project management, finance and accounting, economic analysis, marketing and training and development of employees. Mr. O’Connell serves on the Board of Directors for nonprofit environmental organizations in New York and volunteers teaching financial literacy skills to incarcerated women.

EDWARD ONG, D.B.A., M.S., has 18 years of experience in the development of power supply solutions for consumer electronics, high-end computing, and networking equipment applications. Mr. Ong also has extensive industry experience managing new product introductions, both technical and commercial, for switching power conversion ICs and products.

TARAL OZA, M.S., has been a software developer for over 10 years with leading high-technology companies in the Bay Area. He has hands-on experience with C#, C++, Java, Perl, PHP, TCL, and Assembly, and has been involved with embedded software development for systems and devices. The software products he developed include Windows-based desktop and Linux-based Web applications.

ANAND PAI, M.S., has more than 25 years of experience in the development of X86 processors, systems and communications. Mr. Pai has worked in the areas of Linux kernel, system programming, silicon, system, networking, and virtualized media. He has developed high-performance, low-latency server, kernel, media and Web services.

SHERRY PARSONS, B.S.B.M., has over 30 years of experience in the administrative field and is executive administrative manager for Earthbound Farm. She has taught at UCSC Extension since 2006. Ms. Parsons supported the CEO of Network General, and is a past member of the Silicon Valley Catalyst Association (SVCA).

NIKET PATWARDHAN, M.S., has over 23 years of experience in software engineering. He has been a software engineer, manager, director, vice president of engineering and CEO of major companies and startups in the Bay Area. His expertise includes operating systems, kernels and drivers, networking, databases, search engines, Web portals and user experience.

LY-HUONG PHAM, Ph.D., M.B.A., M.S., program chair, see page 39.

JILL PODOLSKY, B.S., has more than 20 years of experience in HR. Her expertise is in aligning employees with the needs of company customers and training leadership teams. She is certified to administer the Myers Briggs Type Indicator (MBTI). She completed the University of Michigan’s HR Executive Strategy Program. Ms. Podosky has taught for UCSC Extension since 2009.

ELIZABETH POWELL, M.A., is a Learning Specialist at Abbey Neuropsychological Clinic in Palo Alto, CA. Previously, she was the director of the Reading Clinic, where she created programs in reading and math that were implemented company-wide to address the influx of non-dyslexic, reading disabled students. Ms. Powell has extensive experience in reading and math education for students with learning differences.
SIVA PRASAD, M.B.A., M.S. in computer science, has extensive experience in Linux, open architecture systems and networking protocols. His recent work includes system design, BSP development using Linux and VXWorks and writing device drivers for embedded systems.

JONATHAN PRICE, D.F.A., has developed more than a dozen online information facilities for character-based, pen-based, and graphic-based interfaces. He has more than 30 years of experience in technical writing and has taught for UCSC Extension since 1997. Author of How to Write a Computer Manual, The Trail Guide to America Online, and co-author of How to Communicate Technical Information, he’s coached electronic information teams from major computer manufacturers and software vendors.

SRIDIVI PUDIPEDI, Ph.D., has professional experience working with differential equations, medical imaging and text processing. She has used Python in image processing and acquisition, and Web development. Dr. Pudipedi has taught at college level for several years is co-author of the book Image Processing and Acquisition Using Python.

NANCY A. PYZEL, M.B.A., is an Enrolled Agent with 19 years of experience in tax preparation. Ms. Pyzel has worked in management and tax preparation at Tiret & Nance, wrapped A Life Well Spent in 2008. Organizers, a tax and financial planning practice. She worked in management and tax preparation at Tiret & Nance, wrapped A Life Well Spent in 2008. Organizers, a tax and financial planning practice. She has a proven track record of success. Mr. Rondeau has delivered corporate training to small entrepreneurial ventures, global organizations, and government clients throughout the U.S.

MARCO ROSA, M.A., has served as vice president of human resources at MAP Pharmaceuticals, Inc. since 2008. Mr. Rosa held vice president-level management positions at Carl Zeiss Meditec, Inc., COR Therapeutics, Inc., and Genelabs Technologies, Inc. He has also held management positions at ReplayTV, Sony Electronics Inc., and the General Electric Company.

SHARMILA ROY, Ph.D., program chair, see page 56.

EDWARD ROZHON, Ph.D., program chair, see page 11.

KARIM SAWANI, M.P.H., CCRA, senior clinical program manager at Gilead Sciences Inc., has more than 16 years of experience in clinical drug development in cardiovascular, dermatology, infectious disease, oncology, ophthalmology and respiratory areas. Mr. Sawani oversees management of all aspects of Phase I-II global clinical trials and has led projects through several new drug applications (NDA) and supplemental NDAs.

MALKIAT SANDHU, M.A., international economics, M.A. economics, teaches macroeconomics, microeconomics, international political economy, introductory business and computer information systems at a number of Bay Area colleges and universities. Professor Sandhu also consults and is a regular workshop participant at the Federal Reserve Bank of San Francisco and SRI International.

SHASHI SATHYANARAYANA, Ph.D., has more than 18 years of experience in scientific programming, algorithm development and teaching. Dr. Sathyanarayana holds 20 patents in machine learning and ultrasound imaging, and has published 12 technical papers. He is the author of A Gentle Introduction to Backpropagation, a tutorial on neural networks. He is the founder of Numeric Insight, a company that provides algorithm development for new products and features.

BONNIE TOKIWA-SAVAGE, program chair, see page 28.

SULEMAN SAYA, B.S., is a senior software engineer with over 20 years of experience designing, developing, debugging, and testing embedded software. He has taught at UCSC Extension since 1997. Mr. Saya has worked in telecom, networking and storage companies in Silicon Valley. He has extensive experience with projects involving embedded Linux and C/C++.

JULIUS SCHILLINGER, M.S., Ph.D. /ABD, is vice president of strategic partnerships for MHN, the Behavioral Health subsidiary of Health Net, a Fortune 200 healthcare company. He also held senior-level management positions at Health Net, online consumer credit provider NextCard, strategy consultancy C-Change, and Cap Gemini, Ernst & Young.

JEFF SCHLAGETER, B.S.E.E., M.S.E.E., PMP®, is a project management consultant, coach, and trainer specializing in rapid product development and rescuing late projects. He has 33 years of experience in project management, and has taught for UCSC Extension since 2001. His broad work experience includes companies such as GE, Advanced Micro Devices, Actel, Ortel (Lucent), Trend Micro, Cirrus Logic, and Mostek (ST). PMP® is a registered mark of the Project Management Institute®.

SHAHROKH SHAHOURI, M.S., is a consultant for Bay Area chip design companies. He has taught for UCSC Extension since 2008. He has 22 years of experience with high-performance and low-power IC designs in the areas of synthesis, simulation, place and route, and timing closure. Mr. Shakouri has extensive experience with tools from all major EDA companies. He has successfully taped out chips with 6.5M synthesizable gates in 65nm technology.

BINEET SHARMA, M.S.C.S., is an architect and director of engineering for a software company. He has nearly 20 years of experience developing large and medium-scale software products. Mr. Sharma has held a variety of leadership roles in all aspects of the software development life cycle.

VIVEK SHARMA, M.S., has more than 10 years of experience in client-server application development and Web user interface. He is familiar with all the major frameworks in the Java and Java EE domain. He also has worked extensively with JavaScript and AJAX, including cross-platform mobile app development. Mr. Sharma has contributed to major projects for clients throughout the Bay Area.

NARINDER SINGH, Pharm.D., M.B.A., pharmacy director at Santa Clara Valley Medical Center, directs medication management at the hospital and its ten network clinics. Dr. Singh has been in healthcare industry for 20 years. He specializes in performance improvement, quality assurance, medication management, regulations and accreditation, drug safety, patient safety, personnel coaching and motivation to achieve exceptional results.
SAVITA O. SINHA, M.Sc., has over 24 years of clinical research experience coordinating, monitoring, training and managing clinical trials. Her most recent clinical research focus has been on managing international studies. Ms. Sinha has been an independent clinical consultant since 1995 and the CEO of SOS Consulting, Inc. since 2004.

JEANNETTE SMITH, B.A., is the owner and Creative Director of Wild Horse Design. She has taught at UCSC Extension since 1996. She holds a certificate in Graphic Design and Graphic Production from UCSC Extension. Ms. Smith is an accomplished entrepreneur and graphic designer with experience educating students of all ages and backgrounds. She has been teaching Photoshop® and photo editing to college students for many years. She uses Photoshop almost daily in her work.

MICHAEL SMITH, M.A. TESL/TEFL, delivers staff development programs for teachers in TESOL for Bay Area colleges. He has taught for UCSC Extension since 1997.

RENÉE SNOW, Ph.D., CFP®, EA, program chair, see page 32.

JESSICA R. STURM, M.P.H., RN, is founder and principal consultant of Vantage Clinical Advisors, a consulting firm specializing in providing services and infrastructure for the successful strategy, preparation, execution, maintenance, and regulatory approval of clinical trials. Ms. Sturm has 15 years of experience in the medical and clinical research fields, including medical devices and pharmaceuticals.

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28 TUESDAY
- EARLY CHILDHOOD EDUCATION
- EDUCATIONAL THERAPY

29 WEDNESDAY
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