# Electrical Engineering and Computer Sciences and Business Adminstration

## M.E.T. at a Glance: One program, two Bachelor of Science (BS) degrees

The Electrical Engineering and Computer Sciences and Business Administration simultaneous degree is part of the Management, Entrepreneurship, & Technology Program. The M.E.T. Program aims to educate leaders with a seamless understanding of technology innovation, from idea to real-world impact.

M.E.T. students earn two Bachelor of Science degrees in one program that combines the best of the top-ranked College of Engineering and Haas School of Business. The integrated curriculum is completed in four years. Internships, career coaching and other enrichment activities provide ample opportunity for hands-on experience with innovation and entrepreneurship. Each M.E.T. cohort is small, allowing for close mentoring and a tight-knit community.

## Admission to the M.E.T. Program

The M.E.T. Program seeks inquisitive, self-motivated students with a passion for finding and solving big problems. It is highly competitive and is only open to freshmen during the UC application period. Freshman admission for fall 2017 is limited to a maximum of 30 students.

For further information, please see the M.E.T. website (http://met.berkeley.edu) .

## Accreditation

The EECS undergraduate degree program in the College of Engineering is accredited by ABET.

In addition to the University, campus, and M.E.T. Program requirements, listed on the College Requirements tab, students must fulfill the below requirements.

**General Guidelines**

1. A minimum of 38 upper division business units and 20 upper division EECS units are required.
2. A minimum of 45 technical engineering units are required.[1]
3. Students must complete the College Requirements (p. 3) and the Major Requirements.
4. Students must complete the degree program in eight semesters, not including Summer Session.
5. All Haas business courses must be taken for a letter grade, with the exception of UGBA 194 (http://guide.berkeley.edu/search/?P=UGBA%20194) , UGBA 198 (http://guide.berkeley.edu/search/?P=UGBA%20198) and UGBA 199 (http://guide.berkeley.edu/search/?P=UGBA%20199) (only offered *Pass/No Pass*).
6. All technical courses that can be used to fulfill a requirement must be taken for a letter grade.
7. Students who receive a grade of D+ or lower in a core UGBA course must repeat the course until they achieve a grade of C- or better.
8. Students in this program must adhere to all policies and procedures of the College of Engineering and the Haas School of Business.

For information regarding University and campus requirements, Reading and Composition, breadth, class schedule, minimum academic progress, and unit requirements, please see the College Requirements (p. 3) .

[1]Technical engineering courses cannot include:

- Any course taken on a Pass/No Pass basis
- Courses numbered 24, 39, or 84
- Any of the following courses: BIO ENG 100, CHM ENG 185, COMPSCI 70, COMPSCI C79, COMPSCI 195, COMPSCI H195, DES INV courses (except DES INV 15, DES INV 22, DES INV 90E, DES INV 190E), ENGIN 125, ENGIN 157AC, IND ENG 95, IND ENG 172, IND ENG 185, IND ENG 186, IND ENG 190 series, IND ENG 191, IND ENG 192, IND ENG 195, MEC ENG 191AC, MEC ENG 190K, and MEC ENG 191K.

## Lower Division Requirements

| | | |
|---|---|---|
| **Business Prerequisites** | | |
| UGBA 10 | Principles of Business | 3 |
| ECON 1 | Introduction to Economics | 4 |
| **Natural Sciences** | | |
| PHYSICS 7A | Physics for Scientists and Engineers | 4 |
| PHYSICS 7B | Physics for Scientists and Engineers | 4 |
| Select one course from the following: | | 3-5 |
| ASTRON 7A | Introduction to Astrophysics | |
| ASTRON 7B | Introduction to Astrophysics | |
| BIOLOGY 1A & 1AL | General Biology Lecture and General Biology Laboratory | |
| BIOLOGY 1B | General Biology Lecture and Laboratory | |
| CHEM 1A & 1AL | General Chemistry and General Chemistry Laboratory | |
| CHEM 1B | General Chemistry | |
| CHEM 3A & 3AL | Chemical Structure and Reactivity and Organic Chemistry Laboratory | |
| CHEM 3B & 3BL | Chemical Structure and Reactivity and Organic Chemistry Laboratory | |
| CHEM 4A | General Chemistry and Quantitative Analysis [1] | |
| CHEM 4B | General Chemistry and Quantitative Analysis [1] | |
| MCELLBI 32 & 32L | Introduction to Human Physiology and Introduction to Human Physiology Laboratory | |
| PHYSICS 7C | Physics for Scientists and Engineers | |
| Any upper division letter graded course of 3 units or more in astronomy, chemistry, earth and planetary science (other than 170AC), integrative biology, molecular & cell biology, physics, or plant & microbial biology | | |
| **Mathematics** | | |
| MATH 1A | Calculus | 4 |
| MATH 1B | Calculus | 4 |
| MATH 53 | Multivariable Calculus | 4 |
| MATH 54 | Linear Algebra and Differential Equations | 4 |
| or MATH 110 | Linear Algebra | |
| COMPSCI 70 | Discrete Mathematics and Probability Theory | 4 |

| | | |
|---|---|---|
| **EECS Lower Division Core** | | |
| EL ENG 16A | Designing Information Devices and Systems I | 4 |
| EL ENG 16B | Designing Information Devices and Systems II | 4 |
| COMPSCI 61A | The Structure and Interpretation of Computer Programs | 4 |
| COMPSCI 61B | Data Structures | 4 |
| or COMPSCI 61BL | Data Structures and Programming Methodology | |
| COMPSCI 61C | Great Ideas of Computer Architecture (Machine Structures) | 4 |
| or COMPSCI 61CL | Machine Structures (Lab-Centric) | |
| **Total Lower Division Units** | | 58-60 |

[1] CHEM 4A and CHEM 4B are intended for students majoring in chemistry or a closely-related field.

## Upper Division Requirements

| | | |
|---|---|---|
| **Upper Division Electrical Engineering and Computer Sciences Requirements** | | |
| Select a minimum of 20 units of upper division EECS courses. | | 20 |
| At least one of the courses must be a design elective. Select from the following design courses: | | |
| COMPSCI C14 | Course Not Available | |
| COMPSCI 160 | User Interface Design and Development | |
| COMPSCI 162 | Operating Systems and System Programming | |
| COMPSCI 164 | Programming Languages and Compilers | |
| COMPSCI 169 | Software Engineering | |
| COMPSCI 184 | Foundations of Computer Graphics | |
| COMPSCI 186 | Introduction to Database Systems | |
| EECS 149 | Introduction to Embedded Systems | |
| EECS 151 & 151LA | Introduction to Digital Design and Integrated Circuits and Application Specific Integrated Circuits Laboratory | |
| EECS 151 & 151LB | Introduction to Digital Design and Integrated Circuits and Field-Programmable Gate Array Laboratory | |
| EL ENG C106A | Introduction to Robotics | |
| EL ENG C106B | Robotic Manipulation and Interaction | |
| EL ENG C128 | Feedback Control Systems | |
| EL ENG 130 | Integrated-Circuit Devices | |
| EL ENG 140 | Linear Integrated Circuits | |
| EL ENG 143 | Microfabrication Technology | |
| EL ENG C149 | Course Not Available | |
| EL ENG 192 | Mechatronic Design Laboratory | |
| **Electrical Engineering and Computer Sciences Ethics Requirement** | | |
| COMPSCI 195 | Social Implications of Computer Technology | 1 |
| **Upper Division Business Administration Requirements** | | |
| UGBA 100 | Business Communication | 2 |
| UGBA 101A | Microeconomic Analysis for Business Decisions | 3 |
| UGBA 101B | Macroeconomic Analysis for Business Decisions | 3 |
| UGBA 102A | Introduction to Financial Accounting | 3 |
| UGBA 102B | Introduction to Managerial Accounting | 3 |
| UGBA 103 | Introduction to Finance | 4 |
| UGBA 104 | Analytic Decision Modeling Using Spreadsheets | 3 |
| UGBA 105 | Leading People | 3 |
| UGBA 106 | Marketing | 3 |
| UGBA 107 | The Social, Political, and Ethical Environment of Business | 3 |
| **M.E.T. Special Topics** | | |
| Two courses are required. [1] | | 2-4 |
| **Upper Division Business Administration Elective Courses** | | |
| Select a minimum of 4-6 units of upper division UGBA elective courses in order to complete a minimum of 38 units of upper division Business Administration courses. | | 4-6 |
| UGBA 113 | Managerial Economics | |
| UGBA 115 | Competitive Strategy | |
| UGBA 117 | Special Topics in Economic Analysis and Policy | |
| UGBA 118 | International Trade | |
| UGBA 119 | Leading Strategy Implementation | |
| UGBA 120AA | Intermediate Financial Accounting 1 | |
| UGBA 120AB | Intermediate Financial Accounting 2 | |
| UGBA 120B | Advanced Financial Accounting | |
| UGBA 121 | Federal Income Tax Accounting | |
| UGBA 122 | Financial Information Analysis | |
| UGBA 123 | Operating and Financial Reporting Issues in the Financial Services Industry | |
| UGBA W125 | Professional Judgment in Accounting | |
| UGBA 126 | Auditing | |
| UGBA 127 | Special Topics in Accounting | |
| UGBA 128 | Strategic Cost Management | |
| UGBA 129 | Financial Reporting for Complex Transactions | |
| UGBA 131 | Corporate Finance and Financial Statement Analysis | |
| UGBA 132 | Financial Institutions and Markets | |
| UGBA 133 | Investments | |
| UGBA 136F | Behavioral Finance | |
| UGBA 137 | Special Topics in Finance | |
| UGBA 141 | Production and Operations Management | |
| UGBA 143 | Game Theory and Business Decisions | |
| UGBA 147 | Special Topics in Operations and Information Technology Management | |
| UGBA 151 | Management of Human Resources | |
| UGBA 152 | Negotiation and Conflict Resolution | |
| UGBA 154 | Power and Politics in Organizations | |
| UGBA 155 | Leadership | |
| UGBA 156AC | Diversity in the Workplace | |
| UGBA 157 | Special Topics in the Management of Organizations | |
| UGBA 160 | Consumer Behavior | |
| UGBA 161 | Marketing Research: Data and Analytics | |
| UGBA 162 | Brand Management and Strategy | |
| UGBA 162A | Product Branding and Branded Entertainment | |
| UGBA 165 | Advertising Strategy | |
| UGBA 167 | Special Topics in Marketing | |
| UGBA 168B | International Marketing | |
| UGBA 169 | Pricing | |

| | |
|---|---|
| UGBA 170 | Ethical Leadership in Business |
| UGBA C172 | History of American Business |
| UGBA 175 | Legal Aspects of Management |
| UGBA 176 | Media Consulting and Public Relations |
| UGBA 177 | Special Topics in Business and Public Policy |
| UGBA 178 | Introduction to International Business |
| UGBA 179 | International Consulting for Small and Medium-Sized Enterprises |
| UGBA 180 | Introduction to Real Estate and Urban Land Economics |
| UGBA 183 | Introduction to Real Estate Finance |
| UGBA 184 | Urban and Real Estate Economics |
| UGBA 187 | Special Topics in Real Estate Economics and Finance |
| UGBA 190S | Strategy for the Information Technology Firm |
| UGBA 190T | Special Topics in Innovation and Design |
| UGBA 190V | Corporate Strategy in Telecommunications and Media |
| UGBA 191C | Communication for Leaders |
| UGBA 191I | Improvisational Leadership |
| UGBA 191P | Leadership and Personal Development |
| UGBA 192A | Leading Nonprofit and Social Enterprises |
| UGBA 192B | Strategic Philanthropy |
| UGBA 192L | Applied Impact Evaluation |
| UGBA 192N | Topics in Social Sector Leadership |
| UGBA 192P | Sustainable Business Consulting Projects |
| UGBA 192T | Topics in Corporate Social Responsibility |
| UGBA 193C | Curricular Practical Training for International Students |
| UGBA 193I | Business Abroad |
| UGBA 194 | Undergraduate Colloquium on Business Topics |
| UGBA 195A | Entrepreneurship |
| UGBA 195P | Perspectives on Entrepreneurship |
| UGBA 195S | Entrepreneurship To Address Global Poverty |
| UGBA 195T | Topics in Entrepreneurship |
| UGBA 196 | Special Topics in Business Administration |
| UGBA 198 | Directed Study |
| UGBA 199 | Supervised Independent Study and Research |
| **Total Upper Division Units** | 57-61 |

[1] M.E.T. Special Topics courses will count as upper division business units.

**University of California Requirements**

Entry Level Writing (http://guide.berkeley.edu/undergraduate/colleges-schools/haas-business/entry-level-writing-requirement)

All students who enter the University of California as freshmen must demonstrate their command of the English language by fulfilling the Entry Level Writing Requirement. Fulfillment of this requirement is also a prerequisite to enrollment in all reading and composition courses at UC Berkeley.

American History and American Institutions (http://guide.berkeley.edu/undergraduate/colleges-schools/haas-business/american-history-institutions-requirement)

The American History and Institutions requirements are based on the principle that a US resident who graduates from an American university should have an understanding of the history and governmental institutions of the United States.

**Campus Requirement**

American Cultures (http://guide.berkeley.edu/undergraduate/colleges-schools/haas-business/american-cultures-requirement)

American Cultures (AC) is the one requirement that all undergraduate students at UC Berkeley need to take and pass in order to graduate. The requirement offers an exciting intellectual environment centered on the study of race, ethnicity, and culture of the United States. AC courses offer students opportunities to be part of research-led, highly accomplished teaching environments, grappling with the complexity of American culture.

**M.E.T. Program Requirements**

**Reading and Composition**

Two Reading and Composition (R&C) courses must be taken for a letter grade (C- or better required), and must be completed by no later than the end of the sophomore year (4th semester of enrollment). The first half of R&C, the “A” course, must be completed by the end of the freshman year; the second half of R&C, the “B “course, by no later than the end of the sophomore year or a student's registration will be blocked. View a detailed list of courses (http://guide.berkeley.edu/undergraduate/colleges-schools/engineering/reading-composition-requirement) that fulfill Reading and Composition requirements.

**Breadth Requirement**

The undergraduate breadth requirement provides Berkeley students with a rich and varied educational experience outside of their major program. As the foundation of a liberal arts education, breadth courses give students a view into the intellectual life of the University while introducing them to a multitude of perspectives and approaches to research and scholarship. Engaging students in new disciplines and with peers from other majors, the breadth experience strengthens interdisciplinary connections and context that prepare Berkeley graduates to understand and solve the complex issues of their day.

Students in the M.E.T. Program must successfully complete six breadth courses, one in each of the following categories:

Arts and Literature (http://guide.berkeley.edu/undergraduate/colleges-schools/haas-business/arts-literature)

Historical Studies (http://guide.berkeley.edu/undergraduate/colleges-schools/haas-business/historical-studies)

International Studies (http://guide.berkeley.edu/undergraduate/colleges-schools/haas-business/international-studies)

Philosophy and Values (http://guide.berkeley.edu/undergraduate/colleges-schools/haas-business/philosophy-values) (will be satisfied with UGBA 107)

Physical Science (http://guide.berkeley.edu/undergraduate/colleges-schools/haas-business/physical-science) (will be satisfied with Physics 7B)

Social and Behavioral Sciences (http://guide.berkeley.edu/undergraduate/colleges-schools/haas-business/social-behavioral-sciences) (will be satisfied with Econ 1)

- With the exception of UGBA 107, UGBA courses cannot be used to fulfill breadth requirements.
- With the exception of Econ 1, microeconomics and macroeconomics at any level (Econ 2, Econ 3, Econ 100A/B, Econ 101A/B, IAS 106/107) cannot be used to fulfill breadth requirements.
- Courses offered by any Engineering department, with the exception of BIO ENG 100, COMPSCI C79, ENGIN 125, 157AC, MEC ENG 191K and 191AC, cannot be used to fulfill breadth requirements.
- No more than two courses from any one department may be used to satisfy the breadth requirement (L&S Discovery courses (http://lsdiscovery.berkeley.edu) are exempt).
- Advanced Placement or International Baccalaureate exams cannot be used to fulfill the breadth requirement. Some A-Level exams are accepted, but a maximum of two A-Level exams may be used to fulfill breadth requirements.
- Two of the breadth courses must be upper-division (courses numbered 100-196).
- Courses numbered 97, 98, 99, or above 196 may not be used to complete any breadth requirement.
- Breadth courses must be a minimum of 3 semester units.

### Class Schedule Requirements

- Minimum units per semester: 13
- Maximum units per semester: 20.5
- Students in the M.E.T. Program must enroll each semester in no fewer than two technical courses (of a minimum of 3 units each) required of the engineering major program of study in which the student is officially declared.

### Minimum Academic (Grade) Requirements

- A minimum overall and semester grade point average of 2.000 (C average) is required. Students will be subject to dismissal from the University if during any fall or spring semester their overall U.C. GPA falls below a 2.000, or their semester GPA is less than 2.000.
- Students must achieve a minimum GPA of 2.000 (C average) in upper division technical courses each semester. Students will be subject to dismissal from the University if their upper division technical GPA falls below 2.000.
- A minimum overall GPA of 2.000, and a minimum 2.000 GPA in upper division technical course work required of the major are required to graduate.

### Unit Requirements

- A minimum of 120 units are required to graduate.
- A maximum of 16 units of Special Studies coursework (courses numbered 97, 98, 99, 197, 198, or 199) will count towards the 120 units; a maximum of four are allowed in a given semester.
- A maximum of four units of Physical Education from any school attended will count towards the 120 units.
- No more than 1/3 of a student's total UC Berkeley units may be taken Pass/No Pass, including physical education courses, Education Abroad Program, or courses taken on another UC campus.

**First Year**

| Fall | Units | Spring | Units |
|---|---|---|---|
| COMPSCI 61A | 4 | COMPSCI 61B | 4 |
| ECON 1 (Breadth: Social and Behavioral Sciences)[3,4] | 4 | EL ENG 16A | 4 |
| MATH 1A[1] | 4 | MATH 1B[6] | 4 |
| M.E.T. Special Topics[5] | 1-2 | UGBA 10 | 3 |
| Natural Science Elective[2] | 4 | Reading & Composition Course from List A[7] | 4 |
| | **17-18** | | **19** |

**Second Year**

| Fall | Units | Spring | Units |
|---|---|---|---|
| EL ENG 16B | 4 | COMPSCI 61C | 4 |
| MATH 53 | 4 | MATH 54 or 110 | 4 |
| PHYSICS 7A[8] | 4 | PHYSICS 7B (Breadth: Physical Science) | 4 |
| Breadth: Historical Studies[3] | 4 | Breadth: Arts & Literature[3] | 3 |
| Reading & Composition Course from List B | 4 | STAT 21 or 134 | 3-4 |
| | **20** | | **18-19** |

**Third Year**

| Fall | Units | Spring | Units |
|---|---|---|---|
| COMPSCI 70 | 4 | Upper Division EECS[9] | 4 |
| Upper Division EECS[9] | 4 | Upper Division EECS[9] | 4 |
| UGBA 100 | 2 | UGBA 101B | 3 |
| UGBA 101A | 3 | UGBA 102A | 3 |
| UGBA 105 | 3 | UGBA 107 (Breadth: Philosophy & Values)[3] | 3 |
| Breadth: International Studies[3] | 3 | | |
| | **19** | | **17** |

**Fourth Year**

| Fall | Units | Spring | Units |
|---|---|---|---|
| COMPSCI 195 (Engineering Ethics) | 1 | Upper Division EECS or Engineering Elective[10] | 2-4 |
| Upper Division EECS[9] | 4 | Upper Division EECS or Engineering Elective[10] | 3-4 |
| Upper Division EECS[9] | 4 | UGBA 106 | 3 |
| M.E.T. Special Topics[5] | 1-2 | UGBA 102B | 3 |
| UGBA 103 | 4 | UGBA Elective[11] | 2-3 |
| UGBA 104 | 3 | UGBA Elective[11] | 2-3 |
| | **17-18** | | **15-20** |

**Total Units: 142-150**

[1] Math 1A may be fulfilled with a score of 3, 4 or 5 on the AP Calculus AB or BC exam, a score of 5, 6 or 7 on the IB Higher Level Math exam, or a grade of A, B or C on the A-Level Math H1, H2, H3, Pure Math or Further Math exam.

[2] Students must complete one course from the following list: ASTRON 7A, ASTRON 7B, BIOLOGY 1A and BIOLOGY 1AL (must take both), BIOLOGY 1B, CHEM 1A and CHEM 1AL (must take both), CHEM 1B, CHEM 3A and CHEM 3AL (must take both), CHEM 3B and CHEM 3BL (must take both), CHEM 4A, CHEM 4B, MCELLBI 32 and MCELLBI 32L (must take both), PHYSICS 7C, or an upper-division course of 3 units or more in astronomy, biology, chemistry, earth and planetary science (other than EPS 170AC), integrative biology, molecular cell biology, physics, or plant & microbial biology. This requirement is listed in the freshman year curriculum, but many of the options would not be appropriate for a first year student. Complete this requirement in the semester when it is most appropriate to do so (i.e., take PHYSICS 7C after completing PHYSICS 7B). Your M.E.T. adviser can help guide your selection on this requirement. The Natural Science Elective may be fulfilled with a score of 4 or 5 on the AP Biology exam, a score of 3, 4 or 5 on the AP Chemistry exam, a score of 5, 6 or 7 on the IB Higher Level Biology exam or the IB Higher Level Chemistry exam, or a grade of A, B or C on the A-Level Biology exam or the A-Level Chemistry exam.

[3] Econ 1 and UGBA 107 will be accepted for the Social and Behavioral Sciences and Philosophy and Values breadth requirements, respectively, as exceptions for students in the M.E.T. Program. The Biological Science breadth requirement is waived for students in the M.E.T. Program. In order to satisfy the College of Engineering Humanities and Social Sciences requirement, two of the Breadth courses must be upper division. See College Requirements for further restrictions on breadth courses.

[4] Econ 1 may be fulfilled with scores of 4 or 5 on both the AP Microeconomics exam and AP Macroeconomics exam. However, the Social and Behavioral Sciences Breadth requirement cannot be fulfilled with AP exam scores.

[5] M.E.T. Special Topics courses will count as upper division business units.

[6] Math 1B may be fulfilled with a score of 4 or 5 on the AP Calculus BC exam, a score of 5, 6 or 7 on the IB Higher Level Math exam, or a grade of A, B or C on the A-Level Math H2, H3, Pure Math or Further Math exam.

[7] Reading & Composition part A may be fulfilled with a score of 4 or 5 on the AP English Language and Composition exam or the AP English Literature and Composition exam, a score of 5, 6 or 7 on the IB Higher Level English A2 exam, or a grade of A, B or C on the A-Level English Literature exam.

[8] Physics 7A may be fulfilled with a score of 5 on the AP Physics C Mechanics exam.

[9] Students must complete a minimum of 20 units of upper division EECS courses. One course must provide a major design experience, and be selected from the following list: EECS 149, EL ENG C106A, EL ENG C106B, EL ENG C128, EL ENG 130, EL ENG 140, EL ENG 143, EL ENG C149, EL ENG 192, COMPSCI C149, COMPSCI 160, COMPSCI 162, COMPSCI 164, COMPSCI 169, COMPSCI 184, COMPSCI 186, EECS 151 and EECS 151LA (must take both), EECS 151 and EECS 151LB (must take both).

[10] Students must complete a minimum of 45 units of engineering coursework. The 45 units of engineering courses cannot include:

- Any course taken on a Pass/No Pass basis
- Courses numbered 24, 39, or 84
- Any of the following courses: BIO ENG 100, CHM ENG 185, COMPSCI 70, COMPSCI C79, COMPSCI 195, COMPSCI H195, DES INV courses (except DES INV 15, DES INV 22, DES INV 90E, DES INV 190E), ENGIN 125, ENGIN 157AC, IND ENG 95, IND ENG 172, IND ENG 185, IND ENG 186, IND ENG 190 series, IND ENG 191, IND ENG 192, IND ENG 195, MEC ENG 191AC, MEC ENG 190K, and MEC ENG 191K

[11] Students must complete a minimum of 38 units of upper division business coursework. See UGBA Elective course list under “Major Requirements” tab.


- Business Administration (p. )
- Computer Science (p. )
- Electrical Engineering (p. )
- Electrical Engineering and Computer Sciences (p. )


# Business Administration

## UGBA C5 Introduction to Entrepreneurship 2 Units

Offered through: Business Administration
Terms offered: Spring 2017, Fall 2015, Fall 2014
This course offers students a taste of what it’s really like to start a business. In addition to learning key foundational entrepreneurial concepts such as idea generation & evaluation, customer & product development, creating a business model, fundraising, marketing, and scaling & exiting a business, students will also hear from successful entrepreneurs who share their perspectives and best practices. Students will apply core concepts by working in teams to evaluate and select a venture idea that they will then develop throughout the semester.
Introduction to Entrepreneurship: Read More [+]
**Hours & Format**

**Fall and/or spring:** 15 weeks - 2 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam not required.

**Also listed as:** L & S C5

Introduction to Entrepreneurship: Read Less [-]

## UGBA 10 Principles of Business 3 Units

Offered through: Business Administration
Terms offered: Spring 2018, Fall 2017, Spring 2017
This course provides an introduction to the study of the modern business enterprise. The course is taught in five modules, the order of which may vary from semester to semester. The first examines the role and governance of business enterprise in a market economy. The second concentrates on financial issues, while the third looks at the problems of managing people in organizations. The fourth examines product pricing, marketing, and distribution issues and the last concentrates on the international business environment.
Principles of Business: Read More [+]
**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of discussion per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam not required.

**Formerly known as:** Business Administration 10

Principles of Business: Read Less [-]

## UGBA 24 Freshman Seminars 1 Unit

Offered through: Business Administration
Terms offered: Fall 2013, Spring 2007, Spring 2005
The Berkeley Seminar Program has been designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small-seminar setting. Berkeley Seminars are offered in all campus departments, and topics vary from department to department and semester to semester.
Freshman Seminars: Read More [+]
**Rules & Requirements**

**Repeat rules:** Course may be repeated for credit as topic varies. Course may be repeated for credit when topic changes.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 1 hour of seminar per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** The grading option will be decided by the instructor when the class is offered. Final exam required.

Freshman Seminars: Read Less [-]

## UGBA 39D Freshman/Sophomore Seminar 2 - 4 Units

Offered through: Business Administration
Terms offered: Spring 2008, Fall 2007
Freshman and sophomore seminars offer lower division students the opportunity to explore an intellectual topic with a faculty member and a group of peers in a small-seminar setting. These seminars are offered in all campus departments; topics vary from department to department and from semester to semester.
Freshman/Sophomore Seminar: Read More [+]
**Rules & Requirements**

**Prerequisites:** Priority given to freshmen and sophomores

**Hours & Format**

**Fall and/or spring:** 15 weeks - 2-4 hours of seminar per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** The grading option will be decided by the instructor when the class is offered. Final exam required.

Freshman/Sophomore Seminar: Read Less [-]

## UGBA 96 Lower Division Special Topics in Business Administration 1 - 4 Units

Offered through: Business Administration
Terms offered: Spring 2018, Fall 2017, Spring 2017
Study in various fields of business administration for lower division students. Topics will vary from year to year and will be announced at the beginning of each semester.
Lower Division Special Topics in Business Administration: Read More [+]
**Hours & Format**

**Fall and/or spring:** 15 weeks - 1-4 hours of lecture per week

**Summer:** 6 weeks - 2.5-10 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Lower Division Special Topics in Business Administration: Read Less [-]

## UGBA 98 Directed Group Study 1 - 4 Units

Offered through: Business Administration
Terms offered: Spring 2015, Fall 2014, Spring 2014
Organized group study on topics selected by lower division students under the sponsorship and direction of a member of the Haas School of Business faculty.
Directed Group Study: Read More [+]
**Rules & Requirements**

**Credit Restrictions:** Enrollment is restricted; see the Introduction to Courses and Curricula section of this catalog.

**Repeat rules:** Course may be repeated for credit.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 1-4 hours of directed group study per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Offered for pass/not pass grade only. Final exam not required.

**Formerly known as:** Business Administration 98

Directed Group Study: Read Less [-]

## UGBA 100 Business Communication 2 Units

Offered through: Business Administration
Terms offered: Spring 2018, Fall 2017, Spring 2017
Theory and practice of effective communication in a business environment. Students practice what they learn with oral presentations and written assignments that model real-life business situations.
Business Communication: Read More [+]
**Rules & Requirements**

**Prerequisites:** Restricted to Undergraduate Business Administration Majors Only

**Hours & Format**

**Fall and/or spring:** 15 weeks - 2 hours of lecture per week

**Summer:**
6 weeks - 5 hours of lecture per week
8 weeks - 4 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Business Communication: Read Less [-]

## UGBA 101A Microeconomic Analysis for Business Decisions 3 Units

Offered through: Business Administration
Terms offered: Spring 2018, Fall 2017, Summer 2017 First 6 Week Session
Economic analysis applicable to the problems of business enterprises with emphasis on the determination of the level of prices, outputs, and inputs; effects of the state of the competitive environment on business and government policies.
Microeconomic Analysis for Business Decisions: Read More [+]
**Rules & Requirements**

**Prerequisites:** Economics 1, Mathematics 1A or 16A, Statistics 21, or equivalents

**Credit Restrictions:** Students will receive no credit for Undergraduate Business Administration 101A after completing Economics 100A or 101A, Environmental Economics and Policy 100 or International and Area Studies 106. A deficient grade in Economics 100A, 101A, Environmental Economics and Policy 100, or International and Area Studies 106 may be repeated by taking 101A.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1.5 hours of discussion per week

**Summer:** 6 weeks - 7.5 hours of lecture and 2.5 hours of discussion per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Microeconomic Analysis for Business Decisions: Read Less [-]

## UGBA 101B Macroeconomic Analysis for Business Decisions 3 Units

Offered through: Business Administration
Terms offered: Spring 2018, Fall 2017, Summer 2017 Second 6 Week Session
Analysis of the operation of the market system with emphasis on the factors responsible for economic instability; analysis of public and business policies which are necessary as a result of business fluctuations.
Macroeconomic Analysis for Business Decisions: Read More [+]
**Rules & Requirements**

**Prerequisites:** Economics 1, Mathematics 1A or 16A, Statistics 21, or equivalents

**Credit Restrictions:** Students will receive no credit for Undergraduate Business Administration 101B after completing Economics 100B or 101B or International and Area Studies 107. A deficient grade in Economics 100B, 101B, or International and Area Studies 107 may be repeated by taking Undergraduate Business Administration 101B.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 2 hours of lecture and 1 hour of discussion per week

**Summer:** 6 weeks - 7.5 hours of lecture and 2.5 hours of discussion per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Formerly known as:** Business Administration 111

Macroeconomic Analysis for Business Decisions: Read Less [-]

## UGBA 102A Introduction to Financial Accounting 3 Units

Offered through: Business Administration
Terms offered: Spring 2018, Fall 2017, Summer 2017 First 6 Week Session
The identification, measurement, and reporting of financial effects of events on enterprises, with a particular emphasis on business organization. Preparation and interpretation of balance sheets, income statements, and statements of cash flows.
Introduction to Financial Accounting: Read More [+]
**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of discussion per week

**Summer:** 6 weeks - 5 hours of lecture and 5 hours of discussion per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam not required.

**Formerly known as:** Business Administration 120

Introduction to Financial Accounting: Read Less [-]

## UGBA 102B Introduction to Managerial Accounting 3 Units

Offered through: Business Administration
Terms offered: Spring 2018, Fall 2017, Summer 2017 Second 6 Week Session
The uses of accounting systems and their outputs in the process of management of an enterprise. Classification of costs and revenue on several bases for various uses; budgeting and standard cost accounting; analyses of relevant costs and other data for decision making.
Introduction to Managerial Accounting: Read More [+]
**Rules & Requirements**

**Prerequisites:** 102A

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of discussion per week

**Summer:** 6 weeks - 5 hours of lecture and 5 hours of discussion per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Formerly known as:** Business Administration 123

Introduction to Managerial Accounting: Read Less [-]

## UGBA W102A Introduction to Financial Accounting 3 Units

Offered through: Business Administration
Terms offered: Not yet offered
The identification, measurement, and reporting of financial effects of events on enterprises, with a particular emphasis on business organization. Preparation and interpretation of balance sheets, income statements, and statements of cash flows.
Introduction to Financial Accounting: Read More [+]

**Hours & Format**

**Summer:** 6 weeks - 7.5 hours of web-based lecture per week

**Online:** This is an online course.

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructor:** Zhang

Introduction to Financial Accounting: Read Less [-]

## UGBA 103 Introduction to Finance 4 Units

Offered through: Business Administration
Terms offered: Spring 2018, Fall 2017, Summer 2017 Second 6 Week Session
Analysis and management of the flow of funds through an enterprise. Cash management, source and application of funds, term loans, types and sources of long-term capital. Capital budgeting, cost of capital, and financial structure. Introduction to capital markets.
Introduction to Finance: Read More [+]

**Rules & Requirements**

**Prerequisites:** 101A

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1.5 hours of discussion per week

**Summer:**
6 weeks - 8 hours of lecture and 2 hours of discussion per week
8 weeks - 6 hours of lecture and 2 hours of discussion per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Formerly known as:** Business Administration 130

Introduction to Finance: Read Less [-]

## UGBA 104 Analytic Decision Modeling Using Spreadsheets 3 Units

Offered through: Business Administration
Terms offered: Spring 2018, Fall 2017, Summer 2017 Second 6 Week Session
This course provides an introduction to several quantitative methods used to facilitate complex decision-making in business, with applications in many different industries, at different levels in the organization, and with different scopes of decisions. The power of the methods covered in this class is further enhanced by implementing them in spreadsheet software, which allows complex problems to be approached and solved in a straightforward and understandable manner.
Analytic Decision Modeling Using Spreadsheets: Read More [+]

**Rules & Requirements**

**Prerequisites:** Mathematics 1B or 16B, Statistics 21, or equivalents

**Hours & Format**

**Fall and/or spring:** 15 weeks - 2 hours of lecture and 1 hour of discussion per week

**Summer:** 6 weeks - 5 hours of lecture and 2.5 hours of discussion per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Analytic Decision Modeling Using Spreadsheets: Read Less [-]

## UGBA 105 Leading People 3 Units

Offered through: Business Administration
Terms offered: Spring 2018, Fall 2017, Summer 2017 First 6 Week Session
A general descriptive and analytical study of organizations from the behavioral science point of view. Problems of motivation, leadership, morale, social structure, groups, communications, hierarchy, and control in complex organizations are addressed. The interaction among technology, environment, and human behavior are considered. Alternate theoretical models are discussed.
Leading People: Read More [+]
**Rules & Requirements**

**Credit Restrictions:** Students will receive no credit for Undergrad. Business Administration 105 after completing Business Administration 150 or S150.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

**Summer:**
6 weeks - 8 hours of lecture per week
8 weeks - 6 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Leading People: Read Less [-]

## UGBA 106 Marketing 3 Units

Offered through: Business Administration
Terms offered: Spring 2018, Fall 2017, Summer 2017 First 6 Week Session
The evolution of markets and marketing; market structure; marketing cost and efficiency; public and private regulation; the development of marketing programs including decisions involving products, price, promotional distribution.
Marketing: Read More [+]
**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

**Summer:**
6 weeks - 7.5 hours of lecture per week
8 weeks - 6 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Marketing: Read Less [-]

## UGBA 107 The Social, Political, and Ethical Environment of Business 3 Units

Offered through: Business Administration
Terms offered: Spring 2018, Fall 2017, Summer 2017 Second 6 Week Session
Study and analysis of American business in a changing social and political environment. Interaction between business and other institutions. Role of business in the development of social values, goals, and national priorities. The expanding role of the corporation in dealing with social problems and issues.
The Social, Political, and Ethical Environment of Business: Read More [+]
**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of discussion per week

**Summer:** 6 weeks - 5-7.5 hours of lecture and 2.5-0 hours of discussion per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

The Social, Political, and Ethical Environment of Business: Read Less [-]

## UGBA 113 Managerial Economics 3 Units

Offered through: Business Administration
Terms offered: Fall 2010, Fall 2009
Analysis of the theory and practice of decision-making in business firms, utilizing the concepts and techniques of managerial economics. The business decisions to be investigated include pricing policies, internal transfer pricing, and various choices under uncertainty.
Managerial Economics: Read More [+]
**Rules & Requirements**

**Prerequisites:** 101A-101B or equivalents

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Formerly known as:** Business Administration 113

Managerial Economics: Read Less [-]

## UGBA 115 Competitive Strategy 3 Units

Offered through: Business Administration
Terms offered: Spring 2018, Fall 2017, Summer 2017 3 Week Session
This course draws upon theories and frameworks from industrial organization economics, game theory, and resource-based views to address the unique challenges confronted by senior executives of organizations. The focus is strategies for competitive advantage at an organizational level. Topics include industry and competitor analysis, horizontal and vertical boundaries of the firm, strategic positioning, internal competencies, and dynamic capabilities.
Competitive Strategy: Read More [+]
**Rules & Requirements**

**Prerequisites:** 101A or equivalent

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

**Summer:**
3 weeks - 15 hours of lecture per week
6 weeks - 7.5 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam not required.

Competitive Strategy: Read Less [-]

## UGBA 117 Special Topics in Economic Analysis and Policy 1 - 4 Units

Offered through: Business Administration
Terms offered: Spring 2018, Fall 2017, Fall 2013
A variety of topics in economic analysis and policy with emphasis on current problems and research.
Special Topics in Economic Analysis and Policy: Read More [+]
**Rules & Requirements**

**Prerequisites:** 101A-101B or equivalents

**Repeat rules:** Course may be repeated for credit.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 1-4 hours of lecture per week

**Summer:** 6 weeks - 2.5-10 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Formerly known as:** Business Administration 119

Special Topics in Economic Analysis and Policy: Read Less [-]

## UGBA 118 International Trade 3 Units

Offered through: Business Administration
Terms offered: Spring 2018, Summer 2017 Second 6 Week Session, Spring 2017
This course will develop models for understanding the economic causes and effects of international trade, will investigate the effects of economic policies that inhibit trade, and will examine the political economy of trade. By integrating the findings of the latest theoretical and empirical research in international economics, this course help students learn how to explore the current political debates in the U.S. and elsewhere regarding the benefits and costs of international trade.
International Trade: Read More [+]
**Rules & Requirements**

**Prerequisites:** Undergraduate Business Administration 101A or equivalent

**Credit Restrictions:** Students will receive no credit for Undergraduate Business Administration 118 after taking Economics 181 or Economics C181/Environmental Economics and Policy C181.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of discussion per week

**Summer:** 6 weeks - 7.5 hours of lecture and 2.5 hours of discussion per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

International Trade: Read Less [-]

## UGBA 119 Leading Strategy Implementation 3 Units

Offered through: Business Administration
Terms offered: Spring 2018, Spring 2017, Spring 2016
Class format consists of lectures, experiential exercises, student presentations, and case discussions. This course will cover the concepts and techniques required for successful implementation of business strategies with a particular focus on the role of effective leadership in leading strategic change.
Leading Strategy Implementation: Read More [+]
**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

**Summer:** 10 weeks - 4.5 hours of lecture per week

**Online:** This is an online course.

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam not required.

**Formerly known as:** Business Administration 190

Leading Strategy Implementation: Read Less [-]

## UGBA 120AA Intermediate Financial Accounting 1 4 Units

Offered through: Business Administration
Terms offered: Fall 2017, Summer 2017 First 6 Week Session, Fall 2016
This Course introduces the student to concepts, theory and applications of financial accounting. The topics covered include accrual accounting concepts, financial statement analysis, inventory valuations, capital assets and their corresponding depreciation and impairment. Attention is given to examples on current reporting practices and to the study of reporting requirements promulgated by the Financial Accounting Standards Board ("FASB") with comparison to the International Accounting Standards Board ("IASB").
Intermediate Financial Accounting 1: Read More [+]
**Rules & Requirements**

**Prerequisites:** 102A

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1.5 hours of discussion per week

**Summer:** 6 weeks - 7.5 hours of lecture and 5 hours of discussion per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Intermediate Financial Accounting 1: Read Less [-]

## UGBA 120AB Intermediate Financial Accounting 2 4 Units

Offered through: Business Administration
Terms offered: Spring 2018, Summer 2017 Second 6 Week Session, Spring 2017
This course expands students' knowledge of the concepts, theory, and application of financial accounting. It continues the technical accounting sequence, which also includes UGBA 120AA, Intermediate Accounting 1 and UGBA 120B, Advanced Financial Accounting. Topics include an in-depth treatment of the financing elements of the balance sheet and the income statement, as well as a detailed examination of the statement of cash flows.
Intermediate Financial Accounting 2: Read More [+]
**Rules & Requirements**

**Prerequisites:** UGBA 102A is required. UGBA 120AA is recommended

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1.5 hours of discussion per week

**Summer:** 6 weeks - 7.5 hours of lecture and 5 hours of discussion per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Intermediate Financial Accounting 2: Read Less [-]

## UGBA 120B Advanced Financial Accounting 4 Units

Offered through: Business Administration
Terms offered: Spring 2018, Fall 2017, Spring 2017
Continuation of 120A. Sources of long term capital; funds statements, financial analysis, accounting for partnerships, consolidated financial statements, adjustments of accounting data using price indexes; accounting for the financial effects of pension plans; other advanced accounting problems.
Advanced Financial Accounting: Read More [+]
**Rules & Requirements**

**Prerequisites:** UGBA 120AA and 120AB are recommended

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1.5 hours of discussion per week

**Summer:** 6 weeks - 7.5 hours of lecture and 5 hours of discussion per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Advanced Financial Accounting: Read Less [-]

## UGBA 121 Federal Income Tax Accounting 4 Units

Offered through: Business Administration
Terms offered: Spring 2018, Fall 2016, Spring 2016
Determination of individual and corporation tax liability; influence of federal taxation on economic activity; tax considerations in business and investment decisions.
Federal Income Tax Accounting: Read More [+]
**Rules & Requirements**

**Prerequisites:** 102A (120AA recommended)

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1.5 hours of discussion per week

**Summer:** 6 weeks - 7.5 hours of lecture and 2 hours of discussion per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Federal Income Tax Accounting: Read Less [-]

## UGBA 122 Financial Information Analysis 4 Units

Offered through: Business Administration
Terms offered: Spring 2018, Fall 2017, Fall 2016
This course is designed to: 1) develop basic skills in financial statement analysis; 2) teach students to identify the relevant financial data used in a variety of decision contexts, such as equity valuation, forecasting firm-level economic variables, distress prediction and credit analysis; 3) help students appreciate the factors that influence the outcome of the financial reporting process, such as the incentives of reporting parties, regulatory rules, and a firm's competitive environment.
Financial Information Analysis: Read More [+]
**Rules & Requirements**

**Prerequisites:** 120AA

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1.5 hours of discussion per week

**Summer:** 6 weeks - 7.5 hours of lecture and 5 hours of discussion per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Financial Information Analysis: Read Less [-]

## UGBA 123 Operating and Financial Reporting Issues in the Financial Services Industry 3 Units

Offered through: Business Administration
Terms offered: Fall 2017
This course examines how accounting in the financial services industry – banking, insurance, real estate – actually operates. Students learn about underwriting and pricing in each sector, investment processes and controls, incentive-based profit sharing, risk management, and the factors that contribute to profitability. Students learn what financial statements reveal about estimates companies make regarding liabilities and, more generally, what they reveal about how companies deal with uncertainty associated with predicting and measuring financial results. Students examine the controversy over employing Fair Value Accounting across sectors and learn about other sector-specific accounting requirements.
Operating and Financial Reporting Issues in the Financial Services Industry: Read More [+]
**Rules & Requirements**

**Prerequisites:** 120AA

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

**Summer:** 6 weeks - 7.5 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Operating and Financial Reporting Issues in the Financial Services Industry: Read Less [-]

## UGBA W125 Professional Judgment in Accounting 3 Units

Offered through: Business Administration
Terms offered: Prior to 2007
An online course in reviewing auditing principles with a simulated audit experience over the complex areas of estimates and judgments.
Professional Judgment in Accounting: Read More [+]
**Rules & Requirements**

**Prerequisites:** Preferable to have auditing completed or in progress. Must have intermediate accounting

**Hours & Format**

**Summer:** 8 weeks - 5 hours of web-based lecture and 2 hours of web-based discussion per week

**Online:** This is an online course.

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Professional Judgment in Accounting: Read Less [-]

## UGBA 126 Auditing 4 Units

Offered through: Business Administration
Terms offered: Spring 2018, Fall 2017, Summer 2017 First 6 Week Session
Concepts and problems in the field of professional verification of financial and related information, including ethical, legal and other professional issues, historical developments, and current concerns.
Auditing: Read More [+]
**Rules & Requirements**

**Prerequisites:** 120AA (120AB and 120B recommended)

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1.5 hours of discussion per week

**Summer:** 6 weeks - 7.5 hours of lecture and 2 hours of discussion per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Auditing: Read Less [-]

## UGBA 127 Special Topics in Accounting 1 - 4 Units

Offered through: Business Administration
Terms offered: Spring 2018, Fall 2017, Spring 2017
A variety of topics in accounting with emphasis on current problems and research.
Special Topics in Accounting: Read More [+]
**Rules & Requirements**

**Prerequisites:** 102A

**Repeat rules:** Course may be repeated for credit.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 1-4 hours of lecture and 0-1 hours of discussion per week

**Summer:** 6 weeks - 2.5-10 hours of lecture and 0-2.5 hours of discussion per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Special Topics in Accounting: Read Less [-]

## UGBA 128 Strategic Cost Management 3 Units

Offered through: Business Administration
Terms offered: Fall 2017, Spring 2015, Fall 2012
Managerial accounting is a company's internal language and is used for decision-making, production management, product design and pricing, performance evaluation and motivation of employees. The objective of the course is to develop the skills and analytical ability of effectively and efficiently use managerial accounting information in order to help a company achieve its strategic and financial goals.
Strategic Cost Management: Read More [+]
**Rules & Requirements**

**Prerequisites:** 102B

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Strategic Cost Management: Read Less [-]

## UGBA 129 Financial Reporting for Complex Transactions 3 Units

Offered through: Business Administration
Terms offered: Spring 2014
This course develops sophisticated users of financial information. Students will enhance their ability to understand the economic essence of important complex business transactions, focusing on topics related to major financial events in the lifecycle of an organization (IPOs, mergers and acquisitions, bankruptcies, etc.) Students' ability to identify and understand the financial reporting and tax issues related to these business dealings and accounting situations will dramatically increase. Many fascinating transactions will be examined in an effort to understand the economic underpinnings of the transactions and their accounting representation in the financial statements.
Financial Reporting for Complex Transactions: Read More [+]
**Rules & Requirements**

**Prerequisites:** UGBA 120A

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

**Summer:** 8 weeks - 7.5 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Alternative to final exam.

Financial Reporting for Complex Transactions: Read Less [-]

## UGBA 131 Corporate Finance and Financial Statement Analysis 3 Units

Offered through: Business Administration
Terms offered: Spring 2018, Fall 2017, Summer 2017 Second 6 Week Session
This course will cover the principles and practice of business finance. It will focus on project evaluation, capital structure, and corporate governance. Firms' policies toward debt, equity, and dividends are explored. The incentives and conflicts facing managers and owners are also discussed.
Corporate Finance and Financial Statement Analysis: Read More [+]
**Rules & Requirements**

**Prerequisites:** 103

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of discussion per week

**Summer:** 6 weeks - 7.5 hours of lecture and 2 hours of discussion per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Formerly known as:** Business Administration 134

Corporate Finance and Financial Statement Analysis: Read Less [-]

## UGBA 132 Financial Institutions and Markets 3 Units

Offered through: Business Administration
Terms offered: Summer 2017 First 6 Week Session, Summer 2016 10 Week Session, Summer 2016 First 6 Week Session
Organization, behavior, and management of financial institutions. Markets for financial assets and the structure of yields, influence of Federal Reserve System and monetary policy on financial assets and institutions.
Financial Institutions and Markets: Read More [+]
**Rules & Requirements**

**Prerequisites:** 101A-101B, and 103

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of discussion per week

**Summer:** 6 weeks - 8 hours of lecture and 2.5 hours of discussion per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Formerly known as:** Business Administration 132

Financial Institutions and Markets: Read Less [-]

## UGBA 133 Investments 3 Units

Offered through: Business Administration
Terms offered: Fall 2017, Summer 2017 First 6 Week Session, Summer 2017 Second 6 Week Session
Sources of and demand for investment capital, operations of security markets, determination of investment policy, and procedures for analysis of securities.
Investments: Read More [+]
**Rules & Requirements**

**Prerequisites:** 103

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of discussion per week

**Summer:** 6 weeks - 7.5 hours of lecture and 2.5 hours of discussion per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Investments: Read Less [-]

## UGBA 136F Behavioral Finance 3 Units

Offered through: Business Administration
Terms offered: Summer 2017 Second 6 Week Session, Summer 2016 10 Week Session, Summer 2016 Second 6 Week Session
This course explores why markets are sometimes inefficient. We consider the role that investors' heuristics and biases play in generating mispricing in financial markets. We also explore how various trading frictions limit the ability of arbitrageurs to reduce mispricing. Finally, we look at the influence of market inefficiencies on corporate decisions.
Behavioral Finance: Read More [+]
**Rules & Requirements**

**Prerequisites:** 103

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

**Summer:** 6 weeks - 7.5 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Behavioral Finance: Read Less [-]

## UGBA 137 Special Topics in Finance 1 - 4 Units

Offered through: Business Administration
Terms offered: Spring 2018, Summer 2017 Second 6 Week Session, Spring 2017
A variety of topics in finance with emphasis on current problems and research.
Special Topics in Finance: Read More [+]
**Rules & Requirements**

**Prerequisites:** 103

**Repeat rules:** Course may be repeated for credit.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 1-4 hours of lecture per week

**Summer:** 6 weeks - 2.5-10 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Formerly known as:** Business Administration 139

Special Topics in Finance: Read Less [-]

## UGBA 141 Production and Operations Management 3 Units

Offered through: Business Administration
Terms offered: Spring 2017, Spring 2016, Spring 2015
A survey of the concepts and methodologies for management control of production and operations systems. Topics include inventory control, material requirements planning for multistage production systems, aggregate planning, scheduling, and production distribution.
Production and Operations Management: Read More [+]
**Rules & Requirements**

**Prerequisites:** 104 or equivalent, or consent of instructor

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of discussion per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Formerly known as:** Business Administration 142

Production and Operations Management: Read Less [-]

## UGBA 143 Game Theory and Business Decisions 3 Units

Offered through: Business Administration
Terms offered: Fall 2014, Fall 2013, Spring 2010
This course provides an introduction to game theory and decision analysis. Game theory is concerned with strategic interactions among players (multi-player games), and decision analysis is concerned with making choices under uncertainty (single-player games). Emphasis is placed on applications.
Game Theory and Business Decisions: Read More [+]
**Rules & Requirements**

**Prerequisites:** Mathematics 1B or 16B, Statistics 21, or equivalent

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of discussion per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Game Theory and Business Decisions: Read Less [-]

## UGBA 147 Special Topics in Operations and Information Technology Management 1 - 4 Units

Offered through: Business Administration
Terms offered: Spring 2018, Summer 2017 First 6 Week Session, Spring 2009
A variety of topics in manufacturing and information technology with emphasis on current problems and research.
Special Topics in Operations and Information Technology Management: Read More [+]
**Rules & Requirements**

**Repeat rules:** Course may be repeated for credit.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 1-4 hours of lecture per week

**Summer:** 6 weeks - 2.5-10 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Special Topics in Operations and Information Technology Management: Read Less [-]

## UGBA 151 Management of Human Resources 3 Units

Offered through: Business Administration
Terms offered: Fall 2016, Summer 2016 10 Week Session, Summer 2016 First 6 Week Session
The designs of systems of rewards, assessment, and manpower development. The interaction of selection, placement, training, personnel evaluation, and career ladders within an on-going organization. Role of the staff manager. Introduction of change. Implications of behavioral research for management problems and policies.
Management of Human Resources: Read More [+]
**Rules & Requirements**

**Prerequisites:** 105

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

**Summer:** 6 weeks - 7.5 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Formerly known as:** Business Administration 151

Management of Human Resources: Read Less [-]

## UGBA 152 Negotiation and Conflict Resolution 3 Units

Offered through: Business Administration
Terms offered: Spring 2018, Fall 2017, Summer 2017 Second 6 Week Session
The purpose of this course is to understand the theory and processes of negotiation as practiced in a variety of settings. It is designed to be relevant to the broad spectrum of negotiation problems faced by managers and professionals. By focusing on the behavior of individuals, groups, and organizations in the context of competitive situations, the course will allow students the opportunity to develop negotiation skills experientially in useful analytical frameworks (e.g.- simulations, cases).
Negotiation and Conflict Resolution: Read More [+]
**Rules & Requirements**

**Prerequisites:** 105

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

**Summer:** 6 weeks - 7.5 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Formerly known as:** Business Administration 152

Negotiation and Conflict Resolution: Read Less [-]

## UGBA 154 Power and Politics in Organizations 2 or 3 Units

Offered through: Business Administration
Terms offered: Fall 2017, Summer 2017 Second 6 Week Session, Fall 2016
This course will provide students with a sense of "political intelligence." After taking this course, students will be able to: (1) diagnose the true distribution of power in organizations, (2) identify strategies for building sources of power, (3) develop techniques for influencing others, (4) understand the role of power in building cooperation and leading change in organizations, and (5) make sense of others' attempts to influence them. These skills are essential for effective and satisfying career building.
Power and Politics in Organizations: Read More [+]
**Hours & Format**

**Fall and/or spring:** 15 weeks - 2-3 hours of lecture per week

**Summer:** 6 weeks - 7.5-10 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Power and Politics in Organizations: Read Less [-]

## UGBA 155 Leadership 3 Units

Offered through: Business Administration
Terms offered: Spring 2018, Fall 2017, Summer 2017 First 6 Week Session
The purpose of this course is for the students to develop understanding of the theory and practice of leadership in various organizational settings. It is designed to allow students the opportunity to develop leadership skills through experiential exercises, behavorial and self-assessments, case studies, class disscussions, and lectures.
Leadership: Read More [+]
**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

**Summer:** 6 weeks - 7.5 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Leadership: Read Less [-]

## UGBA 156AC Diversity in the Workplace 3 Units

Offered through: Business Administration
Terms offered: Fall 2013, Spring 2013, Fall 2011
This course introduces students to various theories on diversity in business and the importance of human capital equity and inclusion to organizations. Students will engage in community-based projects to be more conscious of the social impact of positive human relations and to foster equity, social justice, and civic responsibility. Emphasis placed on experiential learning with issues of race, ethnicity, gender, generational status, spirituality, sexual orientation, and physical and mental ability.
Diversity in the Workplace: Read More [+]
**Rules & Requirements**

**Prerequisites:** 10, 105, 151 recommended

**Requirements this course satisfies:** Satisfies the American Cultures requirement

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam not required.

Diversity in the Workplace: Read Less [-]

## UGBA 157 Special Topics in the Management of Organizations 1 - 4 Units

Offered through: Business Administration
Terms offered: Spring 2018, Spring 2017, Spring 2016
A variety of topics in organizational behavior and industrial relations with emphasis on current problems and research.
Special Topics in the Management of Organizations: Read More [+]
**Rules & Requirements**

**Prerequisites:** 105

**Repeat rules:** Course may be repeated for credit.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 1-4 hours of lecture per week

**Summer:** 6 weeks - 2.5-10 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Formerly known as:** Business Administration 159

Special Topics in the Management of Organizations: Read Less [-]

## UGBA 160 Consumer Behavior 3 Units

Offered through: Business Administration
Terms offered: Spring 2018, Summer 2017 First 6 Week Session, Spring 2017
Consumer behavior is the study of how consumers process information, form attitudes and judgments, and make decisions. Its study is critical to understand how consumers think and behave, which is critical for a company wishing to develop a customer focus. Given how different people are, it is amazing how similarly their minds work. Consumer psychology is the systematic study of how consumers perceive information, how they encode it in memory, integrate it with other sources of information, retrieve it from memory, and utilize it to make decisions. It is one of the building blocks of the study of marketing and provides the student with a set of tools with diverse applications.
Consumer Behavior: Read More [+]
**Rules & Requirements**

**Prerequisites:** 106

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

**Summer:** 6 weeks - 7.5 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Consumer Behavior: Read Less [-]

## UGBA 161 Marketing Research: Data and Analytics 3 Units

Offered through: Business Administration
Terms offered: Spring 2017, Fall 2014, Fall 2012
Marketing research objectives; qualitative research, surveys, experiments, sampling, data analysis.
Marketing Research: Data and Analytics: Read More [+]
**Rules & Requirements**

**Prerequisites:** 106

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Marketing Research: Data and Analytics: Read Less [-]

## UGBA 162 Brand Management and Strategy 3 Units

Offered through: Business Administration
Terms offered: Fall 2017, Fall 2016, Fall 2015
This course is an introduction to product management in marketing consumer and industrial goods and services. The course will cover analysis of market information, development of product strategy, programming strategy, and implementation.
Brand Management and Strategy: Read More [+]
**Rules & Requirements**

**Prerequisites:** 106

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

**Summer:** 6 weeks - 7.5 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Formerly known as:** Business Administration 162

Brand Management and Strategy: Read Less [-]

## UGBA 162A Product Branding and Branded Entertainment 2 Units

Offered through: Business Administration
Terms offered: Fall 2017, Fall 2016
As consumers demand information and products tailored specifically to their individual needs, brands strive to create alternative advertising methods to build lasting relationships and retain “top of mind” status. Smart consumers, especially those in niche markets, have dismissed traditional avenues of sponsorship and product placement. Course explores how and why brand executives across multiple industries are leveraging entertainment to connect with niche markets. It educates students about how marketers develop creative and entertaining ways to connect with multi-hyphenate customers. Course culminates in a Creative Pitch, based on a case study, and a Client Presentation where students present marketing campaigns to industry executives.
Product Branding and Branded Entertainment: Read More [+]
**Hours & Format**

**Fall and/or spring:** 15 weeks - 2 hours of lecture per week

**Summer:** 6 weeks - 5 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Product Branding and Branded Entertainment: Read Less [-]

## UGBA 165 Advertising Strategy 3 Units

Offered through: Business Administration
Terms offered: Fall 2017, Summer 2017 First 6 Week Session, Fall 2016
Basic concepts and functions of advertising in the economy; consumer motivation; problems in utilizing advertising and measuring its effectiveness.
Advertising Strategy: Read More [+]
**Rules & Requirements**

**Prerequisites:** 106

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

**Summer:** 6 weeks - 7.5 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Formerly known as:** Business Administration 165

Advertising Strategy: Read Less [-]

## UGBA 167 Special Topics in Marketing 1 - 4 Units

Offered through: Business Administration
Terms offered: Spring 2018, Fall 2017, Spring 2017
A variety of topics in marketing with emphasis on current problems and research.
Special Topics in Marketing: Read More [+]
**Rules & Requirements**

**Prerequisites:** 106

**Repeat rules:** Course may be repeated for credit.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 1-4 hours of lecture per week

**Summer:**
6 weeks - 2.5-10 hours of lecture per week
8 weeks - 4-6 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Formerly known as:** Business Administration 169

Special Topics in Marketing: Read Less [-]

## UGBA 168B International Marketing 3 Units

Offered through: Business Administration
Terms offered: Spring 2015, Spring 2014
Provides frameworks, knowledge, and sensitivities to formulate and implement marketing strategies for competing in the international arena. Regions and countries covered include the Americas, Europe, Japan, China, India, Russia, Africa, and Asia-Pacific. Issues covered include global versus local advertising, international pricing strategies, selecting and managing strategic international alliances and distribution channels, managing international brands and product lines through product life cycle, international retailing, and international marketing organization and control.
International Marketing: Read More [+]
**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Alternative to final exam.

International Marketing: Read Less [-]

## UGBA 169 Pricing 3 Units

Offered through: Business Administration
Terms offered: Summer 2017 Second 6 Week Session, Spring 2017, Spring 2016
This three-module course aims to equip students with proven concepts, techniques, and frameworks for assessing and formulating pricing strategies. The first module develops the economics and behavorial foundations of pricing. The second module discusses several innovative pricing concepts including price customization, nonlinear pricing, price matching, and product line pricing. The third module analyzes the strengths and weaknesses of several Internet-based, buyer-determined pricing models.
Pricing: Read More [+]
**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

**Summer:** 6 weeks - 7.5 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Pricing: Read Less [-]

## UGBA 170 Ethical Leadership in Business 2 Units

Offered through: Business Administration
Terms offered: Spring 2017, Spring 2016, Spring 2015
The purpose of this class is to enhance the ability of students to anticipate, critically analyze, and appropriately respond to the wide-range social and ethical issues that challenge managers as well as individuals in their roles as citizens, consumers, investors, and employees. Instruction is based on lectures and case analysis, supplemented by topical and philosophical articles and essays.
Ethical Leadership in Business: Read More [+]
**Hours & Format**

**Fall and/or spring:** 15 weeks - 2 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam not required.

Ethical Leadership in Business: Read Less [-]

## UGBA C172 History of American Business 3 Units

Offered through: Business Administration
Terms offered: Spring 2017, Spring 2016, Spring 2015
This course will examine selected aspects of the history of American business. Included will be discussions of the evolution of the large corporation, the development of modern managerial techniques, and the changing relationship of business, government, and labor.
History of American Business: Read More [+]
**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructor:** Rosen

**Also listed as:** AMERSTD C172

History of American Business: Read Less [-]

## UGBA 175 Legal Aspects of Management 3 Units

Offered through: Business Administration
Terms offered: Fall 2017, Summer 2017 Second 6 Week Session, Fall 2016
An analysis of the law and the legal process, emphasizing the nature and functions of law within the U.S. federal system, followed by a discussion of the legal problems pertaining to contracts and related topics, business association, and the impact of law on economic enterprise.
Legal Aspects of Management: Read More [+]
**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

**Summer:** 6 weeks - 7.5 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Formerly known as:** Business Administration 175

Legal Aspects of Management: Read Less [-]

## UGBA 176 Media Consulting and Public Relations 2 Units

Offered through: Business Administration
Terms offered: Fall 2017, Fall 2016
Introduces students to the conceptual issues and formidable practical challenges involved in the profession of corporate and non-profit public relations. Students build on previous coursework in oral and written business communications, brand management, governance and strategy. They learn how to work in teams to craft innovative and effective media responses to external stakeholders (e.g., customers, clients, donors, regulators, lawyers, public officials, the general public) when the organizations for which they work face the need to manage change (e.g. a new product introduction, the entrance of a new competitor) or deal with an unanticipated crisis.
Media Consulting and Public Relations: Read More [+]
**Hours & Format**

**Fall and/or spring:** 15 weeks - 2 hours of lecture per week

**Summer:** 6 weeks - 5 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Media Consulting and Public Relations: Read Less [-]

## UGBA 177 Special Topics in Business and Public Policy 1 - 4 Units

Offered through: Business Administration
Terms offered: Spring 2016, Fall 2015, Fall 2014
A variety of topics in business and public policy with emphasis on current problems and research.
Special Topics in Business and Public Policy: Read More [+]
**Rules & Requirements**

**Prerequisites:** 107

**Repeat rules:** Course may be repeated for credit.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 1-4 hours of lecture per week

**Summer:** 6 weeks - 2.5-10 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Formerly known as:** Business Administration 179

Special Topics in Business and Public Policy: Read Less [-]

## UGBA 178 Introduction to International Business 3 Units

Offered through: Business Administration
Terms offered: Spring 2018, Fall 2017, Summer 2017 Second 6 Week Session
A survey involving environmental, economic, political, and social constraints on doing business abroad; effects of overseas business investments on domestic and foreign economies; foreign market analysis and operational strategy of a firm; management problems and development potential of international operations.
Introduction to International Business: Read More [+]
**Rules & Requirements**

**Prerequisites:** Undergraduate Business Administration 101A-101B or equivalents

**Credit Restrictions:** Students will receive no credit for Undergraduate Business Administration 178 after completing Business Administration 188. A deficient grade in Business Administration 188 may be removed by taking Undergraduate Business Administration 178.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

**Summer:** 6 weeks - 7.5 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Introduction to International Business: Read Less [-]

## UGBA 179 International Consulting for Small and Medium-Sized Enterprises 3 Units

Offered through: Business Administration
Terms offered: Spring 2018, Fall 2017, Spring 2017
By exploring the intersection of global business, entrepreneurship, and consulting, this course provides an understanding of how decision-makers in small and medium sized enterprises (SMEs) can develop the frameworks necessary for making decisions about how to venture across borders in pursuit of economic opportunities in today's hypercompetitive global business environment. In addition to the technical analysis of cases, there is a strong emphasis on how to create a new service company, market and sell to potential clients, manage client relationships, and leverage financial and human resources in a service setting.
International Consulting for Small and Medium-Sized Enterprises: Read More [+]

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

**Summer:** 6 weeks - 7.5 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

International Consulting for Small and Medium-Sized Enterprises: Read Less [-]

## UGBA 180 Introduction to Real Estate and Urban Land Economics 3 Units

Offered through: Business Administration
Terms offered: Spring 2018, Spring 2017, Fall 2016
The nature of real property; market analysis; construction cycles; mortgage lending; equity investment; metropolitan growth; urban land use; real property valuation; public policies.
Introduction to Real Estate and Urban Land Economics: Read More [+]

**Rules & Requirements**

**Prerequisites:** Economics 1, Mathematics 16A or 1A, or equivalents

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

**Summer:** 6 weeks - 7.5 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Formerly known as:** Business Administration 180

Introduction to Real Estate and Urban Land Economics: Read Less [-]

## UGBA 183 Introduction to Real Estate Finance 3 Units

Offered through: Business Administration
Terms offered: Spring 2018, Spring 2016, Spring 2015
Real estate debt and equity financing; mortgage market structure; effects of credit on demand; equity investment criteria; public policies in real estate finance and urban development.
Introduction to Real Estate Finance: Read More [+]

**Rules & Requirements**

**Prerequisites:** 180

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Formerly known as:** Business Administration 183

Introduction to Real Estate Finance: Read Less [-]

## UGBA 184 Urban and Real Estate Economics 3 Units

Offered through: Business Administration
Terms offered: Spring 2016, Spring 2015, Spring 2014
This course examines how market forces influence the development of cities and the development and pricing of real estate assets. Topics include city formation; city size; land rent and land use; the operation of residential, commerical and industrial property markets; and the impacts of government policies, including the provision of public services, the imposition property taxes and fees, transportation pricing and investment, and land use regulations.
Urban and Real Estate Economics: Read More [+]

**Rules & Requirements**

**Prerequisites:** A background in microeconomics and basic calculus is preferable. Please contact the instructor if you are unsure about your preparation for this course

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Urban and Real Estate Economics: Read Less [-]

## UGBA 187 Special Topics in Real Estate Economics and Finance 1 - 4 Units

Offered through: Business Administration
Terms offered: Fall 2010, Fall 2009
A variety of topics in real estate economics and finance with emphasis on current problems and research.
Special Topics in Real Estate Economics and Finance: Read More [+]
**Rules & Requirements**

**Repeat rules:** Course may be repeated for credit as topic varies. Course may be repeated for credit when topic changes.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 1-4 hours of lecture per week

**Summer:** 6 weeks - 2.5-10 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Special Topics in Real Estate Economics and Finance: Read Less [-]

## UGBA 190S Strategy for the Information Technology Firm 3 Units

Offered through: Business Administration
Terms offered: Prior to 2007
This course is a strategy and general management course for students interested in pursuing careers in the global information technology industry. Students are taught to view the IT industry through the eyes of the general manager/CEO (whether at a start-up or an industry giant). They learn how to evaluate strategic options and their consequences, how to understand the perspectives of various industry players, and how to anticipate how they are likely to behave under various circumstances. These include the changing economics of production, the role network effects and standards have on adoption of new products and services, the tradeoffs among potential pricing strategies, and the regulatory and public policy context.
Strategy for the Information Technology Firm: Read More [+]
**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

**Summer:** 8 weeks - 6 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Strategy for the Information Technology Firm: Read Less [-]

## UGBA 190T Special Topics in Innovation and Design 1 - 4 Units

Offered through: Business Administration
Terms offered: Spring 2018, Fall 2017, Summer 2017 First 6 Week Session
Advanced study in the fields of innovation and design that will address current and emerging issues. Topics will vary with each offering and will be announced at the beginning of each term.
Special Topics in Innovation and Design: Read More [+]
**Rules & Requirements**

**Repeat rules:** Course may be repeated for credit.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 1-4 hours of lecture per week

**Summer:**
6 weeks - 2.5-10 hours of lecture per week
8 weeks - 2-7.5 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Special Topics in Innovation and Design: Read Less [-]

## UGBA 190V Corporate Strategy in Telecommunications and Media 2 Units

Offered through: Business Administration
Terms offered: Prior to 2007
This course is an intensive and in-depth study of the rapidly evolving global telecommunications and media industry viewed through the perspective of an entrepreneur/innovator (whether at a start-up or an established company) attempting to introduce a new product or service into the market. The course is fundamentally about strategy and general management, but will draw from a variety of disciplines including public policy, law, marketing, economics, finance, engineering, and physics to identify the key issues, analyze the potential options and understand the consequences of the decisions made by management.
Corporate Strategy in Telecommunications and Media: Read More [+]
**Hours & Format**

**Fall and/or spring:** 15 weeks - 2 hours of lecture per week

**Summer:** 6 weeks - 5 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Corporate Strategy in Telecommunications and Media: Read Less [-]

## UGBA 191C Communication for Leaders 2 Units

Offered through: Business Administration
Terms offered: Fall 2016, Summer 2016 10 Week Session, Summer 2016 Second 6 Week Session
This course is a workshop in the fundamentals of public speaking skills in today's business environment. Each student will give speeches, coach, and debate each other, and take part in a variety of listening and other communication exercises. The course focuses on authenticity, persuasion, and advocacy.
Communication for Leaders: Read More [+]
**Hours & Format**

**Fall and/or spring:** 15 weeks - 1 hour of lecture and 2 hours of discussion per week

**Summer:**
6 weeks - 2.5 hours of lecture and 5 hours of discussion per week
8 weeks - 1.5 hours of lecture and 3.5 hours of discussion per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam not required.

Communication for Leaders: Read Less [-]

## UGBA 191I Improvisational Leadership 3 Units

Offered through: Business Administration
Terms offered: Fall 2017, Fall 2016, Fall 2015
This class explores the broad principles of improvisation, a performing art form that has developed pedagogical methods to enhance individual spontaneity, listening and awareness, expressive skills, risk-taking, and one’s ability to make authentic social and emotional connections. The ultimate aim of the course is to help students develop an innovative and improvisational leadership mindset, sharpening in-the-moment decision making and the ability to quickly recognize and act upon opportunities when presented. In practical terms, this course strives to enhance students’ business communication skills and increase both interpersonal intuition and confidence.
Improvisational Leadership: Read More [+]
**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

**Summer:** 6 weeks - 7.5 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Improvisational Leadership: Read Less [-]

## UGBA 191L Leadership Communication 1 Unit

Offered through: Business Administration
Terms offered: Not yet offered
Leadership Communication is a workshop in the fundamentals of public speaking in today's business environment. Through prepared and impromptu speeches aimed at moving others to action, peer coaching, and lectures, students will sharpen their authentic and persuasive communication skills, develop critical listening skills, improve abilities to give, receive, and apply feedback, and gain confidence as public speakers.
Leadership Communication: Read More [+]
**Hours & Format**

**Fall and/or spring:** 2 weeks - 8 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** The grading option will be decided by the instructor when the class is offered. Alternative to final exam.

Leadership Communication: Read Less [-]

## UGBA 191P Leadership and Personal Development 3 Units

Offered through: Business Administration
Terms offered: Spring 2018, Spring 2017, Spring 2016
This course is highly interactive and challenges you to explore questions central to your own leadership journey. The ultimate aim of the class is to help you develop a lifelong leadership development practice, where continuous personal growth is valued and actively pursued.
Leadership and Personal Development: Read More [+]
**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

**Summer:** 6 weeks - 7.5 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Leadership and Personal Development: Read Less [-]

## UGBA 192A Leading Nonprofit and Social Enterprises 3 Units

Offered through: Business Administration
Terms offered: Spring 2018, Spring 2017, Spring 2016
This course prepares students conceptually and practically to found, lead, and manage organizations in the nonprofit sector. The course focuses on mission and theory of change (strategy), role of the board in governance, managing and marketing to multiple constituencies, role of advocacy in meeting mission, leadership styles and managing organizational culture, resource development (philanthropy), nonprofit financial management, managing for impact, HR management (volunteering), and cross-sector alliances.
Leading Nonprofit and Social Enterprises: Read More [+]
**Rules & Requirements**

**Prerequisites:** 101A or equivalent

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

**Summer:** 6 weeks - 7 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam not required.

**Formerly known as:** Business Administration 115

Leading Nonprofit and Social Enterprises: Read Less [-]

## UGBA 192AC Social Movements and Social Media 3 Units

Offered through: Business Administration
Terms offered: Fall 2017, Fall 2016
This course provides a survey of innovative social movements and their complex relationships to social media technologies. It will examine the evolution from pre-social-media to present-day mobilizing strategies and the interplay between explicitly policy- and advocacy-focused approaches and related efforts rooted in music, visual arts, popular culture and celebrities. The course will place into comparative relief the discourses of explicitly racially- or ethnically-defined movements and movements that mobilize based on other, sometimes overlapping categories of marginalization including class, immigration status, gender identity and occupational category.
Social Movements and Social Media: Read More [+]
**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam not required.

**Instructor:** David Harris

Social Movements and Social Media: Read Less [-]

## UGBA 192B Strategic Philanthropy 2 Units

Offered through: Business Administration
Terms offered: Spring 2018, Spring 2017
This course teaches students the concepts and practices of effective philanthropy. It offers students the experience of studying relevant theories and frameworks for assessing potential grant recipients and a real-world grant making experience in which they complete a series of nonprofit organizational assessments and then make actual grants totaling $10,000 to a limited number of organizations. Students learn about the evolution of the philanthropic sector from traditional entities, such as private, corporate and community foundations, to an array of new funding intermediaries, technology-driven philanthropies, open source platforms, “impact” investors, and venture philanthropy partnerships.
Strategic Philanthropy: Read More [+]
**Hours & Format**

**Fall and/or spring:** 15 weeks - 2 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Alternative to final exam.

Strategic Philanthropy: Read Less [-]

## UGBA 192L Applied Impact Evaluation 2 Units

Offered through: Business Administration
Terms offered: Prior to 2007
This course covers the methods and applications of impact evaluations, which is the science of measuring the causal impact of a program or policy on outcomes of interest. At its essence, impact evaluation is about generating evidence on which policies work, and which don’t. This subject matter should appeal to three main audiences: (1) those in decision-making positions, such as policy makers and business leaders, and need to consume the information generated from impact evaluations to make informed evidence-based decisions, (2) project managers, development practitioners and business managers who commission impact evaluations and (3) researchers who actually design and implement impact evaluations.
Applied Impact Evaluation: Read More [+]
**Hours & Format**

**Fall and/or spring:** 15 weeks - 2 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Alternative to final exam.

Applied Impact Evaluation: Read Less [-]

## UGBA 192N Topics in Social Sector Leadership 1 - 5 Units

Offered through: Business Administration
Terms offered: Spring 2018, Fall 2017, Spring 2017
Advanced study in the field of social sector leadership that will address current and emerging issues. Topics will vary with each offering and will be announced at the beginning of each term.
Topics in Social Sector Leadership: Read More [+]

**Rules & Requirements**

**Repeat rules:** Course may be repeated for credit as topic varies. Course may be repeated for credit when topic changes.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 1-5 hours of lecture per week

**Summer:** 6 weeks - 2.5-12.5 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Topics in Social Sector Leadership: Read Less [-]

## UGBA 192P Sustainable Business Consulting Projects 3 Units

Offered through: Business Administration
Terms offered: Fall 2016, Fall 2014, Fall 2012
Discuss the field of strategic corporate social responsibility (CSR) through a series of lectures, guest speakers, and projects. The course will examine best practices used by companies to engage in socially responsible business practices. It will provide students with a flavor of the complex dilemmas one can face in business in trying to do both "good for society" and "well for shareholders." It looks at CSR from a corporation perspective, and how this supports core business objectives, core competencies, and bottom-line profits.
Sustainable Business Consulting Projects: Read More [+]

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam not required.

Sustainable Business Consulting Projects: Read Less [-]

## UGBA 192T Topics in Corporate Social Responsibility 1 - 4 Units

Offered through: Business Administration
Terms offered: Spring 2018, Spring 2017, Summer 2016 First 6 Week Session
Advanced study in the field of corporate social responsibility that will address current and emerging issues. Topics will vary with each offering and will be announced at the beginning of each term.
Topics in Corporate Social Responsibility: Read More [+]

**Rules & Requirements**

**Repeat rules:** Course may be repeated for credit.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 1-4 hours of lecture per week

**Summer:** 6 weeks - 2.5-10 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Topics in Corporate Social Responsibility: Read Less [-]

## UGBA 193B Energy & Civilization 4 Units

Offered through: Business Administration
Terms offered: Fall 2017, Fall 2016
Energy is one of the main drivers of civilization. Today we are at the precipice of what many hope will be a major paradigm shift in energy production and use. Two transitions are needed. On the one hand, we must find ways to extend the benefits of our existing energy system to the impoverished people living in the developing world while continuing to provide these benefits to the people of the developed world. On the other hand, we must completely overhaul the existing system to fight climate change and other forms of air and water pollution. Are these shifts truly within our reach? Can we achieve both simultaneously? If so, how? This Big Ideas course will grapple with these questions using an interdisciplinary systems approach.
Energy & Civilization: Read More [+]

**Rules & Requirements**

**Credit Restrictions:** Students who take UGBA 193B will not receive credit for L&S 126.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of discussion per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Energy & Civilization: Read Less [-]

## UGBA 193C Curricular Practical Training for International Students 0.0 Units

Offered through: Business Administration
Terms offered: Summer 2014 10 Week Session, Summer 2013 10 Week Session, Summer 2012 10 Week Session
This is a zero-unit internship course for non-immigrant international students participating in internships under the Curricular Practical Training program. Requires a paper exploring how the theoretical constructs learned in UGBA courses were applied during the internship.
Curricular Practical Training for International Students: Read More [+]
**Rules & Requirements**

**Prerequisites:** International students only

**Hours & Format**

**Fall and/or spring:** 15 weeks - 0 hours of internship per week

**Summer:** 6 weeks - 0 hours of internship per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Offered for pass/not pass grade only. Final exam required.

Curricular Practical Training for International Students: Read Less [-]

## UGBA 193I Business Abroad 1 - 4 Units

Offered through: Business Administration
Terms offered: Summer 2017 Second 6 Week Session, Spring 2015
This course includes both formal learning in lectures, experiential learning, and action research through site visits abroad. Students and instructor will visit with international companies and/or organizations to learn about the business opportunities and challenges of operating in a specific country or region. Evaluation is based on student participation, presentations, and a research paper. Country and business industry focus may vary from term to term depending upon the instructor.
Business Abroad: Read More [+]
**Rules & Requirements**

**Prerequisites:** To be determined by instructor depending on topic

**Repeat rules:** Course may be repeated for credit when topic changes.

**Hours & Format**

**Summer:** 6 weeks - 3-12 hours of lecture and 3-12 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam not required.

Business Abroad: Read Less [-]

## UGBA 194 Undergraduate Colloquium on Business Topics 1 Unit

Offered through: Business Administration
Terms offered: Spring 2018, Fall 2017, Fall 2016
This is a speakers series course designed to give students insights from practitioners into complex issues facing American business leaders. Each week a guest speaker will discuss an issue related to a particular theme, ranging from corporate governance to the social responsibilities of business. Students will be challenged to synthesize, question, and extend those insights under the guidance of the instructor.
Undergraduate Colloquium on Business Topics: Read More [+]
**Rules & Requirements**

**Repeat rules:** Course may be repeated for credit when topic changes.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 1 hour of lecture per week

**Summer:** 6 weeks - 2.5 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Offered for pass/not pass grade only. Final exam required.

Undergraduate Colloquium on Business Topics: Read Less [-]

## UGBA 195A Entrepreneurship 3 Units

Offered through: Business Administration
Terms offered: Spring 2018, Spring 2017, Spring 2016
Do you have an idea for a new business, but want to learn how to more fully develop this idea? Would you like to receive funding for your business idea, but lack a framework to ask for capital? This course takes students through the new venture process using a business plan as the main deliverable. A well-written business plan sets key milestones and indicates the resources needed to achieve them, in an increasingly complex business environment. Through the planning process that tightly links market and financial planning a business plan creates a set of standards to which investors and teammates can evaluate actual performance, laying the foundation for an “operating plan” once the business is launched.
Entrepreneurship: Read More [+]
**Hours & Format**

**Fall and/or spring:** 15 weeks - 2 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam not required.

Entrepreneurship: Read Less [-]

## UGBA 195P Perspectives on Entrepreneurship 3 Units

Offered through: Business Administration
Terms offered: Fall 2017, Fall 2016, Fall 2015
This course explores and examines key issues facing entrepreneurs and their businesses. It is intended to provide a broad spectrum of topics across many business disciplines including accounting, finance, marketing, organizational behavior, production/quality, technology, etc. Students will acquire a keen understanding of both the theoretical and real world tools used by today's entrepreneurial business leaders in achieving success in today's global business environment.
Perspectives on Entrepreneurship: Read More [+]

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

**Summer:** 6 weeks - 7.5 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Alternative to final exam.

Perspectives on Entrepreneurship: Read Less [-]

## UGBA 195S Entrepreneurship To Address Global Poverty 3 Units

Offered through: Business Administration
Terms offered: Spring 2013, Spring 2012, Spring 2011
This course examines whether and how entrepreneurial ventures can meaningfully address global poverty vs. more traditional approaches such as foreign aid, private philanthropy or corporate social responsibility initiatives. Combining lectures, case studies, and interviews with social entrepreneurs, it explores poverty and entrepreneurship before focusing on their intersection in various bottom-of-pyramid markets, from health, housing, and education to energy, agriculture, and finance.
Entrepreneurship To Address Global Poverty: Read More [+]

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam not required.

Entrepreneurship To Address Global Poverty: Read Less [-]

## UGBA 195T Topics in Entrepreneurship 1 - 3 Units

Offered through: Business Administration
Terms offered: Spring 2018, Fall 2017, Spring 2017
Courses of this kind will cover issues in entrepreneurship that either appeal to a specialized interest by type of firm being started (e.g., new ventures in computer software) or in the aspect of the entrepreneurial process being considered (e.g., new venture funding). The courses typically will be designed to take advantage of the access offered by the University and the locale to knowledgeable and experienced members of the business community.
Topics in Entrepreneurship: Read More [+]

**Rules & Requirements**

**Repeat rules:** Course may be repeated for credit as topic varies. Course may be repeated for credit when topic changes.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 1-3 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Topics in Entrepreneurship: Read Less [-]

## UGBA 196 Special Topics in Business Administration 1 - 4 Units

Offered through: Business Administration
Terms offered: Fall 2017, Summer 2017 Second 6 Week Session, Spring 2017
Study in various fields of business administration. Topics will vary from year to year and will be announced at the beginning of each semester.
Special Topics in Business Administration: Read More [+]

**Rules & Requirements**

**Prerequisites:** Upper division standing

**Repeat rules:** Course may be repeated for credit when topic changes.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 1-4 hours of lecture per week

**Summer:**
6 weeks - 2.5-10 hours of lecture per week
10 weeks - 2-4 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Formerly known as:** Business Administration 196

Special Topics in Business Administration: Read Less [-]

## UGBA 198 Directed Study 1 - 4 Units

Offered through: Business Administration
Terms offered: Spring 2016, Fall 2015, Spring 2015
Organized group study on topics selected by upper division students under the sponsorship and direction of a member of the Haas School of Business faculty.
Directed Study: Read More [+]
**Rules & Requirements**

**Prerequisites:** Consent of instructor

**Credit Restrictions:** Enrollment is restricted; see the Introduction to Courses and Curricula section of this catalog.

**Repeat rules:** Course may be repeated for credit.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 1-4 hours of directed group study per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Offered for pass/not pass grade only. Final exam not required.

**Formerly known as:** Business Administration 198

Directed Study: Read Less [-]

## UGBA 199 Supervised Independent Study and Research 1 - 4 Units

Offered through: Business Administration
Terms offered: Spring 2015, Spring 2014, Fall 2013
Enrollment restrictions apply.
Supervised Independent Study and Research: Read More [+]
**Rules & Requirements**

**Prerequisites:** Consent of instructor

**Credit Restrictions:** Enrollment is restricted; see the Introduction to Courses and Curricula section of this catalog.

**Repeat rules:** Course may be repeated for credit.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 0 hours of independent study per week

**Summer:**
6 weeks - 1-4 hours of independent study per week
8 weeks - 1-4 hours of independent study per week

**Additional Details**

**Subject/Course Level:** Undergrad. Business Administration/ Undergraduate

**Grading/Final exam status:** Offered for pass/not pass grade only. Final exam not required.

**Formerly known as:** Business Administration 199

Supervised Independent Study and Research: Read Less [-]

## Computer Science

## COMPSCI C8 Foundations of Data Science 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2018, Fall 2017, Summer 2017 8 Week Session
Foundations of data science from three perspectives: inferential thinking, computational thinking, and real-world relevance. Given data arising from some real-world phenomenon, how does one analyze that data so as to understand that phenomenon? The course teaches critical concepts and skills in computer programming and statistical inference, in conjunction with hands-on analysis of real-world datasets, including economic data, document collections, geographical data, and social networks. It delves into social and legal issues surrounding data analysis, including issues of privacy and data ownership.
Foundations of Data Science: Read More [+]
**Rules & Requirements**

**Prerequisites:** This course may be taken on its own, but students are encouraged to take it concurrently with a data science connector course (numbered 88 in a range of departments)

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3-3 hours of lecture and 2-2 hours of laboratory per week

**Summer:** 8 weeks - 6 hours of lecture and 4 hours of laboratory per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Also listed as:** INFO C8/STAT C8

Foundations of Data Science: Read Less [-]

## COMPSCI C8R Introduction to Computational Thinking with Data 3 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Not yet offered
An introduction to computational thinking and quantitative reasoning, preparing students for further coursework, especially Foundations of Data Science (CS/Info/Stat C8). Emphasizes the use of computation to gain insight about quantitative problems with real data. Expressions, data types, collections, and tables in Python. Programming practices, abstraction, and iteration. Visualizing univariate and bivariate data with bar charts, histograms, plots, and maps. Introduction to statistical concepts including averages and distributions, predicting one variable from another, association and causality, probability and probabilistic simulation. Relationship between numerical functions and graphs. Sampling and introduction to inference.
Introduction to Computational Thinking with Data: Read More [+]
**Objectives Outcomes**

**Course Objectives:** C8R also includes quantitative reasoning concepts that aren't covered in Data 8. These include certain topics in: principles of data visualization; simulation of random processes; and understanding numerical functions through their graphs. This will help prepare students for computational and quantitative courses other than Data 8.
C8R takes advantage of the complementarity of computing and quantitative reasoning to enliven abstract ideas and build students' confidence in their ability to solve real problems with quantitative tools. Students learn computer science concepts and immediately apply them to plot functions, visualize data, and simulate random events.

Foundations of Data Science (CS/Info/Stat C8, a.k.a. Data 8) is an increasingly popular class for entering students at Berkeley. Data 8 builds students' computing skills in the first month of the semester, and students rely on these skills as the course progresses. For some students, particularly those with little prior exposure to computing, developing these skills benefits from further time and practice. C8R is a rapid introduction to Python programming, visualization, and data analysis, which will prepare students for success in Data 8.

**Student Learning Outcomes:** Students will be able to perform basic computations in Python, including working with tabular data.
Students will be able to understand basic probabilistic simulations.
Students will be able to understand the syntactic structure of Python code.
Students will be able to use good practices in Python programming.
Students will be able to use visualizations to understand univariate data and to identify associations or causal relationships in bivariate data.

**Rules & Requirements**

**Credit Restrictions:** Students who have taken COMPSCI/INFO/STAT C8 will receive no credit for COMPSCI/STAT C8R.

**Hours & Format**

**Summer:** 6 weeks - 4 hours of lecture, 2 hours of discussion, and 4 hours of laboratory per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructor:** Adhikari

**Also listed as:** STAT C8R

Introduction to Computational Thinking with Data: Read Less [-]

## COMPSCI 9A Matlab for Programmers 2 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2018, Fall 2017, Spring 2017
Introduction to the constructs in the Matlab programming language, aimed at students who already know how to program. Array and matrix operations, functions and function handles, control flow, plotting and image manipulation, cell arrays and structures, and the Symbolic Mathematics toolbox.
Matlab for Programmers: Read More [+]
**Rules & Requirements**

**Prerequisites:** Programming experience equivalent to that gained in Computer Science 10; familiarity with applications of matrix processing

**Repeat rules:** Course may be repeated for a maximum of 4 units.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 2 hours of self-paced per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Offered for pass/not pass grade only. Final exam required.

**Instructor:** Hilfinger

Matlab for Programmers: Read Less [-]

## COMPSCI 9C C for Programmers 2 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2018, Fall 2017, Spring 2017
Self-paced course in the C programming language for students who already know how to program. Computation, input and output, flow of control, functions, arrays, and pointers, linked structures, use of dynamic storage, and implementation of abstract data types.
C for Programmers: Read More [+]
**Rules & Requirements**

**Prerequisites:** Programming experience with pointers (or addresses in assembly language) and linked data structures equivalent to that gained in Computer Science 9B or 61A, or Engineering 7

**Hours & Format**

**Fall and/or spring:** 15 weeks - 2 hours of self-paced per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Offered for pass/not pass grade only. Final exam required.

**Instructor:** Hilfinger

C for Programmers: Read Less [-]

## COMPSCI 9D Scheme and Functional Programming for Programmers 2 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2016, Fall 2015, Spring 2015
Self-paced course in functional programming, using the Scheme programming language, for students who already know how to program. Recursion; higher-order functions; list processing; implementation of rule-based querying.
Scheme and Functional Programming for Programmers: Read More [+]
**Rules & Requirements**

**Prerequisites:** Programming experience similar to that gained in Computer Science 10 or Engineering 7

**Hours & Format**

**Fall and/or spring:** 15 weeks - 2 hours of self-paced per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Offered for pass/not pass grade only. Final exam required.

**Instructor:** Hilfinger

Scheme and Functional Programming for Programmers: Read Less [-]

## COMPSCI 9E Productive Use of the UNIX Environment 2 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2018, Fall 2017, Spring 2017
Use of UNIX utilities and scripting facilities for customizing the programming environment, organizing files (possibly in more than one computer account), implementing a personal database, reformatting text, and searching for online resources.
Productive Use of the UNIX Environment: Read More [+]
**Rules & Requirements**

**Prerequisites:** Programming experience similar to that gained in Computer Science 61A or Engineering 7; DOS or UNIX experience

**Hours & Format**

**Fall and/or spring:** 15 weeks - 2 hours of self-paced per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Offered for pass/not pass grade only. Final exam required.

**Instructor:** Hilfinger

Productive Use of the UNIX Environment: Read Less [-]

## COMPSCI 9F C++ for Programmers 2 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2018, Fall 2017, Spring 2017
Self-paced introduction to the constructs provided in the C++ programming language for procedural and object-oriented programming, aimed at students who already know how to program.
C++ for Programmers: Read More [+]

**Rules & Requirements**

**Prerequisites:** Programming experience equivalent to that gained in Computer Science 9B or 61A, or Engineering 7

**Hours & Format**

**Fall and/or spring:** 15 weeks - 2 hours of self-paced per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Offered for pass/not pass grade only. Final exam required.

**Instructor:** Hilfinger

C++ for Programmers: Read Less [-]

## COMPSCI 9G JAVA for Programmers 2 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2018, Fall 2017, Spring 2017
Self-paced course in Java for students who already know how to program. Applets; variables and computation; events and flow of control; classes and objects; inheritance; GUI elements; applications; arrays, strings, files, and linked structures; exceptions; threads.
JAVA for Programmers: Read More [+]

**Rules & Requirements**

**Prerequisites:** 9C or 9F or 61A plus experience with object-oriented programming or C-based language

**Hours & Format**

**Fall and/or spring:** 15 weeks - 2 hours of self-paced per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Offered for pass/not pass grade only. Final exam required.

**Instructor:** Garcia

JAVA for Programmers: Read Less [-]

## COMPSCI 9H Python for Programmers 2 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2018, Fall 2017, Spring 2017
Introduction to the constructs provided in the Python programming language, aimed at students who already know how to program. Flow of control; strings, tuples, lists, and dictionaries; CGI programming; file input and output; object-oriented programming; GUI elements.
Python for Programmers: Read More [+]

**Rules & Requirements**

**Prerequisites:** Programming experience equivalent to that gained in Computer Science 10

**Hours & Format**

**Fall and/or spring:** 15 weeks - 1 hour of self-paced per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Offered for pass/not pass grade only. Final exam required.

**Instructor:** Hilfinger

Python for Programmers: Read Less [-]

## COMPSCI 10 The Beauty and Joy of Computing 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2018, Fall 2017, Summer 2017 8 Week Session
An introduction to the beauty and joy of computing. The history, social implications, great principles, and future of computing. Beautiful applications that have changed the world. How computing empowers discovery and progress in other fields. Relevance of computing to the student and society will be emphasized. Students will learn the joy of programming a computer using a friendly, graphical language, and will complete a substantial team programming project related to their interests.
The Beauty and Joy of Computing: Read More [+]

**Rules & Requirements**

**Credit Restrictions:** Students will receive no credit for 10 after having taken W10, 61A, 61B, or 61C.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 2 hours of lecture, 1 hour of discussion, and 4 hours of laboratory per week

**Summer:** 8 weeks - 4 hours of lecture, 2 hours of discussion, and 8 hours of laboratory per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructors:** Garcia, Hug

The Beauty and Joy of Computing: Read Less [-]

## COMPSCI W10 The Beauty and Joy of Computing 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Fall 2012
This course meets the programming prerequisite for 61A. An introduction to the beauty and joy of computing. The history, social implications, great principles, and future of computing. Beautiful applications that have changed the world. How computing empowers discovery and progress in other fields. Relevance of computing to the student and society will be emphasized. Students will learn the joy of programming a computer using a friendly, graphical language, and will complete a substantial team programming project related to their interests.
The Beauty and Joy of Computing: Read More [+]
**Rules & Requirements**

**Credit Restrictions:** Students will receive no credit for W10 after taking 10, 61A, 61B or 61C. A deficient grade in 10 may be removed by taking W10.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 2 hours of web-based lecture and 5 hours of web-based discussion per week

**Summer:** 8 weeks - 4 hours of web-based lecture and 10 hours of web-based discussion per week

**Online:** This is an online course.

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructors:** Garcia, Hug

The Beauty and Joy of Computing: Read Less [-]

## COMPSCI 36 CS Scholars Seminar: The Educational Climate in CS & CS61A technical discussions 2 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2018
Computer Science 36 is a seminar for CS Scholars who are concurrently taking CS61A: The Structure and Interpretation of Computer Programs. CS Scholars is a cohort-model program to provide support in exploring and potentially declaring a CS major for students with little to no computational background prior to coming to the university. CS 36 provides an introduction to the CS curriculum at UC Berkeley, and the overall CS landscape in both industry and academia—through the lens of accessibility and its relevance to diversity. Additionally, CS36 provides technical instruction to review concepts in CS61A, in order to support CS Scholars' individual learning and success in the CS61A course.
CS Scholars Seminar: The Educational Climate in CS & CS61A technical discussions: Read More [+]
**Objectives Outcomes**

**Student Learning Outcomes:** Students will know where to find several support services including tutoring, advising, counseling, and career advice.
Students will perform as well as possible in the CS61A prerequisite for the CS major. They will also have customized program plans for completing the major within four years.

**Rules & Requirements**

**Prerequisites:** Prerequisite satisfied Concurrently: Participating in the CS Scholars program, and concurrently taking Computer Science 61A

**Hours & Format**

**Fall and/or spring:** 15 weeks - 2 hours of seminar per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Offered for pass/not pass grade only. Alternative to final exam.

**Instructor:** Hunn

CS Scholars Seminar: The Educational Climate in CS & CS61A technical discussions: Read Less [-]

## COMPSCI 39 Freshman/Sophomore Seminar 1.5 - 2 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Fall 2017, Spring 2017
Freshman and sophomore seminars offer lower division students the opportunity to explore an intellectual topic with a faculty member and a group of peers in a small-seminar setting. These seminars are offered in all campus departments; topics vary from department to department and from semester to semester. Enrollment limits are set by the faculty, but the suggested limit is 25.
Freshman/Sophomore Seminar: Read More [+]

**Rules & Requirements**

**Prerequisites:** Priority given to freshmen and sophomores

**Repeat rules:** Course may be repeated for credit as topic varies. Course may be repeated for credit when topic changes.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 2-3 hours of seminar per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Offered for pass/not pass grade only. Final exam not required.

Freshman/Sophomore Seminar: Read Less [-]

## COMPSCI 39J Freshman/Sophomore Seminar 1.5 - 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Fall 2010, Spring 2010, Fall 2009
Freshman and sophomore seminars offer lower division students the opportunity to explore an intellectual topic with a faculty member and a group of peers in a small-seminar setting. These seminars are offered in all campus departments; topics vary from department to department and from semester to semester. Enrollment limits are set by the faculty, but the suggested limit is 25.
Freshman/Sophomore Seminar: Read More [+]

**Rules & Requirements**

**Prerequisites:** Priority given to freshmen and sophomores

**Hours & Format**

**Fall and/or spring:** 15 weeks - 2-4 hours of seminar per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** The grading option will be decided by the instructor when the class is offered. Final exam required.

Freshman/Sophomore Seminar: Read Less [-]

## COMPSCI 39K Freshman/Sophomore Seminar 1.5 - 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2013, Spring 2011, Spring 2010
Freshman and sophomore seminars offer lower division students the opportunity to explore an intellectual topic with a faculty member and a group of peers in a small-seminar setting. These seminars are offered in all campus departments; topics vary from department to department and from semester to semester. Enrollment limits are set by the faculty, but the suggested limit is 25.
Freshman/Sophomore Seminar: Read More [+]

**Rules & Requirements**

**Prerequisites:** Priority given to freshmen and sophomores

**Hours & Format**

**Fall and/or spring:** 15 weeks - 2-4 hours of seminar per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** The grading option will be decided by the instructor when the class is offered. Final exam required.

Freshman/Sophomore Seminar: Read Less [-]

## COMPSCI 39M Freshman/Sophomore Seminar 1.5 - 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Fall 2008
Freshman and sophomore seminars offer lower division students the opportunity to explore an intellectual topic with a faculty member and a group of peers in a small-seminar setting. These seminars are offered in all campus departments; topics vary from department to department and from semester to semester. Enrollment limits are set by the faculty, but the suggested limit is 25.
Freshman/Sophomore Seminar: Read More [+]

**Rules & Requirements**

**Prerequisites:** Priority given to freshmen and sophomores

**Hours & Format**

**Fall and/or spring:** 15 weeks - 2-4 hours of seminar per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** The grading option will be decided by the instructor when the class is offered. Final exam required.

Freshman/Sophomore Seminar: Read Less [-]

## COMPSCI 39N Freshman/Sophomore Seminar 1.5 - 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Fall 2010, Fall 2009
Freshman and sophomore seminars offer lower division students the opportunity to explore an intellectual topic with a faculty member and a group of peers in a small-seminar setting. These seminars are offered in all campus departments; topics vary from department to department and from semester to semester. Enrollment limits are set by the faculty, but the suggested limit is 25.
Freshman/Sophomore Seminar: Read More [+]

**Rules & Requirements**

**Prerequisites:** Priority given to freshmen and sophomores

**Hours & Format**

**Fall and/or spring:** 15 weeks - 2-4 hours of seminar per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** The grading option will be decided by the instructor when the class is offered. Final exam required.

Freshman/Sophomore Seminar: Read Less [-]

## COMPSCI 39P Freshman/Sophomore Seminar 1.5 - 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Fall 2013, Spring 2013, Fall 2012
Freshman and sophomore seminars offer lower division students the opportunity to explore an intellectual topic with a faculty member and a group of peers in a small-seminar setting. These seminars are offered in all campus departments; topics vary from department to department and from semester to semester. Enrollment limits are set by the faculty, but the suggested limit is 25.
Freshman/Sophomore Seminar: Read More [+]

**Rules & Requirements**

**Prerequisites:** Priority given to freshmen and sophomores

**Hours & Format**

**Fall and/or spring:** 15 weeks - 2-4 hours of seminar per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** The grading option will be decided by the instructor when the class is offered. Final exam required.

Freshman/Sophomore Seminar: Read Less [-]

## COMPSCI 39Q Freshman/Sophomore Seminar 1.5 - 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Fall 2011
Freshman and sophomore seminars offer lower division students the opportunity to explore an intellectual topic with a faculty member and a group of peers in a small-seminar setting. These seminars are offered in all campus departments; topics vary from department to department and from semester to semester. Enrollment limits are set by the faculty, but the suggested limit is 25.
Freshman/Sophomore Seminar: Read More [+]

**Rules & Requirements**

**Prerequisites:** Priority given to freshmen and sophomores

**Hours & Format**

**Fall and/or spring:** 15 weeks - 2-4 hours of seminar per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** The grading option will be decided by the instructor when the class is offered. Final exam required.

Freshman/Sophomore Seminar: Read Less [-]

## COMPSCI 39R Freshman/Sophomore Seminar 1.5 - 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2016, Spring 2013
Freshman and sophomore seminars offer lower division students the opportunity to explore an intellectual topic with a faculty member and a group of peers in a small-seminar setting. These seminars are offered in all campus departments; topics vary from department to department and from semester to semester. Enrollment limits are set by the faculty, but the suggested limit is 25.
Freshman/Sophomore Seminar: Read More [+]

**Rules & Requirements**

**Prerequisites:** Priority given to freshmen and sophomores

**Hours & Format**

**Fall and/or spring:** 15 weeks - 2-4 hours of seminar per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** The grading option will be decided by the instructor when the class is offered. Final exam required.

Freshman/Sophomore Seminar: Read Less [-]

## COMPSCI 47A Completion of Work in Computer Science 61A 1 Unit

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2018, Fall 2017, Spring 2017
Implementation of generic operations. Streams and iterators. Implementation techniques for supporting functional, object-oriented, and constraint-based programming in the Scheme programming language. Together with 9D, 47A constitutes an abbreviated, self-paced version of 61A for students who have already taken a course equivalent to 61B.
Completion of Work in Computer Science 61A: Read More [+]
**Rules & Requirements**

**Prerequisites:** 61B or equivalent, 9D, and consent of instructor

**Credit Restrictions:** Students will receive no credit for 47A after taking 61A.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 0 hours of self-paced per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructor:** Garcia

Completion of Work in Computer Science 61A: Read Less [-]

## COMPSCI 47B Completion of Work in Computer Science 61B 1 Unit

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2018, Fall 2017, Spring 2017
Iterators. Hashing, applied to strings and multi-dimensional structures. Heaps. Storage management. Design and implementation of a program containing hundreds of lines of code. Students with sufficient partial credit in 61B may, with consent of instructor, complete the credit in this self-paced course.
Completion of Work in Computer Science 61B: Read More [+]
**Rules & Requirements**

**Prerequisites:** A course in data structures, 9G or equivalent, and consent of instructor

**Credit Restrictions:** Students will receive no credit for 47B after taking 61B.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 0 hours of self-paced per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructor:** Garcia

Completion of Work in Computer Science 61B: Read Less [-]

## COMPSCI 47C Completion of Work in Computer Science 61C 1 Unit

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2018, Fall 2017, Spring 2017
MIPS instruction set simulation. The assembly and linking process. Caches and virtual memory. Pipelined computer organization. Students with sufficient partial credit in 61C may, with consent of instructor, complete the credit in this self-paced course.
Completion of Work in Computer Science 61C: Read More [+]
**Rules & Requirements**

**Prerequisites:** Experience with assembly language including writing an interrupt handler, 9C or equivalent, and consent of instructor

**Credit Restrictions:** Students will receive no credit for 47C after taking 61C.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 0 hours of self-paced per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructor:** Garcia

Completion of Work in Computer Science 61C: Read Less [-]

## COMPSCI 61A The Structure and Interpretation of Computer Programs 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2018, Fall 2017, Summer 2017 8 Week Session
An introduction to programming and computer science focused on abstraction techniques as means to manage program complexity. Techniques include procedural abstraction; control abstraction using recursion, higher-order functions, generators, and streams; data abstraction using interfaces, objects, classes, and generic operators; and language abstraction using interpreters and macros. The course exposes students to programming paradigms, including functional, object-oriented, and declarative approaches. It includes an introduction to asymptotic analysis of algorithms. There are several significant programming projects.
The Structure and Interpretation of Computer Programs: Read More [+]
**Rules & Requirements**

**Prerequisites:** Mathematics 1A (may be taken concurrently); programming experience equivalent to that gained in 3 or the Advanced Placement Computer Science A course

**Credit Restrictions:** Students will receive no credit for Computer Science 61A after completing Computer Science 47A or Computer Science 61AS. A deficient grade in Computer Science 61AS may be removed by taking Computer Science 61A.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture, 1.5 hours of discussion, and 1.5 hours of laboratory per week

**Summer:** 8 weeks - 6 hours of lecture, 3 hours of discussion, and 3 hours of laboratory per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructors:** Garcia, Hilfinger

The Structure and Interpretation of Computer Programs: Read Less [-]

## COMPSCI 61AS The Structure and Interpretation of Computer Programs (Self-Paced) 1 - 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2016, Fall 2015, Summer 2015 8 Week Session
Introductory programming and computer science. Abstraction as means to control program complexity. Programming paradigms: functional, object-oriented, client/server, and declarative (logic). Control abstraction: recursion and higher order functions. Introduction to asymptotic analysis of algorithms. Data abstraction: abstract data types, type-tagged data, first class data types, sequences implemented as lists and as arrays, generic operators implemented with data-directed programming and with message passing. Implementation of object-oriented programming with closures over dispatch procedures. Introduction to interpreters and compilers. There are several significant programming projects. Course may be completed in one or two semesters. Students must complete a mimimum of two units during their first semester of 61AS.
The Structure and Interpretation of Computer Programs (Self-Paced): Read More [+]
**Rules & Requirements**

**Prerequisites:** Mathematics 1A (may be taken concurrently). Programming experience equivalent to that gained in 10 or the Advanced Placement Computer Science A course is recommended, but is not essential; students without this experience will begin at an earlier point in the online course

**Credit Restrictions:** Students will receive no credit for Computer Science 61AS after completing Computer Science 47A or Computer Science 61A. A deficient grade in Computer Science 61A may be removed by taking Computer Science 61AS.

**Repeat rules:** Course may be repeated for a maximum of 4 units.Course may be repeated for a maximum of 4 units.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 6 hours of laboratory per week

**Summer:**
6 weeks - 15 hours of laboratory per week
8 weeks - 11 hours of laboratory per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructors:** Garcia, Harvey, Hilfinger

The Structure and Interpretation of Computer Programs (Self-Paced): Read Less [-]

## COMPSCI 61B Data Structures 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2018, Fall 2017, Spring 2017
Fundamental dynamic data structures, including linear lists, queues, trees, and other linked structures; arrays strings, and hash tables. Storage management. Elementary principles of software engineering. Abstract data types. Algorithms for sorting and searching. Introduction to the Java programming language.
Data Structures: Read More [+]
**Rules & Requirements**

**Prerequisites:** Computer ScienceI 61A or Computer Science 88 or Engineering 7

**Credit Restrictions:** Students will receive no credit for Computer Science 61B after completing Computer Science47B or 61BL. A deficiency in Computer Science 61BL may be removed by taking Computer Science 61B.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture, 1 hour of discussion, and 2 hours of laboratory per week

**Summer:** 8 weeks - 6 hours of lecture, 2 hours of discussion, and 4 hours of laboratory per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructors:** Hilfinger, Shewchuk

Data Structures: Read Less [-]

## COMPSCI 61BL Data Structures and Programming Methodology 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Summer 2017 8 Week Session, Summer 2016 10 Week Session, Summer 2016 8 Week Session
The same material as in 61B, but in a laboratory-based format.
Data Structures and Programming Methodology: Read More [+]
**Rules & Requirements**

**Prerequisites:** COMPSCI 61A or COMPSCI 88 or ENGIN 7

**Credit Restrictions:** Students will receive no credit for 61BL after taking 47B or 61B. Deficiency in 61B may be removed by taking 61BL.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 1 hour of lecture and 6 hours of laboratory per week

**Summer:** 8 weeks - 2 hours of lecture and 12 hours of laboratory per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructor:** Hilfinger

Data Structures and Programming Methodology: Read Less [-]

## COMPSCI 61C Great Ideas of Computer Architecture (Machine Structures) 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2018, Fall 2017, Summer 2017 8 Week Session
The internal organization and operation of digital computers. Machine architecture, support for high-level languages (logic, arithmetic, instruction sequencing) and operating systems (I/O, interrupts, memory management, process switching). Elements of computer logic design. Tradeoffs involved in fundamental architectural design decisions.
Great Ideas of Computer Architecture (Machine Structures): Read More [+]

**Rules & Requirements**

**Prerequisites:** 61A, along with either 61B or 61BL, or programming experience equivalent to that gained in 9C, 9F, or 9G

**Credit Restrictions:** Students will receive no credit for 61C after taking 47C or 61CL. Deficiency in 61C may be removed by taking 61CL.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture, 1 hour of discussion, and 2 hours of laboratory per week

**Summer:** 8 weeks - 6 hours of lecture, 2 hours of discussion, and 4 hours of laboratory per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructors:** Garcia, Katz, Stojanovic

Great Ideas of Computer Architecture (Machine Structures): Read Less [-]

## COMPSCI 61CL Machine Structures (Lab-Centric) 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Fall 2009, Spring 2009, Fall 2008
The same material as in 61C but in a lab-centric format.
Machine Structures (Lab-Centric): Read More [+]

**Rules & Requirements**

**Prerequisites:** 61A, along with 61B or 61BL, or programming experience equivalent to that gained in 9C, 9F, or 9G

**Credit Restrictions:** Students will receive no credit for 61CL after taking 47C or 61C. Deficiency in 61C may be removed by taking 61CL.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 2 hours of lecture, 1 hour of discussion, and 4 hours of laboratory per week

**Summer:** 8 weeks - 4 hours of lecture, 2 hours of discussion, and 8 hours of laboratory per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructors:** Garcia, Patterson

Machine Structures (Lab-Centric): Read Less [-]

## COMPSCI W61A The Structure and Interpretation of Computer Programs (Online) 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Not yet offered
An introduction to programming and computer science focused on abstraction techniques as means to manage program complexity. Techniques include procedural abstraction; control abstraction using recursion, higher-order functions, generators, and streams; data abstraction using interfaces, objects, classes, and generic operators; and language abstraction using interpreters and macros. The course exposes students to programming paradigms, including functional, object-oriented, and declarative approaches. It includes an introduction to asymptotic analysis of algorithms. There are several significant programming projects.
The Structure and Interpretation of Computer Programs (Online): Read More [+]
**Rules & Requirements**

**Prerequisites:** Mathematics 1A (may be taken concurrently)

**Credit Restrictions:** Students will receive no credit for Computer Science W61A after completing Computer Science 47A or Computer Science 61A. A deficient grade in Computer Science W61A may be removed by taking Computer Science 61A.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of web-based lecture, 1.5 hours of laboratory, and 1.5 hours of web-based discussion per week

**Online:** This is an online course.

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructor:** Denero

The Structure and Interpretation of Computer Programs (Online): Read Less [-]

## COMPSCI 70 Discrete Mathematics and Probability Theory 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2018, Fall 2017, Summer 2017 8 Week Session
Logic, infinity, and induction; applications include undecidability and stable marriage problem. Modular arithmetic and GCDs; applications include primality testing and cryptography. Polynomials; examples include error correcting codes and interpolation. Probability including sample spaces, independence, random variables, law of large numbers; examples include load balancing, existence arguments, Bayesian inference.
Discrete Mathematics and Probability Theory: Read More [+]
**Rules & Requirements**

**Prerequisites:** Sophomore mathematical maturity, and programming experience equivalent to that gained in 3 or the Advanced Placement Computer Science A course

**Credit Restrictions:** Students will receive no credit for 70 after taking Mathematics 55.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 2 hours of discussion per week

**Summer:** 8 weeks - 6 hours of lecture and 4 hours of discussion per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructors:** Rao, Vazirani, Wagner, Sahai

Discrete Mathematics and Probability Theory: Read Less [-]

## COMPSCI C79 Societal Risks and the Law 3 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2013
Defining, perceiving, quantifying and measuring risk; identifying risks and estimating their importance; determining whether laws and regulations can protect us from these risks; examining how well existing laws work and how they could be improved; evaluting costs and benefits. Applications may vary by term. This course cannot be used to complete engineering unit or technical elective requirements for students in the College of Engineering.
Societal Risks and the Law: Read More [+]
**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of discussion per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam not required.

**Also listed as:** POL SCI C79/STAT C79

Societal Risks and the Law: Read Less [-]

## COMPSCI 88 Computational Structures in Data Science 2 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2018, Fall 2016, Spring 2016
Development of Computer Science topics appearing in Foundations of Data Science (C8); expands computational concepts and techniques of abstraction. Understanding the structures that underlie the programs, algorithms, and languages used in data science and elsewhere. Mastery of a particular programming language while studying general techniques for managing program complexity, e.g., functional, object-oriented, and declarative programming. Provides practical experience with composing larger systems through several significant programming projects.
Computational Structures in Data Science: Read More [+]
**Objectives Outcomes**

**Course Objectives:** Develop a foundation of computer science concepts that arise in the context of data analytics, including algorithm, representation, interpretation, abstraction, sequencing, conditional, function, iteration, recursion, types, objects, and testing, and develop proficiency in the application of these concepts in the context of a modern programming language at a scale of whole programs on par with a traditional CS introduction course.

**Student Learning Outcomes:** Students will be able to demonstrate a working knowledge of these concepts and a proficiency of programming based upon them sufficient to construct substantial stand-alone programs.

**Rules & Requirements**

**Prerequisites:** Math 1A. Also, this course is a Data Science connector course and may only be taken concurrently with or after COMPSCI C8/ INFO C8/STAT C8. Students may take more than one Data Science connector (88) course if they wish, concurrent with or after having taken the C8 course

**Credit Restrictions:** Students may receive no credit for Computer Science 88 after completing Computer Science 61A.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 1 hour of lecture and 2 hours of laboratory per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Computational Structures in Data Science: Read Less [-]

## COMPSCI 94 Special Topics 1 - 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Fall 2015
Topics will vary semester to semester. See the Computer Science Division announcements.
Special Topics: Read More [+]
**Rules & Requirements**

**Prerequisites:** Consent of instructor

**Repeat rules:** Course may be repeated for credit when topic changes.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 1-4 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Special Topics: Read Less [-]

## COMPSCI 97 Field Study 1 - 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Fall 2015, Spring 2015, Fall 2014
Students take part in organized individual field sponsored programs with off-campus companies or tutoring/mentoring relevant to specific aspects and applications of computer science on or off campus. Note Summer CPT or OPT students: written report required. Course does not count toward major requirements, but will be counted in the cumulative units toward graduation.
Field Study: Read More [+]
**Rules & Requirements**

**Prerequisites:** Consent of instructor (see department adviser)

**Repeat rules:** Course may be repeated for credit.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 1-4 hours of fieldwork per week

**Summer:**
6 weeks - 2.5-10 hours of fieldwork per week
8 weeks - 2-7.5 hours of fieldwork per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Offered for pass/not pass grade only. Final exam not required.

Field Study: Read Less [-]

## COMPSCI 98 Directed Group Study 1 - 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Fall 2016, Fall 2015, Spring 2015
Seminars for group study of selected topics, which will vary from year to year. Intended for students in the lower division.
Directed Group Study: Read More [+]

**Rules & Requirements**

**Prerequisites:** Consent of instructor

**Repeat rules:** Course may be repeated for credit.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 1-4 hours of directed group study per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Offered for pass/not pass grade only. Final exam not required.

Directed Group Study: Read Less [-]

## COMPSCI 99 Individual Study and Research for Undergraduates 1 - 2 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Fall 2015, Fall 2014, Spring 2014
A course for lower division students in good standing who wish to undertake a program of individual inquiry initiated jointly by the student and a professor. There are no other formal prerequisites, but the supervising professor must be convinced that the student is able to profit by the program.
Individual Study and Research for Undergraduates: Read More [+]

**Rules & Requirements**

**Prerequisites:** GPA of 3.4 or better

**Repeat rules:** Course may be repeated for credit.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 0 hours of independent study per week

**Summer:**
6 weeks - 1-5 hours of independent study per week
8 weeks - 1-4 hours of independent study per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Offered for pass/not pass grade only. Final exam not required.

Individual Study and Research for Undergraduates: Read Less [-]

## COMPSCI C100 Principles & Techniques of Data Science 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2018, Fall 2017, Spring 2017
In this course, students will explore the data science lifecycle, including question formulation, data collection and cleaning, exploratory data analysis and visualization, statistical inference and prediction, and decision-making. This class will focus on quantitative critical thinking and key principles and techniques needed to carry out this cycle. These include languages for transforming, querying and analyzing data; algorithms for machine learning methods including regression, classification and clustering; principles behind creating informative data visualizations; statistical concepts of measurement error and prediction; and techniques for scalable data processing.
Principles & Techniques of Data Science: Read More [+]

**Rules & Requirements**

**Prerequisites:** Computer Science/Information/Statistics C8 or Engineering 7; and either Computer Science 61A or Computer Science 88. Corequisite: Mathematics 54 or Electrical Engineering 16A

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture, 1 hour of discussion, and 1 hour of laboratory per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Also listed as:** STAT C100

Principles & Techniques of Data Science: Read Less [-]

## COMPSCI 146L Programmable Digital Systems Laboratory 2 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2015
Hardware description languages for digital system design and interactions with tool flows. Design, implementation, and verification of digital designs. Digital synthesis, partitioning, placement, routing, and simulation for Field-Programmable Gate Arrays. Large digital-system design concepts. Project design component – example, a full processor implementation with peripherals.
Programmable Digital Systems Laboratory: Read More [+]
**Objectives Outcomes**

**Student Learning Outcomes:** This course is a one-time offering to supplement the EE141 course offered in the Fall 2014, with a lab and project section that cover the design of larger digital systems on a programmable chip platform (FPGA). The EE141 lectures in the Fall 2014 already covered the necessary lecture material, so students who took the EE141 lab in the Fall of 2014 will have a chance to expand their skills into the area of FPGA Digital System Design. Hence the pre-requisite for this course is that a student has taken the EE141 course in the Fall 2014.

**Rules & Requirements**

**Prerequisites:** Computer Science 61C, Electrical Engineering 105 recommended and Electrical Engineering 141 (taken Fall 2014) - mandatory

**Credit Restrictions:** Students will receive no credit for Computer Science 146L after taking Fall 2014 version of Computer Science 150.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of laboratory and 1 hour of discussion per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Offered for pass/not pass grade only. Final exam not required.

**Instructor:** Stojanovic

Programmable Digital Systems Laboratory: Read Less [-]

## COMPSCI 152 Computer Architecture and Engineering 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2018, Fall 2016, Spring 2016
Instruction set architecture, microcoding, pipelining (simple and complex). Memory hierarchies and virtual memory. Processor parallelism: VLIW, vectors, multithreading. Multiprocessors.
Computer Architecture and Engineering: Read More [+]
**Rules & Requirements**

**Prerequisites:** 61C

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 2 hours of discussion per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Letter grade. Alternative to final exam.

**Instructors:** Asanovic, Culler, Kubiatowicz, Wawrzynek

Computer Architecture and Engineering: Read Less [-]

## COMPSCI 160 User Interface Design and Development 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2018, Fall 2017, Summer 2017 8 Week Session
The design, implementation, and evaluation of user interfaces. User-centered design and task analysis. Conceptual models and interface metaphors. Usability inspection and evaluation methods. Analysis of user study data. Input methods (keyboard, pointing, touch, tangible) and input models. Visual design principles. Interface prototyping and implementation methodologies and tools. Students will develop a user interface for a specific task and target user group in teams.
User Interface Design and Development: Read More [+]
**Rules & Requirements**

**Prerequisites:** Computer Science 61B or 61BL

**Credit Restrictions:** Students will receive no credit for Computer Science 160 after taking Computer Science 260A.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of discussion per week

**Summer:** 8 weeks - 6 hours of lecture and 2 hours of discussion per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructors:** Agrawala, Canny, Hartmann, Paulos

User Interface Design and Development: Read Less [-]

## COMPSCI 161 Computer Security 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2018, Fall 2017, Spring 2017
Introduction to computer security. Cryptography, including encryption, authentication, hash functions, cryptographic protocols, and applications. Operating system security, access control. Network security, firewalls, viruses, and worms. Software security, defensive programming, and language-based security. Case studies from real-world systems.
Computer Security: Read More [+]
**Rules & Requirements**

**Prerequisites:** 61C (Machine Structures), plus either 70 (Discrete Mathematics) or Mathematics 55

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of discussion per week

**Summer:** 8 weeks - 6 hours of lecture and 2 hours of discussion per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructors:** Paxson, Song, Tygar, Wagner

Computer Security: Read Less [-]

## COMPSCI 162 Operating Systems and System Programming 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2018, Fall 2017, Spring 2017
Basic concepts of operating systems and system programming. Utility programs, subsystems, multiple-program systems. Processes, interprocess communication, and synchronization. Memory allocation, segmentation, paging. Loading and linking, libraries. Resource allocation, scheduling, performance evaluation. File systems, storage devices, I/O systems. Protection, security, and privacy.
Operating Systems and System Programming: Read More [+]
**Rules & Requirements**

**Prerequisites:** Computer Science 61B, 61C, and 70

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of discussion per week

**Summer:** 8 weeks - 6 hours of lecture and 2 hours of discussion per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructors:** Joseph, Kubiatowicz, Stoica

Operating Systems and System Programming: Read Less [-]

## COMPSCI 164 Programming Languages and Compilers 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2018, Fall 2017, Spring 2017
Survey of programming languages. The design of modern programming languages. Principles and techniques of scanning, parsing, semantic analysis, and code generation. Implementation of compilers, interpreters, and assemblers. Overview of run-time organization and error handling.
Programming Languages and Compilers: Read More [+]
**Rules & Requirements**

**Prerequisites:** 61B and 61C

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of discussion per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructors:** Bodik, Hilfinger, Necula

Programming Languages and Compilers: Read Less [-]

## COMPSCI 168 Introduction to the Internet: Architecture and Protocols 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Fall 2017, Fall 2016, Fall 2015
This course is an introduction to the Internet architecture. We will focus on the concepts and fundamental design principles that have contributed to the Internet's scalability and robustness and survey the various protocols and algorithms used within this architecture. Topics include layering, addressing, intradomain routing, interdomain routing, reliable delivery, congestion control, and the core protocols (e.g., TCP, UDP, IP, DNS, and HTTP) and network technologies (e.g., Ethernet, wireless).
Introduction to the Internet: Architecture and Protocols: Read More [+]
**Rules & Requirements**

**Prerequisites:** Computer Science 61B and 162

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of discussion per week

**Summer:** 8 weeks - 6 hours of lecture and 2 hours of discussion per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructors:** Katz, Paxson, Ratnasamy, Shenker, Stoica

Introduction to the Internet: Architecture and Protocols: Read Less [-]

## COMPSCI 169 Software Engineering 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Fall 2017, Summer 2017 8 Week Session, Fall 2016
Ideas and techniques for designing, developing, and modifying large software systems. Function-oriented and object-oriented modular design techniques, designing for re-use and maintainability. Specification and documentation. Verification and validation. Cost and quality metrics and estimation. Project team organization and management. Students will work in teams on a substantial programming project.
Software Engineering: Read More [+]

**Rules & Requirements**

**Prerequisites:** Computer Science 61B and 61C, and either Computer Science 70 or Mathematics 113

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of discussion per week

**Summer:** 8 weeks - 6 hours of lecture and 2 hours of discussion per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructors:** Brewer, Fox, Necula, Sen

Software Engineering: Read Less [-]

## COMPSCI 170 Efficient Algorithms and Intractable Problems 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2018, Fall 2017, Spring 2017
Concept and basic techniques in the design and analysis of algorithms; models of computation; lower bounds; algorithms for optimum search trees, balanced trees and UNION-FIND algorithms; numerical and algebraic algorithms; combinatorial algorithms. Turing machines, how to count steps, deterministic and nondeterministic Turing machines, NP-completeness. Unsolvable and intractable problems.
Efficient Algorithms and Intractable Problems: Read More [+]

**Rules & Requirements**

**Prerequisites:** Computer Science 61B and 70

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of discussion per week

**Summer:** 8 weeks - 6 hours of lecture and 2 hours of discussion per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructors:** Demmel, Papadimitriou, Rao, Wagner, Vazirani

Efficient Algorithms and Intractable Problems: Read Less [-]

## COMPSCI 172 Computability and Complexity 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2016, Fall 2015, Spring 2015
Finite automata, Turing machines and RAMs. Undecidable, exponential, and polynomial-time problems. Polynomial-time equivalence of all reasonable models of computation. Nondeterministic Turing machines. Theory of NP-completeness: Cook's theorem, NP-completeness of basic problems. Selected topics in language theory, complexity and randomness.
Computability and Complexity: Read More [+]

**Rules & Requirements**

**Prerequisites:** 170

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of discussion per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructors:** Papadimitriou, Seshia, Sinclair, Vazirani

Computability and Complexity: Read Less [-]

## COMPSCI 174 Combinatorics and Discrete Probability 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2018, Spring 2017, Spring 2016
Permutations, combinations, principle of inclusion and exclusion, generating functions, Ramsey theory. Expectation and variance, Chebychev's inequality, Chernov bounds. Birthday paradox, coupon collector's problem, Markov chains and entropy computations, universal hashing, random number generation, random graphs and probabilistic existence bounds.
Combinatorics and Discrete Probability: Read More [+]

**Rules & Requirements**

**Prerequisites:** 170

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of discussion per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructors:** Bartlett, Papadimitriou, Sinclair, Vazirani

Combinatorics and Discrete Probability: Read Less [-]

## COMPSCI 176 Algorithms for Computational Biology 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Fall 2017, Fall 2016, Fall 2015
Algorithms and probabilistic models that arise in various computational biology applications: suffix trees, suffix arrays, pattern matching, repeat finding, sequence alignment, phylogenetics, genome rearrangements, hidden Markov models, gene finding, motif finding, stochastic context free grammars, RNA secondary structure. There are no biology prerequisites for this course, but a strong quantitative background will be essential.
Algorithms for Computational Biology: Read More [+]

**Rules & Requirements**

**Prerequisites:** Computer Science 70 and 170. Experience programming in a language such as C, C++, Java, or Python

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of discussion per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructor:** Song

Algorithms for Computational Biology: Read Less [-]

## COMPSCI 184 Foundations of Computer Graphics 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2018, Spring 2017, Fall 2016
Techniques of modeling objects for the purpose of computer rendering: boundary representations, constructive solids geometry, hierarchical scene descriptions. Mathematical techniques for curve and surface representation. Basic elements of a computer graphics rendering pipeline; architecture of modern graphics display devices. Geometrical transformations such as rotation, scaling, translation, and their matrix representations. Homogeneous coordinates, projective and perspective transformations. Algorithms for clipping, hidden surface removal, rasterization, and anti-aliasing. Scan-line based and ray-based rendering algorithms. Lighting models for reflection, refraction, transparency.
Foundations of Computer Graphics: Read More [+]

**Rules & Requirements**

**Prerequisites:** Computer Science 61B or 61BL; programming skills in C, C++, or Java; linear algebra and calculus

**Credit Restrictions:** Students will receive no credit for Comp Sci 184 after taking Comp Sci 284A.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of discussion per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructors:** O'Brien, Sequin, Barsky, Ramamoorthi, Agrawala

Foundations of Computer Graphics: Read Less [-]

## COMPSCI 186 Introduction to Database Systems 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2018, Fall 2017, Spring 2017
Access methods and file systems to facilitate data access. Hierarchical, network, relational, and object-oriented data models. Query languages for models. Embedding query languages in programming languages. Database services including protection, integrity control, and alternative views of data. High-level interfaces including application generators, browsers, and report writers. Introduction to transaction processing. Database system implementation to be done as term project.
Introduction to Database Systems: Read More [+]
**Rules & Requirements**

**Prerequisites:** 61B and 61C

**Credit Restrictions:** Students will receive no credit for Comp Sci 186 after taking Comp Sci 286A.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of discussion per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructors:** Franklin, Hellerstein

Introduction to Database Systems: Read Less [-]

## COMPSCI 188 Introduction to Artificial Intelligence 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2018, Fall 2017, Spring 2017
Ideas and techniques underlying the design of intelligent computer systems. Topics include search, game playing, knowledge representation, inference, planning, reasoning under uncertainty, machine learning, robotics, perception, and language understanding.
Introduction to Artificial Intelligence: Read More [+]
**Rules & Requirements**

**Prerequisites:** Computer Science 61A; Computer Science 61B; Computer Science 70

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of discussion per week

**Summer:** 8 weeks - 6 hours of lecture and 2 hours of discussion per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructors:** Abbeel, Klein, Russell

Introduction to Artificial Intelligence: Read Less [-]

## COMPSCI 189 Introduction to Machine Learning 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2018, Fall 2017, Spring 2017
Theoretical foundations, algorithms, methodologies, and applications for machine learning. Topics may include supervised methods for regression and classication (linear models, trees, neural networks, ensemble methods, instance-based methods); generative and discriminative probabilistic models; Bayesian parametric learning; density estimation and clustering; Bayesian networks; time series models; dimensionality reduction; programming projects covering a variety of real-world applications.
Introduction to Machine Learning: Read More [+]
**Rules & Requirements**

**Prerequisites:** Mathematics 53 and 54; Computer Science 70 or consent of instructor

**Credit Restrictions:** Students will receive no credit for Comp Sci 189 after taking Comp Sci 289A.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of discussion per week

**Summer:** 8 weeks - 6 hours of lecture and 2 hours of discussion per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructors:** Abbeel, Bartlett, Darrell, El Ghaoui, Jordan, Klein, Malik, Russell

Introduction to Machine Learning: Read Less [-]

## COMPSCI C191 Quantum Information Science and Technology 3 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2017, Fall 2014, Spring 2012
This multidisciplinary course provides an introduction to fundamental conceptual aspects of quantum mechanics from a computational and informational theoretic perspective, as well as physical implementations and technological applications of quantum information science. Basic sections of quantum algorithms, complexity, and cryptography, will be touched upon, as well as pertinent physical realizations from nanoscale science and engineering.
Quantum Information Science and Technology: Read More [+]
**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructors:** Crommie, Vazirani, Whaley

**Also listed as:** CHEM C191/PHYSICS C191

Quantum Information Science and Technology: Read Less [-]

## COMPSCI 194 Special Topics 1 - 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2018, Fall 2017, Spring 2017
Topics will vary semester to semester. See the Computer Science Division announcements.
Special Topics: Read More [+]
**Rules & Requirements**

**Prerequisites:** Consent of instructor

**Repeat rules:** Course may be repeated for credit as topic varies. Course may be repeated for credit when topic changes.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 1-4 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Special Topics: Read Less [-]

## COMPSCI 195 Social Implications of Computer Technology 1 Unit

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2018, Fall 2017, Spring 2017
Topics include electronic community; the changing nature of work; technological risks; the information economy; intellectual property; privacy; artificial intelligence and the sense of self; pornography and censorship; professional ethics. Students will lead discussions on additional topics.
Social Implications of Computer Technology: Read More [+]
**Rules & Requirements**

**Credit Restrictions:** Students will receive no credit for 195 after taking C195/Interdisciplinary Field Study C155 or H195.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 1.5 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Offered for pass/not pass grade only. Final exam not required.

**Instructor:** Harvey

Social Implications of Computer Technology: Read Less [-]

## COMPSCI H195 Honors Social Implications of Computer Technology 3 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2014, Fall 2013, Spring 2013
Topics include electronic community; the changing nature of work; technological risks; the information economy; intellectual property; privacy; artificial intelligence and the sense of self; pornography and censorship; professional ethics. Students may lead discussions on additional topics.
Honors Social Implications of Computer Technology: Read More [+]
**Rules & Requirements**

**Credit Restrictions:** Student will receive no credit for H195 after taking 195 or C195.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 1.5 hours of lecture and 1.5 hours of discussion per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Offered for pass/not pass grade only. Final exam not required.

**Instructor:** Harvey

Honors Social Implications of Computer Technology: Read Less [-]

## COMPSCI H196A Senior Honors Thesis Research 1 - 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Fall 2016, Fall 2010, Spring 2010
Thesis work under the supervision of a faculty member. To obtain credit the student must, at the end of two semesters, submit a satisfactory thesis to the Electrical Engineering and Computer Science department archive. A total of four units must be taken. The units many be distributed between one or two semesters in any way. H196A-H196B count as graded technical elective units, but may not be used to satisfy the requirement for 27 upper division technical units in the College of Letters and Science with a major in Computer Science.
Senior Honors Thesis Research: Read More [+]
**Rules & Requirements**

**Prerequisites:** Open only to students in the computer science honors program

**Hours & Format**

**Fall and/or spring:** 15 weeks - 1-4 hours of independent study per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Senior Honors Thesis Research: Read Less [-]

## COMPSCI H196B Senior Honors Thesis Research 1 - 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2010, Spring 2009, Fall 2008
Thesis work under the supervision of a faculty member. To obtain credit the student must, at the end of two semesters, submit a satisfactory thesis to the Electrical Engineering and Computer Science department archive. A total of four units must be taken. The units many be distributed between one or two semesters in any way. H196A-H196B count as graded technical elective units, but may not be used to satisfy the requirement for 27 upper division technical units in the College of Letters and Science with a major in Computer Science.
Senior Honors Thesis Research: Read More [+]
**Rules & Requirements**

**Prerequisites:** Open only to students in the computer science honors program

**Hours & Format**

**Fall and/or spring:** 15 weeks - 1-4 hours of independent study per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Senior Honors Thesis Research: Read Less [-]

## COMPSCI 197 Field Study 1 - 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Fall 2016, Summer 2016 10 Week Session, Fall 2015
Students take part in organized individual field sponsored programs with off-campus companies or tutoring/mentoring relevant to specific aspects and applications of computer science on or off campus. Note Summer CPT or OPT students: written report required. Course does not count toward major requirements, but will be counted in the cumulative units toward graduation.
Field Study: Read More [+]
**Rules & Requirements**

**Prerequisites:** Consent of instructor (see department adviser)

**Repeat rules:** Course may be repeated for credit.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 1-4 hours of fieldwork per week

**Summer:**
6 weeks - 2.5-10 hours of fieldwork per week
8 weeks - 2-7.5 hours of fieldwork per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Offered for pass/not pass grade only. Final exam not required.

Field Study: Read Less [-]

## COMPSCI 198 Directed Group Studies for Advanced Undergraduates 1 - 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2018, Fall 2017, Spring 2017
Group study of selected topics in Computer Sciences, usually relating to new developments.
Directed Group Studies for Advanced Undergraduates: Read More [+]
**Rules & Requirements**

**Prerequisites:** 2.0 GPA or better; 60 units completed

**Repeat rules:** Course may be repeated for credit.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 1-4 hours of directed group study per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Offered for pass/not pass grade only. Final exam not required.

Directed Group Studies for Advanced Undergraduates: Read Less [-]

## COMPSCI 199 Supervised Independent Study 1 - 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Fall 2016, Fall 2015, Spring 2015
Supervised independent study. Enrollment restrictions apply.
Supervised Independent Study: Read More [+]
**Rules & Requirements**

**Prerequisites:** Consent of instructor and major adviser

**Credit Restrictions:** Enrollment is restricted; see the Introduction to Courses and Curricula section of this catalog.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 0 hours of independent study per week

**Summer:**
6 weeks - 1-5 hours of independent study per week
8 weeks - 1-4 hours of independent study per week

**Additional Details**

**Subject/Course Level:** Computer Science/Undergraduate

**Grading/Final exam status:** Offered for pass/not pass grade only. Final exam not required.

Supervised Independent Study: Read Less [-]

# Electrical Engineering

## EL ENG 16A Designing Information Devices and Systems I 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2018, Fall 2017, Summer 2017 8 Week Session
This course and its follow-on course EE16B focus on the fundamentals of designing modern information devices and systems that interface with the real world. Together, this course sequence provides a comprehensive foundation for core EECS topics in signal processing, learning, control, and circuit design while introducing key linear-algebraic concepts motivated by application contexts. Modeling is emphasized in a way that deepens mathematical maturity, and in both labs and homework, students will engage computationally, physically, and visually with the concepts being introduced in addition to traditional paper/pencil exercises. The courses are aimed at entering students as well as non-majors seeking a broad foundation for the field.
Designing Information Devices and Systems I: Read More [+]
**Rules & Requirements**

**Prerequisites:** Math 1A, Math 1B or equivalent (may be taken concurrently), CS 61A or equivalent (encouraged to be taken concurrently)

**Credit Restrictions:** Students will receive no credit for Electrical Engineering 16A after completing Electrical Engineering 20 or 40.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture, 2 hours of discussion, and 3 hours of laboratory per week

**Summer:** 8 weeks - 6 hours of lecture, 4 hours of discussion, and 6 hours of laboratory per week

**Additional Details**

**Subject/Course Level:** Electrical Engineering/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructors:** Alon, Arcak, Ayazifar, Maharbiz, Niknejad, Ranade, Sahai, Subramanian, Tomlin

Designing Information Devices and Systems I: Read Less [-]

## EL ENG 16B Designing Information Devices and Systems II 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2018, Fall 2017, Spring 2017
This course is a follow-on to Electrical Engineering 16A, and focuses on the fundamentals of designing and building modern information devices and systems that interface with the real world. The course sequence provides a comprehensive introduction to core EECS topics in circuit design, signals, and systems in an application-driven context. The courses are delivered assuming mathematical maturity and aptitude at roughly the level of having completed Math 1A-1B, and are aimed at entering students as well as non-majors seeking a broad introduction to the field.
Designing Information Devices and Systems II: Read More [+]
**Rules & Requirements**

**Prerequisites:** Electrical Engineering 16A, Designing Information Devices and Systems I

**Credit Restrictions:** Students will receive no credit for Electrical Engineering 16B after completing Electrical Engineering 20 or 40.<BR/>

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture, 2 hours of discussion, and 3 hours of laboratory per week

**Additional Details**

**Subject/Course Level:** Electrical Engineering/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructors:** Alon, Ayazifar, Lustig, Maharbiz, Subramanian, Tomlin

Designing Information Devices and Systems II: Read Less [-]

## EL ENG 24 Freshman Seminar 1 Unit

Offered through: Electrical Engin and Computer Sci
Terms offered: Fall 2017, Spring 2017, Spring 2016
The Freshman Seminar Program has been designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small seminar setting. Freshman seminars are offered in all campus departments, and topics may vary from department to department and semester to semester.
Freshman Seminar: Read More [+]
**Hours & Format**

**Fall and/or spring:** 15 weeks - 1 hour of seminar per week

**Additional Details**

**Subject/Course Level:** Electrical Engineering/Undergraduate

**Grading/Final exam status:** The grading option will be decided by the instructor when the class is offered. Final exam required.

Freshman Seminar: Read Less [-]

## EL ENG 25 What Electrical Engineers Do--Feedback from Recent Graduates 1 Unit

Offered through: Electrical Engin and Computer Sci
Terms offered: Fall 2011
A Berkeley Electrical Engineering and Computer Sciences degree opens the door to many opportunities, but what exactly are they? Graduation is only a few years away and it's not too early to find out. In this seminar students will hear from practicing engineers who recently graduated. What are they working on? Are they working in a team? What do they wish they had learned better? How did they find their jobs?
What Electrical Engineers Do--Feedback from Recent Graduates: Read More [+]
**Hours & Format**

**Fall and/or spring:** 15 weeks - 1 hour of lecture per week

**Additional Details**

**Subject/Course Level:** Electrical Engineering/Undergraduate

**Grading/Final exam status:** Offered for pass/not pass grade only. Final exam not required.

**Instructor:** Boser

What Electrical Engineers Do--Feedback from Recent Graduates: Read Less [-]

## EL ENG 39 Freshman/Sophomore Seminar 2 - 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2018, Fall 2017, Fall 2016
Freshman and sophomore seminars offer lower division students the opportunity to explore an intellectual topic with a faculty member and a group of peers in a small-seminar setting. These seminars are offered in all campus departments; topics vary from department to department and from semester to semester. Enrollment limits are set by the faculty, but the suggested limit is 25.
Freshman/Sophomore Seminar: Read More [+]
**Rules & Requirements**

**Prerequisites:** Priority given to freshmen and sophomores

**Repeat rules:** Course may be repeated for credit as topic varies. Course may be repeated for credit when topic changes.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 2-4 hours of seminar per week

**Additional Details**

**Subject/Course Level:** Electrical Engineering/Undergraduate

**Grading/Final exam status:** The grading option will be decided by the instructor when the class is offered. Final exam required.

Freshman/Sophomore Seminar: Read Less [-]

## EL ENG 42 Introduction to Digital Electronics 3 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Fall 2013, Summer 2013 8 Week Session, Spring 2013
This course serves as an introduction to the principles of electrical engineering, starting from the basic concepts of voltage and current and circuit elements of resistors, capacitors, and inductors. Circuit analysis is taught using Kirchhoff's voltage and current laws with Thevenin and Norton equivalents. Operational amplifiers with feedback are introduced as basic building blocks for amplication and filtering. Semiconductor devices including diodes and MOSFETS and their IV characteristics are covered. Applications of diodes for rectification, and design of MOSFETs in common source amplifiers are taught. Digital logic gates and design using CMOS as well as simple flip-flops are introduced. Speed and scaling issues for CMOS are considered. The course includes as motivating examples designs of high level applications including logic circuits, amplifiers, power supplies, and communication links.
Introduction to Digital Electronics: Read More [+]

**Rules & Requirements**

**Prerequisites:** Mathematics 1B

**Credit Restrictions:** Students will receive no credit for 42 after taking 40 or 100.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of discussion per week

**Summer:** 8 weeks - 6 hours of lecture and 2 hours of discussion per week

**Additional Details**

**Subject/Course Level:** Electrical Engineering/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Introduction to Digital Electronics: Read Less [-]

## EL ENG 43 Introductory Electronics Laboratory 1 Unit

Offered through: Electrical Engin and Computer Sci
Terms offered: Fall 2013, Summer 2013 8 Week Session, Spring 2013
Using and understanding electronics laboratory equipment such as oscilloscope, power supplies, function generator, multimeter, curve-tracer, and RLC-meter. Includes a term project of constructing and testing a robot or other appropriate electromechanical device.
Introductory Electronics Laboratory: Read More [+]

**Rules & Requirements**

**Prerequisites:** 42 (may be taken concurrently) or equivalent or consent of instructor

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of laboratory per week

**Summer:** 8 weeks - 3.5 hours of laboratory per week

**Additional Details**

**Subject/Course Level:** Electrical Engineering/Undergraduate

**Grading/Final exam status:** Offered for pass/not pass grade only. Final exam not required.

Introductory Electronics Laboratory: Read Less [-]

## EL ENG 49 Electronics for the Internet of Things 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2018
Electronics has become pervasive in our lives as a powerful technology with applications in a wide range of fields including healthcare, environmental monitoring, robotics, or entertainment. This course teaches how to build electronic circuits that interact with the environment through sensors and actuators and how to communicate wirelessly with the internet to cooperate with other devices and with humans. In the laboratory students design and build representative samples such as solar harvesters, robots, that exchange information with or are controlled from the cloud.
Electronics for the Internet of Things: Read More [+]
**Objectives Outcomes**

**Course Objectives:** Electronics has become a powerful and ubiquitous technology supporting solutions to a wide range of applications in fields ranging from science, engineering, healthcare, environmental monitoring, transportation, to entertainment. The objective of this course is to teach students majoring in these and related subjects how to use electronic devices to solve problems in their areas of expertise.
Through the lecture and laboratory, students gain insight into the possibilities and limitations of the technology and how to use electronics to help solve problems. Students learn to use electronics to interact with the environment through sound, light, temperature, motion using sensors and actuators, and how to use electronic computation to orchestrate the interactions and exchange information wirelessly over the internet.

**Student Learning Outcomes:** Deploy electronic sensors and interface them to microcontrollers through digital and analog channels as well as common protocols (I2C, SPI),
Design, build and test electronic devices leveraging these concepts.
Interact with the internet and cloud services using protocols such as http, MQTT, Blynk,
Interface DC motors, steppers and servos to microcontrollers,
Represent information with voltage, current, power, and energy and how to measure these quantities with laboratory equipment,
To use and program low-cost and low-power microcontrollers for sensing, actuation, and information processing, and find and use program libraries supporting these tasks
Understand and make basic low-pass and high-pass filters, Wheatstone bridge etc.
Use electronics to sense and actuate physical parameters such as temperature, humidity, sound, light, and motion,

**Rules & Requirements**

**Prerequisites:** Engineering 7 or Computer Science 10 or equivalent background in computer programming (including Computer Science 61A, Data Science 8) Math 1a or equivalent background in Calculus

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture, 2 hours of discussion, and 3 hours of laboratory per week

**Additional Details**

**Subject/Course Level:** Electrical Engineering/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructor:** Boser

Electronics for the Internet of Things: Read Less [-]

## EL ENG 84 Sophomore Seminar 1 or 2 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Fall 2017, Spring 2016, Fall 2015
Sophomore seminars are small interactive courses offered by faculty members in departments all across the campus. Sophomore seminars offer opportunity for close, regular intellectual contact between faculty members and students in the crucial second year. The topics vary from department to department and semester to semester. Enrollment limited to 15 sophomores.
Sophomore Seminar: Read More [+]
**Rules & Requirements**

**Prerequisites:** At discretion of instructor

**Repeat rules:** Course may be repeated for credit as topic varies. Course may be repeated for credit when topic changes.

**Hours & Format**

**Fall and/or spring:**
5 weeks - 3-6 hours of seminar per week
10 weeks - 1.5-3 hours of seminar per week
15 weeks - 1-2 hours of seminar per week

**Summer:**
6 weeks - 2.5-5 hours of seminar per week
8 weeks - 1.5-3.5 hours of seminar per week

**Additional Details**

**Subject/Course Level:** Electrical Engineering/Undergraduate

**Grading/Final exam status:** The grading option will be decided by the instructor when the class is offered. Final exam required.

Sophomore Seminar: Read Less [-]

## EL ENG 97 Field Study 1 - 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2016, Fall 2015, Spring 2015
Students take part in organized individual field sponsored programs with off-campus companies or tutoring/mentoring relevant to specific aspects and applications of computer science on or off campus. Note Summer CPT or OPT students: written report required. Course does not count toward major requirements, but will be counted in the cumulative units toward graduation.
Field Study: Read More [+]
**Rules & Requirements**

**Prerequisites:** Consent of instructor (see department adviser)

**Repeat rules:** Course may be repeated for credit.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 1-4 hours of fieldwork per week

**Summer:**
6 weeks - 2.5-10 hours of fieldwork per week
8 weeks - 2-7.5 hours of fieldwork per week

**Additional Details**

**Subject/Course Level:** Electrical Engineering/Undergraduate

**Grading/Final exam status:** Offered for pass/not pass grade only. Final exam not required.

Field Study: Read Less [-]

## EL ENG 98 Directed Group Study for Undergraduates 1 - 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Fall 2016, Spring 2016, Fall 2015
Group study of selected topics in electrical engineering, usually relating to new developments.
Directed Group Study for Undergraduates: Read More [+]
**Rules & Requirements**

**Repeat rules:** Course may be repeated for credit.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 1-4 hours of directed group study per week

**Additional Details**

**Subject/Course Level:** Electrical Engineering/Undergraduate

**Grading/Final exam status:** Offered for pass/not pass grade only. Final exam not required.

Directed Group Study for Undergraduates: Read Less [-]

## EL ENG 99 Individual Study and Research for Undergraduates 1 - 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2016, Fall 2015, Spring 2015
Supervised independent study and research for students with fewer than 60 units completed.
Individual Study and Research for Undergraduates: Read More [+]
**Rules & Requirements**

**Prerequisites:** Freshman or sophomore standing and consent of instructor. Minimum GPA of 3.4 required

**Credit Restrictions:** Enrollment is restricted; see the Introduction to Courses and Curricula section of this catalog.

**Repeat rules:** Course may be repeated for credit.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 1-4 hours of independent study per week

**Summer:**
6 weeks - 1-5 hours of independent study per week
8 weeks - 1-4 hours of independent study per week

**Additional Details**

**Subject/Course Level:** Electrical Engineering/Undergraduate

**Grading/Final exam status:** Offered for pass/not pass grade only. Final exam not required.

Individual Study and Research for Undergraduates: Read Less [-]

## EL ENG 105 Microelectronic Devices and Circuits 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2018, Fall 2017, Spring 2017
This course covers the fundamental circuit and device concepts needed to understand analog integrated circuits. After an overview of the basic properties of semiconductors, the p-n junction and MOS capacitors are described and the MOSFET is modeled as a large-signal device. Two port small-signal amplifiers and their realization using single stage and multistage CMOS building blocks are discussed. Sinusoidal steady-state signals are introduced and the techniques of phasor analysis are developed, including impedance and the magnitude and phase response of linear circuits. The frequency responses of single and multi-stage amplifiers are analyzed. Differential amplifiers are introduced.
Microelectronic Devices and Circuits: Read More [+]
**Rules & Requirements**

**Prerequisites:** EE 16A & B

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture, 1 hour of discussion, and 3 hours of laboratory per week

**Additional Details**

**Subject/Course Level:** Electrical Engineering/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Microelectronic Devices and Circuits: Read Less [-]

## EL ENG C106A Introduction to Robotics 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Fall 2017, Fall 2016, Fall 2015
An introduction to the kinematics, dynamics, and control of robot manipulators, robotic vision, and sensing. The course covers forward and inverse kinematics of serial chain manipulators, the manipulator Jacobian, force relations, dynamics, and control. It presents elementary principles on proximity, tactile, and force sensing, vision sensors, camera calibration, stereo construction, and motion detection. The course concludes with current applications of robotics in active perception, medical robotics, and other areas.
Introduction to Robotics: Read More [+]

**Rules & Requirements**

**Prerequisites:** EE 120 or equivalent, consent of instructor

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture, 1 hour of discussion, and 3 hours of laboratory per week

**Additional Details**

**Subject/Course Level:** Electrical Engineering/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructor:** Bajcsy

**Formerly known as:** Electrical Engineering C125/Bioengineering C125

**Also listed as:** BIO ENG C125

Introduction to Robotics: Read Less [-]

## EL ENG C106B Robotic Manipulation and Interaction 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2017, Spring 2016
This course is a sequel to Electrical Engineering C106A/Bioengineering C125, which covers kinematics, dynamics and control of a single robot. This course will cover dynamics and control of groups of robotic manipulators coordinating with each other and interacting with the environment. Concepts will include an introduction to grasping and the constrained manipulation, contacts and force control for interaction with the environment. We will also cover active perception guided manipulation, as well as the manipulation of non-rigid objects. Throughout, we will emphasize design and human-robot interactions, and applications to applications in manufacturing, service robotics, tele-surgery, and locomotion.
Robotic Manipulation and Interaction: Read More [+]

**Rules & Requirements**

**Prerequisites:** Electrical Engineering C106A/Bioengineering C125 or consent of the instructor

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture, 1 hour of discussion, and 3 hours of laboratory per week

**Additional Details**

**Subject/Course Level:** Electrical Engineering/Undergraduate

**Grading/Final exam status:** Letter grade. Alternative to final exam.

**Instructors:** Bajcsy, Sastry

**Also listed as:** BIO ENG C125B

Robotic Manipulation and Interaction: Read Less [-]

## EL ENG 113 Power Electronics 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2018, Spring 2017, Spring 2016
Power conversion circuits and techniques. Characterization and design of magnetic devices including transformers, reactors, and electromagnetic machinery. Characteristics of bipolar and MOS power semiconductor devices. Applications to motor control, switching power supplies, lighting, power systems, and other areas as appropriate.
Power Electronics: Read More [+]

**Rules & Requirements**

**Prerequisites:** 105 or consent of instructor

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 3 hours of laboratory per week

**Additional Details**

**Subject/Course Level:** Electrical Engineering/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Power Electronics: Read Less [-]

## EL ENG 117 Electromagnetic Fields and Waves 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2018, Spring 2017, Spring 2016
Review of static electric and magnetic fields and applications; Maxwell's equations; transmission lines; propagation and reflection of plane waves; introduction to guided waves, microwave networks, and radiation and antennas. Minilabs on statics, transmission lines, and waves.
Electromagnetic Fields and Waves: Read More [+]
**Rules & Requirements**

**Prerequisites:** Electrical Engineering 16B, Mathematics 53, 54, Physics 7B, or equivalent that covers AC circuits and electromagnetics up to Maxwell's equations

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture, 1 hour of discussion, and 1.5 hours of laboratory per week

**Additional Details**

**Subject/Course Level:** Electrical Engineering/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Electromagnetic Fields and Waves: Read Less [-]

## EL ENG 118 Introduction to Optical Engineering 3 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Fall 2017, Fall 2016, Fall 2015
Fundamental principles of optical systems. Geometrical optics and aberration theory. Stops and apertures, prisms, and mirrors. Diffraction and interference. Optical materials and coatings. Radiometry and photometry. Basic optical devices and the human eye. The design of optical systems. Lasers, fiber optics, and holography.
Introduction to Optical Engineering: Read More [+]
**Rules & Requirements**

**Prerequisites:** Math 53, and EE 16AB or Math 54

**Credit Restrictions:** Students will receive no credit for Electrical Engineering 118 after taking Electrical Engineering 218A. A deficient grade in Electrical Engineering 119 may be removed by taking Electrical Engineering 118.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of discussion per week

**Additional Details**

**Subject/Course Level:** Electrical Engineering/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructor:** Waller

Introduction to Optical Engineering: Read Less [-]

## EL ENG 120 Signals and Systems 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2018, Fall 2017, Spring 2017
Continuous and discrete-time transform analysis techniques with illustrative applications. Linear and time-invariant systems, transfer functions. Fourier series, Fourier transform, Laplace and Z-transforms. Sampling and reconstruction. Solution of differential and difference equations using transforms. Frequency response, Bode plots, stability analysis. Illustrated by analysis of communication systems and feedback control systems.
Signals and Systems: Read More [+]
**Rules & Requirements**

**Prerequisites:** EE 16A and 16B

**Hours & Format**

**Fall and/or spring:** 15 weeks - 4 hours of lecture and 1 hour of recitation per week

**Additional Details**

**Subject/Course Level:** Electrical Engineering/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Signals and Systems: Read Less [-]

## EL ENG 121 Introduction to Digital Communication Systems 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2016, Fall 2014, Fall 2013
Introduction to the basic principles of the design and analysis of modern digital communication systems. Topics include source coding, channel coding, baseband and passband modulation techniques, receiver design, and channel equalization. Applications to design of digital telephone modems, compact disks, and digital wireless communication systems. Concepts illustrated by a sequence of MATLAB exercises.
Introduction to Digital Communication Systems: Read More [+]
**Rules & Requirements**

**Prerequisites:** EE 16 A & B; CS 70

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of discussion per week

**Additional Details**

**Subject/Course Level:** Electrical Engineering/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Introduction to Digital Communication Systems: Read Less [-]

## EL ENG 122 Introduction to Communication Networks 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2018, Spring 2017, Spring 2016
This course focuses on the fundamentals of the wired and wireless communication networks. The course covers both the architectural principles for making these networks scalable and robust, as well as the key techniques essential for analyzing and designing them. The topics include graph theory, Markov chains, queuing, optimization techniques, the physical and link layers, switching, transport, cellular networks and Wi-Fi.
Introduction to Communication Networks: Read More [+]
**Rules & Requirements**

**Prerequisites:** Computer Science 70. Computer Science 70

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of discussion per week

**Additional Details**

**Subject/Course Level:** Electrical Engineering/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Introduction to Communication Networks: Read Less [-]

## EL ENG 123 Digital Signal Processing 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2018, Spring 2017, Spring 2016
Discrete time signals and systems: Fourier and Z transforms, DFT, 2-dimensional versions. Digital signal processing topics: flow graphs, realizations, FFT, chirp-Z algorithms, Hilbert transform relations, quantization effects, linear prediction. Digital filter design methods: windowing, frequency sampling, S-to-Z methods, frequency-transformation methods, optimization methods, 2-dimensional filter design.
Digital Signal Processing: Read More [+]
**Rules & Requirements**

**Prerequisites:** 120

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture, 1 hour of discussion, and 1 hour of laboratory per week

**Additional Details**

**Subject/Course Level:** Electrical Engineering/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Digital Signal Processing: Read Less [-]

## EL ENG 126 Probability and Random Processes 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2017, Fall 2016, Spring 2016
This course covers the fundamentals of probability and random processes useful in fields such as networks, communication, signal processing, and control. Sample space, events, probability law. Conditional probability. Independence. Random variables. Distribution, density functions. Random vectors. Law of large numbers. Central limit theorem. Estimation and detection. Markov chains.
Probability and Random Processes: Read More [+]
**Rules & Requirements**

**Prerequisites:** EE 16A and 16B

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of discussion per week

**Additional Details**

**Subject/Course Level:** Electrical Engineering/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Probability and Random Processes: Read Less [-]

## EL ENG C128 Feedback Control Systems 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2018, Fall 2017, Spring 2017
Analysis and synthesis of linear feedback control systems in transform and time domains. Control system design by root locus, frequency response, and state space methods. Applications to electro-mechanical and mechatronics systems.
Feedback Control Systems: Read More [+]
**Rules & Requirements**

**Prerequisites:** EE 16A and either ME 132 or EE 120

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture, 1 hour of discussion, and 3 hours of laboratory per week

**Additional Details**

**Subject/Course Level:** Electrical Engineering/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Also listed as:** MEC ENG C134

Feedback Control Systems: Read Less [-]

## EL ENG 129 Neural and Nonlinear Information Processing 3 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2010, Fall 2009, Spring 2009
Principles of massively parallel real-time computation, optimization, and information processing via nonlinear dynamics and analog VLSI neural networks, applications selected from image processing, pattern recognition, feature extraction, motion detection, data compression, secure communication, bionic eye, auto waves, and Turing patterns.
Neural and Nonlinear Information Processing: Read More [+]
**Rules & Requirements**

**Prerequisites:** 120 or consent of instructor

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Electrical Engineering/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam not required.

**Instructor:** Chua

Neural and Nonlinear Information Processing: Read Less [-]

## EL ENG 130 Integrated-Circuit Devices 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2018, Fall 2017, Spring 2017
Overview of electronic properties of semiconductor. Metal-semiconductor contacts, pn junctions, bipolar transistors, and MOS field-effect transistors. Properties that are significant to device operation for integrated circuits. Silicon device fabrication technology.
Integrated-Circuit Devices: Read More [+]
**Rules & Requirements**

**Prerequisites:** EE 16A and 16B

**Credit Restrictions:** Students will receive no credit for El Eng 130 after taking El Eng 230A.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of discussion per week

**Additional Details**

**Subject/Course Level:** Electrical Engineering/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Integrated-Circuit Devices: Read Less [-]

## EL ENG 134 Fundamentals of Photovoltaic Devices 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2018, Spring 2017, Spring 2016
This course is designed to give an introduction to, and overview of, the fundamentals of photovoltaic devices. Students will learn how solar cells work, understand the concepts and models of solar cell device physics, and formulate and solve relevant physical problems related to photovoltaic devices. Monocrystalline, thin film and third generation solar cells will be discussed and analyzed. Light management and economic considerations in a solar cell system will also be covered.
Fundamentals of Photovoltaic Devices: Read More [+]
**Rules & Requirements**

**Prerequisites:** EE 16A and 16B

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of discussion per week

**Additional Details**

**Subject/Course Level:** Electrical Engineering/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructor:** Arias

Fundamentals of Photovoltaic Devices: Read Less [-]

## EL ENG 137A Introduction to Electric Power Systems 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Fall 2017, Fall 2016, Fall 2015
Overview of conventional electric power conversion and delivery, emphasizing a systemic understanding of the electric grid with primary focus at the transmission level, aimed toward recognizing needs and opportunities for technological innovation. Topics include aspects of a.c. system design, electric generators, components of transmission and distribution systems, power flow analysis, system planning and operation, performance measures, and limitations of legacy technologies.
Introduction to Electric Power Systems: Read More [+]
**Rules & Requirements**

**Prerequisites:** 16A & 16B or consent of instructor; Physics 7B

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of discussion per week

**Additional Details**

**Subject/Course Level:** Electrical Engineering/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructor:** von Meier

Introduction to Electric Power Systems: Read Less [-]

## EL ENG 137B Introduction to Electric Power Systems 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2018, Spring 2017, Spring 2016
Overview of recent and potential future evolution of electric power systems with focus on new and emerging technologies for power conversion and delivery, primarily at the distribution level. Topics include power electronics applications, solar and wind generation, distribution system design and operation, electric energy storage, information management and communications, demand response, and microgrids.
Introduction to Electric Power Systems: Read More [+]
**Rules & Requirements**

**Prerequisites:** Electrical Engineering 137A or consent of instructor

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of discussion per week

**Additional Details**

**Subject/Course Level:** Electrical Engineering/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructor:** von Meier

Introduction to Electric Power Systems: Read Less [-]

## EL ENG 140 Linear Integrated Circuits 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2018, Fall 2017, Spring 2017
Single and multiple stage transistor amplifiers. Operational amplifiers. Feedback amplifiers, 2-port formulation, source, load, and feedback network loading. Frequency response of cascaded amplifiers, gain-bandwidth exchange, compensation, dominant pole techniques, root locus. Supply and temperature independent biasing and references. Selected applications of analog circuits such as analog-to-digital converters, switched capacitor filters, and comparators. Hardware laboratory and design project.
Linear Integrated Circuits: Read More [+]
**Rules & Requirements**

**Prerequisites:** Electrical Engineering 105

**Credit Restrictions:** Students will receive no credit for El Eng 140 after taking El Eng 240A.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture, 1 hour of discussion, and 3 hours of laboratory per week

**Additional Details**

**Subject/Course Level:** Electrical Engineering/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructors:** Alon, Sanders

Linear Integrated Circuits: Read Less [-]

## EL ENG 142 Integrated Circuits for Communications 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Fall 2017, Spring 2016, Spring 2015
Analysis and design of electronic circuits for communication systems, with an emphasis on integrated circuits for wireless communication systems. Analysis of noise and distortion in amplifiers with application to radio receiver design. Power amplifier design with application to wireless radio transmitters. Radio-frequency mixers, oscillators, phase-locked loops, modulators, and demodulators.
Integrated Circuits for Communications: Read More [+]
**Rules & Requirements**

**Prerequisites:** EE 16A & B; EE 105

**Credit Restrictions:** Students will receive no credit for El Eng 142 after taking El Eng 242A.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture, 1 hour of discussion, and 3 hours of laboratory per week

**Additional Details**

**Subject/Course Level:** Electrical Engineering/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Integrated Circuits for Communications: Read Less [-]

## EL ENG 143 Microfabrication Technology 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2018, Fall 2017, Spring 2017
Integrated circuit device fabrication and surface micromachining technology. Thermal oxidation, ion implantation, impurity diffusion, film deposition, expitaxy, lithography, etching, contacts and interconnections, and process integration issues. Device design and mask layout, relation between physical structure and electrical/mechanical performance. MOS transistors and poly-Si surface microstructures will be fabricated in the laboratory and evaluated.
Microfabrication Technology: Read More [+]
**Rules & Requirements**

**Prerequisites:** Physics 7B or equivalent

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 3 hours of laboratory per week

**Additional Details**

**Subject/Course Level:** Electrical Engineering/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Microfabrication Technology: Read Less [-]

## EL ENG 144 Fundamental Algorithms for Systems Modeling, Analysis, and Optimization 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Fall 2015, Fall 2014, Fall 2013
The modeling, analysis, and optimization of complex systems requires a range of algorithms and design software. This course reviews the fundamental techniques underlying the design methodology for complex systems, using integrated circuit design as example. Topics include design flows, discrete and continuous models and algorithms, and strategies for implementing algorithms efficiently and correctly in software. Laboratory assignments and a class project will expose students to state-of-the-art tools.
Fundamental Algorithms for Systems Modeling, Analysis, and Optimization: Read More [+]
**Rules & Requirements**

**Prerequisites:** EE 16A; Computer Science 70 or consent of instructor

**Hours & Format**

**Fall and/or spring:** 15 weeks - 4 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Electrical Engineering/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructors:** Keutzer, Lee, Roychowdhury, Seshia

Fundamental Algorithms for Systems Modeling, Analysis, and Optimization: Read Less [-]

## EL ENG C145B Medical Imaging Signals and Systems 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Fall 2017, Fall 2016, Fall 2015
Biomedical imaging is a clinically important application of engineering, applied mathematics, physics, and medicine. In this course, we apply linear systems theory and basic physics to analyze X-ray imaging, computerized tomography, nuclear medicine, and MRI. We cover the basic physics and instrumentation that characterizes medical image as an ideal perfect-resolution image blurred by an impulse response. This material could prepare the student for a career in designing new medical imaging systems that reliably detect small tumors or infarcts.
Medical Imaging Signals and Systems: Read More [+]
**Rules & Requirements**

**Prerequisites:** Electrical Engineering 16A and 16B

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of discussion per week

**Additional Details**

**Subject/Course Level:** Electrical Engineering/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructor:** Conolly

**Also listed as:** BIO ENG C165

Medical Imaging Signals and Systems: Read Less [-]

## EL ENG C145L Introductory Electronic Transducers Laboratory 3 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Fall 2014, Fall 2013, Fall 2012
Laboratory exercises exploring a variety of electronic transducers for measuring physical quantities such as temperature, force, displacement, sound, light, ionic potential; the use of circuits for low-level differential amplification and analog signal processing; and the use of microcomputers for digital sampling and display. Lectures cover principles explored in the laboratory exercises; construction, response and signal to noise of electronic transducers and actuators; and design of circuits for sensing and controlling physical quantities.
Introductory Electronic Transducers Laboratory: Read More [+]
**Hours & Format**

**Fall and/or spring:** 15 weeks - 2 hours of lecture and 3 hours of laboratory per week

**Additional Details**

**Subject/Course Level:** Electrical Engineering/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructor:** Derenzo

**Also listed as:** BIO ENG C145L

Introductory Electronic Transducers Laboratory: Read Less [-]

## EL ENG C145M Introductory Microcomputer Interfacing Laboratory 3 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2013, Spring 2012, Spring 2011
Laboratory exercises constructing basic interfacing circuits and writing 20-100 line C programs for data acquisition, storage, analysis, display, and control. Use of the IBM PC with microprogrammable digital counter/timer, parallel I/O port. Circuit components include anti-aliasing filters, the S/H amplifier, A/D and D/A converters. Exercises include effects of aliasing in periodic sampling, fast Fourier transforms of basic waveforms, the use of the Hanning filter for leakage reduction, Fourier analysis of the human voice, digital filters, and control using Fourier deconvolution. Lectures cover principles explored in the lab exercises and design of microcomputer-based systems for data acquisitions, analysis and control.
Introductory Microcomputer Interfacing Laboratory: Read More [+]
**Rules & Requirements**

**Prerequisites:** EE 16A & 16B

**Hours & Format**

**Fall and/or spring:** 15 weeks - 2 hours of lecture and 3 hours of laboratory per week

**Additional Details**

**Subject/Course Level:** Electrical Engineering/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructor:** Derenzo

**Also listed as:** BIO ENG C145M

Introductory Microcomputer Interfacing Laboratory: Read Less [-]

## EL ENG C145O Laboratory in the Mechanics of Organisms 3 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2015, Spring 2014, Spring 2013, Spring 2012
Introduction to laboratory and field study of the biomechanics of animals and plants using fundamental biomechanical techniques and equipment. Course has a series of rotations involving students in experiments demonstrating how solid and fluid mechanics can be used to discover the way in which diverse organisms move and interact with their physical environment. The laboratories emphasize sampling methodology, experimental design, and statistical interpretation of results. Latter third of course devoted to independent research projects. Written reports and class presentation of project results are required.
Laboratory in the Mechanics of Organisms: Read More [+]
**Rules & Requirements**

**Prerequisites:** Integrative Biology 135 or consent of instructor; for Electrical Engineering and Computer Science students, Electrical Engineering 105, 120 or Computer Science 184

**Credit Restrictions:** Students will receive no credit for C135L after taking 135L.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 6 hours of laboratory, 1 hour of discussion, and 1 hour of fieldwork per week

**Additional Details**

**Subject/Course Level:** Electrical Engineering/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Formerly known as:** Integrative Biology 135L

**Also listed as:** BIO ENG C136L/INTEGBI C135L

Laboratory in the Mechanics of Organisms: Read Less [-]

## EL ENG 146L Application Specific Integrated Circuits Laboratory 2 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2015
This is a lab course that covers the design of modern Application-Specific Integrated Circuits (ASICs). The labs lay the foundation of modern digital design by first setting-up the scripting and hardware description language base for specification of digital systems and interactions with tool flows. Software testing of digital designs is covered leading into a set of labs that cover the design flow. Digital synthesis, floorplanning, placement and routing are covered, as well as tools to evaluate design timing and power. Chip-level assembly is covered, instantiation of custom IP blocks: I/O pads, memories, PLLs, etc. The labs culminate with a project design – implementation of a 3-stage RISC-V processor with register file and caches.
Application Specific Integrated Circuits Laboratory: Read More [+]
**Objectives Outcomes**

**Course Objectives:** This course is a one-time offering to supplement the CS150 course offered in the Fall 2014, with a lab and project section that cover the Application-Specific Integrated Circuit Design. The CS150 lectures in the Fall 2014 already covered the necessary lecture material, so students who took the CS150 lab in the Fall of 2014 will have a chance to expand their skills into the area of Application-Specific Integrated Circuit design.
Hence the pre-requisite for this course is that a student has taken the CS150 course in the Fall 2014.

**Rules & Requirements**

**Prerequisites:** Electrical Engineering 40; Electrical Engineering 105 recommended and Computer Science 150 (taken Fall 2014) - mandatory

**Credit Restrictions:** Students will receive no credit for Electrical Engineering 146L after taking Fall 2014 version of Electrical Engineering 141/241A.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of laboratory and 1 hour of discussion per week

**Additional Details**

**Subject/Course Level:** Electrical Engineering/Undergraduate

**Grading/Final exam status:** Offered for pass/not pass grade only. Final exam not required.

**Instructor:** Stojanovic

Application Specific Integrated Circuits Laboratory: Read Less [-]

## EL ENG 147 Introduction to Microelectromechanical Systems (MEMS) 3 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Fall 2017, Fall 2016, Fall 2015
This course will teach fundamentals of micromachining and microfabrication techniques, including planar thin-film process technologies, photolithographic techniques, deposition and etching techniques, and the other technologies that are central to MEMS fabrication. It will pay special attention to teaching of fundamentals necessary for the design and analysis of devices and systems in mechanical, electrical, fluidic, and thermal energy/signal domains, and will teach basic techniques for multi-domain analysis. Fundamentals of sensing and transduction mechanisms including capacitive and piezoresistive techniques, and design and analysis of micmicromachined miniature sensors and actuators using these techniques will be covered.
Introduction to Microelectromechanical Systems (MEMS): Read More [+]
**Rules & Requirements**

**Prerequisites:** Electrical Engineering 16A and 16B

**Credit Restrictions:** Students will receive no credit for El Eng 147 after taking El Eng 247A.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of discussion per week

**Additional Details**

**Subject/Course Level:** Electrical Engineering/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructors:** Maharbiz, Nguyen, Pister

Introduction to Microelectromechanical Systems (MEMS): Read Less [-]

## EL ENG 192 Mechatronic Design Laboratory 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2018, Spring 2017, Spring 2016
Design project course, focusing on application of theoretical principles in electrical engineering to control of a small-scale system, such as a mobile robot. Small teams of students will design and construct a mechatronic system incorporating sensors, actuators, and intelligence.
Mechatronic Design Laboratory: Read More [+]
**Rules & Requirements**

**Prerequisites:** EE120, EE16A+EE16B, CS61ABC

**Hours & Format**

**Fall and/or spring:** 15 weeks - 1.5 hours of lecture and 10 hours of laboratory per week

**Additional Details**

**Subject/Course Level:** Electrical Engineering/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructor:** Fearing

Mechatronic Design Laboratory: Read Less [-]

## EL ENG 194 Special Topics 1 - 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2018, Spring 2017, Fall 2015
Topics will vary semester to semester. See the Electrical Engineering announcements.
Special Topics: Read More [+]
**Rules & Requirements**

**Prerequisites:** Consent of instructor

**Repeat rules:** Course may be repeated for credit as topic varies. Course may be repeated for credit when topic changes.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 1-4 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Electrical Engineering/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Special Topics: Read Less [-]

## EL ENG H196A Senior Honors Thesis Research 1 - 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2016, Fall 2015, Spring 2015
Thesis work under the supervision of a faculty member. A minimum of four units must be taken; the units may be distributed between one and two semesters in any way. To obtain credit a satisfactory thesis must be submitted at the end of the two semesters to the Electrical and Engineering and Computer Science Department archive. Students who complete four units and a thesis in one semester receive a letter grade at the end of H196A. Students who do not, receive an IP in H196A and must enroll in H196B.
Senior Honors Thesis Research: Read More [+]
**Rules & Requirements**

**Prerequisites:** Open only to students in the Electrical Engineering and Computer Science honors program

**Hours & Format**

**Fall and/or spring:** 15 weeks - 1-4 hours of independent study per week

**Additional Details**

**Subject/Course Level:** Electrical Engineering/Undergraduate

**Grading/Final exam status:** Letter grade. This is part one of a year long series course. A provisional grade of IP (in progress) will be applied and later replaced with the final grade after completing part two of the series. Final exam required.

Senior Honors Thesis Research: Read Less [-]

## EL ENG H196B Senior Honors Thesis Research 1 - 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2016, Spring 2015, Spring 2014
Thesis work under the supervision of a faculty member. A minimum of four units must be taken; the units may be distributed between one and two semesters in any way. To obtain credit a satisfactory thesis must be submitted at the end of the two semesters to the Electrical and Engineering and Computer Science Department archive. Students who complete four units and a thesis in one semester receive a letter grade at the end of H196A. Students who do not, receive an IP in H196A and must enroll in H196B.
Senior Honors Thesis Research: Read More [+]
**Rules & Requirements**

**Prerequisites:** Open only to students in the Electrical Engineering and Computer Science honors program

**Hours & Format**

**Fall and/or spring:** 15 weeks - 1-4 hours of independent study per week

**Additional Details**

**Subject/Course Level:** Electrical Engineering/Undergraduate

**Grading/Final exam status:** Letter grade. This is part two of a year long series course. Upon completion, the final grade will be applied to both parts of the series. Final exam required.

Senior Honors Thesis Research: Read Less [-]

## EL ENG 197 Field Study 1 - 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2016, Fall 2015, Spring 2015
Students take part in organized individual field sponsored programs with off-campus companies or tutoring/mentoring relevant to specific aspects and applications of computer science on or off campus. Note Summer CPT or OPT students: written report required. Course does not count toward major requirements, but will be counted in the cumulative units toward graduation.
Field Study: Read More [+]
**Rules & Requirements**

**Prerequisites:** Consent of instructor (see department adviser)

**Repeat rules:** Course may be repeated for credit.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 1-4 hours of fieldwork per week

**Summer:**
6 weeks - 2.5-10 hours of fieldwork per week
8 weeks - 2-7.5 hours of fieldwork per week

**Additional Details**

**Subject/Course Level:** Electrical Engineering/Undergraduate

**Grading/Final exam status:** Offered for pass/not pass grade only. Final exam not required.

Field Study: Read Less [-]

## EL ENG 198 Directed Group Study for Advanced Undergraduates 1 - 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Spring 2018, Spring 2017, Fall 2016
Group study of selected topics in electrical engineering, usually relating to new developments.
Directed Group Study for Advanced Undergraduates: Read More [+]
**Rules & Requirements**

**Prerequisites:** 2.0 GPA or better; 60 units completed

**Repeat rules:** Course may be repeated for credit.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 1-4 hours of directed group study per week

**Additional Details**

**Subject/Course Level:** Electrical Engineering/Undergraduate

**Grading/Final exam status:** Offered for pass/not pass grade only. Final exam not required.

Directed Group Study for Advanced Undergraduates: Read Less [-]

## EL ENG 199 Supervised Independent Study 1 - 4 Units

Offered through: Electrical Engin and Computer Sci
Terms offered: Fall 2017, Fall 2016, Summer 2016 8 Week Session
Supervised independent study. Enrollment restrictions apply.
Supervised Independent Study: Read More [+]
**Rules & Requirements**

**Prerequisites:** Consent of instructor and major adviser

**Credit Restrictions:** Enrollment is restricted; see the Introduction to Courses and Curricula section of this catalog.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 0 hours of independent study per week

**Summer:**
6 weeks - 1-5 hours of independent study per week
8 weeks - 1-4 hours of independent study per week

**Additional Details**

**Subject/Course Level:** Electrical Engineering/Undergraduate

**Grading/Final exam status:** Offered for pass/not pass grade only. Final exam not required.

Supervised Independent Study: Read Less [-]

# Electrical Engineering and Computer Sciences

## EECS 47D Completion of work in Electrical Engineering 16A 1 - 3 Units

Terms offered: Not yet offered
This course allows students who have had a linear algebra and/or basic circuit theory course to complete the work in EE16A and be ready for EE16B or EE47E. The course focuses on the fundamentals of designing modern information devices and systems that interface with the real world and provides a comprehensive foundation for core EECS topics in signal processing, learning, control, and circuit design. Modeling is emphasized in a way that deepens mathematical maturity, and in both labs and homework, students will engage computationally, physically, and visually with the concepts being introduced in addition to traditional paper/pencil exercises.
Completion of work in Electrical Engineering 16A: Read More [+]
**Rules & Requirements**

**Prerequisites:** Math 1A, Math 1B or equivalent, CS 61A or equivalent (encouraged to be taken concurrently), College level courses in linear algebra and/or circuit theory, and consent of the instructor

**Hours & Format**

**Fall and/or spring:** 15 weeks - 2-8 hours of self-paced per week

**Summer:** 8 weeks - 4-13 hours of self-paced per week

**Additional Details**

**Subject/Course Level:** Electrical Engin and Computer Sci/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructors:** Alon, Arcak, Ayazifar, Maharbiz, Niknejad, Ranade, Sahai, Subramanian, Tomlin

Completion of work in Electrical Engineering 16A: Read Less [-]

## EECS 47E Completion of work in Electrical Engineering 16B 1 - 3 Units

Terms offered: Not yet offered
This course allows students who have had a linear algebra and/or basic circuit theory course to complete the work in EE16B. The course focuses on the fundamentals of designing modern information devices and systems that interface with the real world and provides a comprehensive foundation for core EECS topics in signal processing (DFT), learning (SVD/PCA), feedback control, and circuit design. Modeling is emphasized in a way that deepens mathematical maturity, and in both labs and homework, students will engage computationally, physically, and visually with the concepts being introduced in addition to traditional paper/pencil exercises.
Completion of work in Electrical Engineering 16B: Read More [+]
**Rules & Requirements**

**Prerequisites:** Math 1A, Math 1B or equivalent, EE16A or EECS 47D or Math 54, CS 61A or equivalent, College level courses in linear algebra and/or circuit theory, and consent of the instructor

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3-8 hours of self-paced per week

**Summer:** 8 weeks - 6-16 hours of self-paced per week

**Additional Details**

**Subject/Course Level:** Electrical Engin and Computer Sci/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructors:** Alon, Arcak, Ayazifar, Maharbiz, Niknejad, Ranade, Sahai, Subramanian, Tomlin

Completion of work in Electrical Engineering 16B: Read Less [-]

## EECS 47F Completion of work in Computer Science 70 1 - 3 Units

Terms offered: Not yet offered
This course allows students who have had a discrete math and/or probability course to complete the work in CS70. Logic, infinity, and induction; applications include undecidability and stable marriage problem. Modular arithmetic and GCDs; applications include primality testing and cryptography. Polynomials; examples include error correcting codes and interpolation. Probability including sample spaces, independence, random variables, law of large numbers; examples include load balancing, existence arguments, Bayesian inference.
Completion of work in Computer Science 70: Read More [+]
**Rules & Requirements**

**Prerequisites:** Sophomore mathematical maturity, programming experience equivalent to that gained in 61A, a prior college level course on discrete math and/or probability, and consent of the instructor

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3-8 hours of self-paced per week

**Summer:** 8 weeks - 6-16 hours of self-paced per week

**Additional Details**

**Subject/Course Level:** Electrical Engin and Computer Sci/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam not required.

**Instructors:** Ranade, Rao, Sahai, Seshia, Vazirani, Walrand

Completion of work in Computer Science 70: Read Less [-]

## EECS C106A Introduction to Robotics 4 Units

Terms offered: Fall 2017
An introduction to the kinematics, dynamics, and control of robot manipulators, robotic vision, and sensing. The course covers forward and inverse kinematics of serial chain manipulators, the manipulator Jacobian, force relations, dynamics, and control. It presents elementary principles on proximity, tactile, and force sensing, vision sensors, camera calibration, stereo construction, and motion detection. The course concludes with current applications of robotics in active perception, medical robotics, and other areas.
Introduction to Robotics: Read More [+]
**Rules & Requirements**

**Prerequisites:** Electrical Engineering 120 or equivalent, consent of instructor

**Credit Restrictions:** Students will receive no credit for Electrical Engineering and Computer Science C106A/Bioengineering C106A after completing EE C106A/BioE C125, Electrical Engineering 206A, or Electrical Engineering and Computer Science 206A.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture, 1 hour of discussion, and 3 hours of laboratory per week

**Additional Details**

**Subject/Course Level:** Electrical Engin and Computer Sci/ Undergraduate

**Grading/Final exam status:** Letter grade. Alternative to final exam.

**Instructor:** Bajcsy

**Also listed as:** BIO ENG C106A

Introduction to Robotics: Read Less [-]

## EECS C106B Robotic Manipulation and Interaction 4 Units

Terms offered: Spring 2018
This course is a sequel to EECS C106A/Bioengineering C106A, which covers kinematics, dynamics and control of a single robot. This course will cover dynamics and control of groups of robotic manipulators coordinating with each other and interacting with the environment. Concepts will include an introduction to grasping and the constrained manipulation, contacts and force control for interaction with the environment. We will also cover active perception guided manipulation, as well as the manipulation of non-rigid objects. Throughout, we will emphasize design and human-robot interactions, and applications to applications in manufacturing, service robotics, tele-surgery, and locomotion.
Robotic Manipulation and Interaction: Read More [+]
**Rules & Requirements**

**Prerequisites:** Electrical Engineering and Computer Science C106A/Bioengineering C106A or consent of the instructor

**Credit Restrictions:** Students will receive no credit for Electrical Engineering and Computer Science C106B/Bioengineering C106B after completing Electrical Engineering C106B/Bioengineering C125B, Electrical Engineering 206B, or Electrical Engineering and Computer Science 206B.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture, 1 hour of discussion, and 3 hours of laboratory per week

**Additional Details**

**Subject/Course Level:** Electrical Engin and Computer Sci/Undergraduate

**Grading/Final exam status:** Letter grade. Alternative to final exam.

**Instructors:** Bajcsy, Sastry

**Also listed as:** BIO ENG C106B

Robotic Manipulation and Interaction: Read Less [-]

## EECS 126 Probability and Random Processes 4 Units

Terms offered: Spring 2018, Fall 2017
This course covers the fundamentals of probability and random processes useful in fields such as networks, communication, signal processing, and control. Sample space, events, probability law. Conditional probability. Independence. Random variables. Distribution, density functions. Random vectors. Law of large numbers. Central limit theorem. Estimation and detection. Markov chains.
Probability and Random Processes: Read More [+]
**Rules & Requirements**

**Prerequisites:** CS 70 preferred but not required. Familiarity with linear algebra

**Credit Restrictions:** Students will receive no credit for EECS 126 after completing EE 126.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of discussion per week

**Additional Details**

**Subject/Course Level:** Electrical Engin and Computer Sci/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructor:** Ramchandran

Probability and Random Processes: Read Less [-]

## EECS 127 Optimization Models in Engineering 4 Units

Terms offered: Spring 2018, Fall 2017
This course offers an introduction to optimization models and their applications, ranging from machine learning and statistics to decision-making and control, with emphasis on numerically tractable problems, such as linear or constrained least-squares optimization.
Optimization Models in Engineering: Read More [+]

**Rules & Requirements**

**Prerequisites:** EE 16A & 16B or consent of instructor

**Credit Restrictions:** Students will receive no credit for EECS 127 after taking EECS 227AT or Electrical Engineering 127/227AT.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of discussion per week

**Additional Details**

**Subject/Course Level:** Electrical Engin and Computer Sci/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructor:** El Ghaoui

**Formerly known as:** Electrical Engineering 127

Optimization Models in Engineering: Read Less [-]

## EECS 149 Introduction to Embedded Systems 4 Units

Terms offered: Fall 2017, Fall 2016, Fall 2015
This course introduces students to the basics of modeling, analysis, and design of embedded, cyber-physical systems. Students learn how to integrate computation with physical processes to meet a desired specification. Topics include models of computation, control, analysis and verification, interfacing with the physical world, real-time behaviors, mapping to platforms, and distributed embedded systems. The course has a strong laboratory component, with emphasis on a semester-long sequence of projects.
Introduction to Embedded Systems: Read More [+]

**Objectives Outcomes**

**Course Objectives:** To develop the skills to realize embedded systems that are safe, reliable, and efficient in their use of resources.
To learn how to model and design the joint dynamics of software, networks, and physical processes.
To learn to think critically about technologies that are available for achieving such joint dynamics.

**Rules & Requirements**

**Prerequisites:** EE 16A & B, or permission of instructor; CS 61C and CS 70

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 3 hours of laboratory per week

**Additional Details**

**Subject/Course Level:** Electrical Engin and Computer Sci/ Undergraduate

**Grading/Final exam status:** Letter grade. Alternative to final exam.

**Instructors:** Seshia, Lee

Introduction to Embedded Systems: Read Less [-]

## EECS 151 Introduction to Digital Design and Integrated Circuits 3 Units

Terms offered: Spring 2018, Fall 2017, Spring 2017
An introduction to digital and system design. The material provides a top-down view of the principles, components, and methodologies for large scale digital system design. The underlying CMOS devices and manufacturing technologies are introduced, but quickly abstracted to higher-levels to focus the class on design of larger digital modules for both FPGAs (field programmable gate arrays) and ASICs (application specific integrated circuits). The class includes extensive use of industrial grade design automation and verification tools for assignments, labs and projects.
The class has two lab options: ASIC Lab (EECS 151LA) and FPGA Lab (EECS 151LB). Students must enroll in at least one of the labs concurrently with the class.
Introduction to Digital Design and Integrated Circuits: Read More [+]
**Objectives Outcomes**

**Course Objectives:** The Verilog hardware description language is introduced and used. Basic digital system design concepts, Boolean operations/combinational logic, sequential elements and finite-state-machines, are described. Design of larger building blocks such as arithmetic units, interconnection networks, input/output units, as well as memory design (SRAM, Caches, FIFOs) and integration are also covered. Parallelism, pipelining and other micro-architectural optimizations are introduced. A number of physical design issues visible at the architecture level are covered as well, such as interconnects, power, and reliability.

**Rules & Requirements**

**Prerequisites:** Electrical Engineering 16A & 16B

**Credit Restrictions:** Students must enroll concurrently in at least one the lab flavors EECS151LA or EECS151LB. Students wishing to take a second lab flavor next term can sign-up only for that Lab section and receive a Letter grade. The pre-requisite for “Lab-only” enrollment that term will be EECS151 from previous terms.

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of discussion per week

**Additional Details**

**Subject/Course Level:** Electrical Engin and Computer Sci/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructors:** Stojanovic, Wawrzynek

Introduction to Digital Design and Integrated Circuits: Read Less [-]

## EECS 151LA Application Specific Integrated Circuits Laboratory 2 Units

Terms offered: Spring 2018, Fall 2017, Spring 2017
This lab lays the foundation of modern digital design by first presenting the scripting and hardware description language base for specification of digital systems and interactions with tool flows. The labs are centered on a large design with the focus on rapid design space exploration. The lab exercises culminate with a project design, e.g., implementation of a three-stage RISC-V processor with a register file and caches. The design is mapped to simulation and layout specification.
Application Specific Integrated Circuits Laboratory: Read More [+]
**Objectives Outcomes**

**Course Objectives:** Software testing of digital designs is covered leading to a set of exercises that cover the design flow. Digital synthesis, floor-planning, placement and routing are covered, as well as tools to evaluate timing and power consumption. Chip-level assembly is covered, including instantiation of custom blocks: I/O pads, memories, PLLs, etc.

**Rules & Requirements**

**Prerequisites:** Computer Science 61C, Electrical Engineering 16A & 16B, Electrical Engineering 105

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of laboratory per week

**Additional Details**

**Subject/Course Level:** Electrical Engin and Computer Sci/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam not required.

**Instructors:** Stojanovic, Wawrzynek

Application Specific Integrated Circuits Laboratory: Read Less [-]

## EECS 151LB Field-Programmable Gate Array Laboratory 2 Units

Terms offered: Spring 2018, Fall 2017, Spring 2017
This lab covers the design of modern digital systems with Field-Programmable Gate Array (FPGA) platforms. A series of lab exercises provide the background and practice of digital design using a modern FPGA design tool flow. Digital synthesis, partitioning, placement, routing, and simulation tools for FPGAs are covered in detail. The labs exercises culminate with a large design project, e.g., an implementation of a full three-stage RISC-V processor system, with caches, graphics acceleration, and external peripheral components. The design is mapped and demonstrated on an FPGA hardware platform.
Field-Programmable Gate Array Laboratory: Read More [+]
**Rules & Requirements**

**Prerequisites:** Electrical Engineering 16A & 16B; Electrical Engineering 105 recommended and Computer Science 61C

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of laboratory per week

**Additional Details**

**Subject/Course Level:** Electrical Engin and Computer Sci/ Undergraduate

**Grading/Final exam status:** Letter grade. Final exam not required.

**Instructors:** Stojanovic, Wawrzynek

Field-Programmable Gate Array Laboratory: Read Less [-]

- Computer Sciences and Electrical Engineering Faculty (p. )
- Business Administration Faculty (p. )

**+** Indicates this faculty member is the recipient of the Distinguished Teaching Award.

## Computer Sciences and Electrical Engineering Faculty

**Pieter Abbeel, *Associate Professor*.** Artificial Intelligence (AI); Control, Intelligent Systems, and Robotics (CIR); Machine Learning.
Research Profile (http://vcresearch.berkeley.edu/faculty/pieter-abbeel)

**Maneesh Agrawala, *Professor*.** Human-Computer Interaction (HCI).
Research Profile (http://vcresearch.berkeley.edu/faculty/maneesh-agrawala)

**David Allstot, *Professor in Residence*.** Integrated Circuits (INC).

**Elad Alon, *Associate Professor*.** Integrated Circuits (INC); Micro/Nano Electro Mechanical Systems (MEMS); Communications & Networking (COMNET); Design, Modeling and Analysis (DMA).
Research Profile (http://vcresearch.berkeley.edu/faculty/elad-alon)

**Venkat Anantharam, *Professor*.** Communications & Networking (COMNET); Artificial Intelligence (AI); Control, Intelligent Systems, and Robotics (CIR); Security (SEC); Signal Processing (SP).
Research Profile (http://vcresearch.berkeley.edu/faculty/venkat-anantharam)

**Murat Arcack, *Professor*.** Control, Intelligent Systems, and Robotics (CIR); Biosystems & Computational Biology (BIO).
Research Profile (http://vcresearch.berkeley.edu/faculty/murat-arcak)

**Ana Claudia Arias, *Associate Professor*.** Physical Electronics (PHY); Flexible and Printed Electronics; Energy (ENE).

**Krste Asanovic, *Professor*.** Computer Architecture & Engineering (ARC); Integrated Circuits (INC); Operating Systems & Networking (OSNT);Design, Modeling and Analysis (DMA).
Research Profile (http://vcresearch.berkeley.edu/faculty/krste-asanovic)

**Babak Ayazifar, *Professor*.** Education (EDUC), Signal processing and system theory EDUCATION: Development of pedagogical techniques and assessment tools.; Signal Processing (SP), Graph signal processing.

**Jonathan Bachrach, *Adjunct Assistant Professor*.** Programming Systems (PS); Computer Architecture & Engineering (ARC); Design, Modeling and Analysis (DMA).

**Ruzena Bajcsy, *Professor*.** Artificial Intelligence (AI); Biosystems & Computational Biology (BIO); Control, Intelligent Systems, and Robotics (CIR); Graphics (GR); Human-Computer Interaction (HCI), Computer vision; Bridging information technology to humanities and social sciences; Security (SEC).
Research Profile (http://vcresearch.berkeley.edu/faculty/ruzena-bajcsy)

**Brian A. Barsky, *Professor*.** Computer science, geometric design and modeling, computer graphics, computer aided cornea modeling and visualization, medical imaging, virtual environments for surgical simulation.
Research Profile (http://vcresearch.berkeley.edu/node/13851)

**Peter L. Bartlett, *Professor*.** Statistics, machine learning, statistical learning theory, adaptive control.
Research Profile (http://vcresearch.berkeley.edu/node/14413)

**Alexandre M. Bayen, *Professor*.** Transportation, modelling and control of distributed parameters systems, large scale infrastructure systems, water distribution.
Research Profile (http://vcresearch.berkeley.edu/node/14130)

**Jeffrey Bokor, *Professor*.** Physical Electronics (PHY); Nanotechnology.
Research Profile (http://vcresearch.berkeley.edu/faculty/jeffrey-bokor)

**Bernhard Boser, *Professor*.** Biosystems & Computational Biology (BIO); Design, Modeling and Analysis (DMA); Integrated Circuits (INC);Physical Electronics (PHY).
Research Profile (http://vcresearch.berkeley.edu/faculty/bernhard-e-boser)

**Eric Brewer, *Professor*.** Operating Systems & Networking (OSNT); Energy (ENE); Security (SEC); Developing regions; Programming languages.
Research Profile (http://vcresearch.berkeley.edu/faculty/eric-brewer)

**John Canny, *Professor*.** Computer science, activity-based computing, livenotes, mechatronic devices, flexonics.
Research Profile (http://vcresearch.berkeley.edu/node/14606)

**Jose M. Carmena, *Professor*.** Brain-machine interfaces, neural ensemble computation, neuroprosthetics, sensorimotor learning and control.
Research Profile (http://vcresearch.berkeley.edu/node/14341)

**Constance Chang-Hasnain, *Professor*.** Microsystems and materials; Nano-Optoelectronic devices.

**Alessandro Chiesa, *Assistant Professor*.** Security (SEC); Theory (THY).

**John Chuang, *Professor*.** Computer networking, computer security, economic incentives, ICTD.
Research Profile (http://vcresearch.berkeley.edu/node/15010)

**Phillip Colella, *Professor in Residence*.**

**Steven Conolly, *Professor*.** Medical imaging instrumentation and control.
Research Profile (http://vcresearch.berkeley.edu/faculty/steven-conolly)

**Thomas Courtade, *Assistant Professor*.** Communications & Networking (COMNET).
Research Profile (http://vcresearch.berkeley.edu/faculty/thomas-courtade)

**David E. Culler, *Professor*.** Computer Architecture & Engineering (ARC); Energy (ENE); Operating Systems & Networking (OSNT);Programming Systems (PS); Security (SEC); Parallel architecture; High-performance networks; Workstation clusters.
Research Profile (http://vcresearch.berkeley.edu/faculty/david-e-culler)

**Trevor Darrell, *Professor in Residence*.** Artificial Intelligence (AI); Control, Intelligent Systems, and Robotics (CIR); Computer Vision.

**James W. Demmel, *Professor*.** Computer science, scientific computing, numerical analysis, linear algebra.
Research Profile (http://vcresearch.berkeley.edu/node/14088)

**John DeNero, *Assistant Professor*.** Artificial Intelligence (AI); Education (EDUC).

**Anca Dragan, *Assistant Professor*.** Artificial Intelligence (AI); Control, Intelligent Systems, and Robotics (CIR); Human-Computer Interaction (HCI).

**Alexei (Alyosha) Efros, *Associate Professor*.** Computer Vision; Graphics (GR); Artificial Intelligence (AI).
Research Profile (http://vcresearch.berkeley.edu/faculty/alexei-efros)

**Laurent El Ghaoui, *Professor*.** Decision-making under uncertainty, convex optimization, robust solutions, semidefinite programming, exhaustive simulation.
Research Profile (http://vcresearch.berkeley.edu/node/15019)

**Ronald S. Fearing, *Professor*.** Control, Intelligent Systems, and Robotics (CIR); Biosystems & Computational Biology (BIO).

**Armando Fox, *Professor*.** Programming systems (PS), Education (EDUC), Operating Systems and Networking (OSNT).
Research Profile (http://vcresearch.berkeley.edu/faculty/armando-fox)

**Michael Franklin, *Professor*.** Operating Systems & Networking (OSNT), AMPLab.

**+ Robert J. Full, *Professor*.** Energetics, comparative biomechanics, arthropod, adhesion, comparative physiology, locomotion, neuromechanics, biomimicry, biological inspiration, reptile, gecko, amphibian, robots, artificial muscles.
Research Profile (http://vcresearch.berkeley.edu/node/14168)

**Jack L. Gallant, *Professor*.** Vision science, form vision, attention, fMRI, computational neuroscience, natural scene perception, brain encoding, brain decoding.
Research Profile (http://vcresearch.berkeley.edu/node/14700)

**Dan Garcia, *Professor*.** Education (EDUC); Computational Game Theory; Graphics (GR).

**Sanjam Garg, *Assistant Professor*.** Theory (THY); Security (SEC).
Research Profile (http://vcresearch.berkeley.edu/faculty/sanjam-garg)

**Ali Ghodsi, *Adjunct Assistant Professor*.** Database Management Systems (DBMS); Operating Systems & Networking (OSNT).

**Ken Goldberg, *Professor*.** Robotics, art, social media, new media, automation.
Research Profile (http://vcresearch.berkeley.edu/node/14251)

**Joseph Gonzalez, *Assistant Professor*.** Artificial Intelligence (AI); Database Management Systems (DBMS).

**Tom Griffiths, *Associate Professor*.** Machine learning, computational models of human cognition, Bayesian statistics, cultural evolution.
Research Profile (http://vcresearch.berkeley.edu/node/14745)

**Bj_rn Hartmann, *Associate Professor*.** Human-Computer Interaction (HCI); Graphics (GR); Programming Systems (PS).

**Marti A. Hearst, *Professor*.** Information retrieval, human-computer interaction, user interfaces, information visualization, web search, search user interfaces, empirical computational linguistics, natural language processing, text mining, social media.
Research Profile (http://vcresearch.berkeley.edu/node/14819)

**Joseph M. Hellerstein, *Professor*.** Database Management Systems (DBMS); Operating Systems & Networking (OSNT).
Research Profile (http://vcresearch.berkeley.edu/faculty/joseph-m-hellerstein)

**Paul N. Hilfinger, *Professor*.** Programming Systems (PS); Scientific Computing (SCI); Software engineering; Parallel programming techniques.
Research Profile (http://vcresearch.berkeley.edu/faculty/paul-n-hilfinger)

**Joshua Hug, *Assistant Professor*.** Education (EDUC); Computer Science education.

**Ali Javey, *Professor*.** Physical Electronics (PHY); Energy (ENE); Micro/Nano Electro Mechanical Systems (MEMS); Nanomaterials and Nanotechnology.
Research Profile (http://vcresearch.berkeley.edu/faculty/ali-javey)

**Michael I. Jordan, *Professor*.** Computer science, artificial intelligence, bioinformatics, statistics, machine learning, electrical engineering, applied statistics, optimization.
Research Profile (http://vcresearch.berkeley.edu/node/13970)

**Anthony D. Joseph, *Professor*.** Operating Systems & Networking (OSNT); Security (SEC); Computer and Network Security; Distributed systems; Mobile computing; Wireless networking; Software engineering, and operating systems.
Research Profile (http://vcresearch.berkeley.edu/faculty/anthony-d-joseph)

**+ Richard Karp, *Professor*.** Computational molecular biology, genomics, DNA molecules, structure of genetic regulatory networks, combinatorial and statsitical methods.
Research Profile (http://vcresearch.berkeley.edu/faculty/richard-karp)

**Randy H. Katz, *Professor*.** Computer Architecture & Engineering (ARC); Operating Systems & Networking (OSNT); Distributed and networked systems design and implementation.

**Kurt Keutzer, *Professor*.** Computer Architecture & Engineering (ARC); Design, Modeling and Analysis (DMA); Scientific Computing (SCI).
Research Profile (http://vcresearch.berkeley.edu/faculty/kurt-keutzer)

**Daniel Klein, *Professor*.** Artificial Intelligence (AI); Natural Language Processing, Computational Linguistics, Machine Learning.
Research Profile (http://vcresearch.berkeley.edu/faculty/daniel-klein)

**John D. Kubiatowicz, *Professor*.** Operating Systems & Networking (OSNT); Security (SEC); Computer architecture; Quantum computer design; Internet-scale storage systems; Peer-to-peer networking.
Research Profile (http://vcresearch.berkeley.edu/faculty/john-d-kubiatowicz)

**Andreas Kuehlmann, *Adjunct Professor*.** Design, Modeling and Analysis (DMA).
Research Profile (http://vcresearch.berkeley.edu/faculty/andreas-kuehlmann)

**Edward A. Lee, *Professor*.** Embedded Software, Real-Time Systems, Cyber-Physical Systems, Concurrency; Design, Modeling and Analysis (DMA); Programming Systems (PS);Signal Processing (SP).
Research Profile (http://vcresearch.berkeley.edu/faculty/edward-lee)

**Luke Lee, *Professor*.** Biophotonics, biophysics, bionanoscience, molecular imaging, single cell analysis, bio-nano interfaces, integrated microfluidic devices (iMD) for diagnostics and preventive personalized medicine.
Research Profile (http://vcresearch.berkeley.edu/node/14953)

**Chunlei Liu, *Associate Professor*.**

**Tsu-Jae King Liu, *Professor*.** Physical Electronics (PHY); Micro/Nano Electro Mechanical Systems (MEMS).
Research Profile (http://vcresearch.berkeley.edu/faculty/tsu-jae-king-liu)

**Michael Lustig, *Associate Professor*.** Medical Imaging; Magnetic Resonance Imaging; Signal Processing (SP); Scientific Computing (SCI); Physical Electronics (PHY); Communications & Networking (COMNET); Biosystems & Computational Biology (BIO); Control, Intelligent Systems, and Robotics (CIR).

**Michel Maharbiz, *Associate Professor*.** Neural interfaces, bioMEMS, microsystems, MEMS, microsystems for the life sciences.
Research Profile (http://vcresearch.berkeley.edu/node/15053)

**Jitendra Malik, *Professor*.** Artificial Intelligence (AI); Biosystems & Computational Biology (BIO); Control, Intelligent Systems, and Robotics (CIR); Graphics (GR); Human-Computer Interaction (HCI); Signal Processing (SP);.
Research Profile (http://vcresearch.berkeley.edu/faculty/jitendra-malik)

**Elchanan Mossel, *Professor*.** Applied probability, statistics, mathematics, finite markov chains, markov random fields, phlylogeny.
Research Profile (http://vcresearch.berkeley.edu/node/15148)

**Rikky Muller, *Assistant Professor*.** Integrated Circuits (INC); Biosystems & Computational Biology (BIO); Micro/Nano Electro Mechanical Systems (MEMS).

**George Necula, *Assistant Professor*.** Software engineering, programming systemsm, security, program analysis.
Research Profile (http://vcresearch.berkeley.edu/faculty/george-necula)

**Ren Ng, *Assistant Professor*.** Imaging Systems; Computational Photography;; Signal Processing (SP); Optics.

**Clark Nguyen, *Professor*.** Micro/Nano Electro Mechanical Systems (MEMS); Integrated Circuits (INC); Physical Electronics (PHY); Design, Modeling and Analysis (DMA).
Research Profile (http://vcresearch.berkeley.edu/faculty/clark-nguyen)

**Ali Niknejad, *Professor*.** Integrated Circuits (INC), Microwave and mm-Wave Circuits and Systems; Physical Electronics (PHY); Signal Processing (SP); Applied Electromagnetics; Communications & Networking (COMNET); Design, Modeling and Analysis (DMA).
Research Profile (http://vcresearch.berkeley.edu/faculty/ali-m-niknejad)

**Borivoje Nikolic, *Professor*.** Integrated Circuits (INC); Communications & Networking (COMNET); Design, Modeling and Analysis (DMA); Computer Architecture & Engineering (ARC).
Research Profile (http://vcresearch.berkeley.edu/faculty/borivoje-nikolic)

**James O'Brien, *Professor*.** Computer graphics, fluid dynamics, computer simulation, physically based animation, finite element simulation, human perception, image forensics, video forensics, computer animation, special effects for film, video game technology, motion capture.
Research Profile (http://vcresearch.berkeley.edu/node/15357)

**Bruno Olshausen, *Professor*.** Visual perception, computational neuroscience, computational vision.
Research Profile (http://vcresearch.berkeley.edu/node/14277)

**Lior Pachter, *Professor*.** Mathematics, applications of statistics, combinatorics to problems in biology.
Research Profile (http://vcresearch.berkeley.edu/node/15209)

**Christos H. Papadimitriou, *Professor*.** Economics, evolution., algorithms, game theory, networks, optimization, complexity.
Research Profile (http://vcresearch.berkeley.edu/node/15369)

**Abhay Parekh, *Adjunct Professor*.** Communications & Networking (COMNET).

**Shyam Parekh, *Adjunct Associate Professor*.** Communications & Networking (COMNET).

**Tapan Parikh, *Associate Professor*.** Human-Computer Interaction (HCI), ICTD.

**David A. Patterson, *Professor*.** Computer Architecture & Engineering (ARC), Computer Architecture and Systems: Parallel Computing performance, correctness, productivity;Biosystems & Computational Biology (BIO), Cancer tumor genomics; Operating Systems & Networking (OSNT).
Research Profile (http://vcresearch.berkeley.edu/faculty/david-patterson)

**Eric Paulos, *Assistant Professor*.** Human-Computer Interaction (HCI), New Media arts.

**Vern Paxson, *Professor*.** Security (SEC); Operating Systems & Networking (OSNT).
Research Profile (http://vcresearch.berkeley.edu/faculty/vern-paxson)

**Kristofer Pister, *Professor*.** Micro/Nano Electro Mechanical Systems (MEMS); Control, Intelligent Systems, and Robotics (CIR), Micro-robotics; Integrated Circuits (INC), Low-power circuits.

Research Profile (http://vcresearch.berkeley.edu/faculty/kristofer-pister)

**+ Kameshwar Poolla, *Professor*.** Cybersecurity, modeling, control, renewable energy, estimation, integrated circuit design and manufacturing, smart grids.
Research Profile (http://vcresearch.berkeley.edu/node/14273)

**Raluca Ada Popa, *Assistant Professor*.** Operating Systems & Networking (OSNT); Security (SEC).

**Jan M. Rabaey, *Professor*.** Communications & Networking (COMNET); Design, Modeling and Analysis (DMA); Energy (ENE); Integrated Circuits (INC); Signal Processing (SP); Computer architecture.
Research Profile (http://vcresearch.berkeley.edu/faculty/jan-m-rabaey)

**Prasad Raghavendra, *Assistant Professor*.** Theory (THY).

**Ravi Ramamoorthi, *Professor*.** Graphics (GR); Scientific Computing (SCI); Signal Processing (SP); Computer Vision.

**Kannan Ramchandran, *Professor*.** Communications & Networking (COMNET); Signal Processing (SP); Control, Intelligent Systems, and Robotics (CIR).
Research Profile (http://vcresearch.berkeley.edu/faculty/kannan-ramchandran)

**Satish Rao, *Professor*.** Biosystems & Computational Biology (BIO); Theory (THY).
Research Profile (http://vcresearch.berkeley.edu/faculty/satish-rao)

**Sylvia Ratnasamy, *Assistant Professor*.** Operating Systems & Networking (OSNT).

**Benjamin Recht, *Associate Professor*.** Control, Intelligent Systems, and Robotics (CIR); Signal Processing (SP); Machine Learning (ML); Optimization (OPT).

**Jaijeet Roychowdhury, *Professor*.** Design, Modeling and Analysis (DMA); Scientific Computing (SCI); Biosystems & Computational Biology (BIO).

**Stuart Russell, *Professor*.** Artificial intelligence, computational biology, algorithms, machine learning, real-time decision-making, probabilistic reasoning.
Research Profile (http://vcresearch.berkeley.edu/faculty/stuart-j-russell)

**Anant Sahai, *Associate Professor*.** Communications & Networking (COMNET), Information Theory, Cognitive Radio and Spectrum Sharing; Control, Intelligent Systems, and Robotics (CIR), Distributed and Networked Control; Signal Processing (SP); Theory (THY), Information Theory.
Research Profile (http://vcresearch.berkeley.edu/faculty/anant-sahai)

**Sayeef Salahuddin, *Associate Professor*.** Physical Electronics (PHY); Design, Modeling and Analysis (DMA); Energy (ENE); Scientific Computing (SCI).

**Seth R. Sanders, *Professor*.** Energy (ENE); Control, Intelligent Systems, and Robotics (CIR); Integrated Circuits (INC); Power and electronics systems.
Research Profile (http://vcresearch.berkeley.edu/faculty/seth-r-sanders)

**Alberto L. Sangiovanni-Vincentelli, *Professor*.** Design, Modeling and Analysis (DMA), Embedded System Design; Design methodologies and tools; Control, Intelligent Systems, and Robotics (CIR), Hybrid systems; Design methodologies and tools; Communications & Networking (COMNET), Wireless sensor network design; Design methodologies and tools.
Research Profile (http://vcresearch.berkeley.edu/faculty/alberto-sangiovanni-vincentelli)

**S. Shankar Sastry, *Professor*.** Computer science, robotics, arial robots, cybersecurity, cyber defense, homeland defense, nonholonomic systems, control of hybrid systems, sensor networks, interactive visualization, robotic telesurgery, rapid prototyping.
Research Profile (http://vcresearch.berkeley.edu/node/13862)

**Koushik Sen, *Associate Professor*.** Programming Systems (PS), Software Engineering, Programming Languages, and Formal Methods: Software Testing, Verification, Model Checking, Runtime Monitoring, Performance Evaluation, and Computational Logic.; Security (SEC).
Research Profile (http://vcresearch.berkeley.edu/faculty/koushik-sen)

**Sanjit Seshia, *Associate Professor*.** Electronic design automation, theory, computer security, program analysis, dependable computing, computational logic, formal methods.
Research Profile (http://vcresearch.berkeley.edu/faculty/sanjit-seshia)

**Scott Shenker, *Professor*.** Internet Architecture, Software-Defined Networks, Datacenter Infrastructure, Large-Scale Distributed Systems, Game Theory and Economics;Operating Systems & Networking (OSNT).
Research Profile (http://vcresearch.berkeley.edu/faculty/scott-shenker)

**Jonathan Shewchuk, *Professor*.** Scientific Computing (SCI); Theory (THY); Graphics (GR).
Research Profile (http://vcresearch.berkeley.edu/faculty/jonathan-shewchuk)

**Alistair Sinclair, *Professor*.** Theory (THY); Randomized algorithms; applied probability; statistical physics.
Research Profile (http://vcresearch.berkeley.edu/faculty/alistair-sinclair)

**Dawn Song, *Professor*.** Operating Systems & Networking (OSNT); Security (SEC); Programming Systems (PS).
Research Profile (http://vcresearch.berkeley.edu/faculty/dawn-song)

**Yun Song, *Associate Professor*.** Computational biology, population genomics, applied probability and statistics.
Research Profile (http://vcresearch.berkeley.edu/node/14178)

**Costas J. Spanos, *Professor*.** Energy (ENE); Integrated Circuits (INC); Physical Electronics (PHY); Semiconductor manufacturing; Solid-State Devices.
Research Profile (http://vcresearch.berkeley.edu/faculty/costas-j-spanos)

**Ian Stoica, *Professor*.** Operating Systems & Networking (OSNT); Security (SEC); Networking and distributed computer systems, Quality of Service (Q of S) and resources management, modeling and performance analysis.

**Vladimir Stojanovic, *Associate Professor*.** Integrated Circuits (INC); Micro/Nano Electro Mechanical Systems (MEMS); Computer Architecture & Engineering (ARC); Physical Electronics (PHY); Communications & Networking (COMNET); Integrated Photonics, Circuit design with Emerging-Technologies.
Research Profile (http://vcresearch.berkeley.edu/faculty/vladimir-stojanovic)

**Bernd Sturmfels, *Professor*.** Mathematics, combinatorics, computational algebraic geometry.

Research Profile (http://vcresearch.berkeley.edu/node/15683)

**Vivek Subramanian, *Professor*.** Physical Electronics (PHY); Energy (ENE); Integrated Circuits (INC).
Research Profile (http://vcresearch.berkeley.edu/faculty/vivek-subramanian)

**Claire Tomlin, *Professor*.** Control, Intelligent Systems, and Robotics (CIR); Biosystems & Computational Biology (BIO); Control theory; hybrid and embedded systems; biological cell networks.
Research Profile (http://vcresearch.berkeley.edu/faculty/claire-tomlin)

**Luca Trevisan, *Professor*.** Theory (THY), (Computational Complexity, Randomness in Computation, Combinatorial Optimization); Security (SEC).

**Stavros Tripakis, *Adjunct Associate Professor*.** Design, Modeling and Analysis (DMA), Computer-Aided System Design, Formal Methods, Verification, Synthesis, Embedded and Cyber-Physical Systems; Programming Systems (PS).

**David Tse, *Adjunct Professor*.** Communications & Networking (COMNET).
Research Profile (http://vcresearch.berkeley.edu/faculty/david-tse)

**Doug Tygar, *Professor*.** Privacy, technology policy, computer security, electronic commerce, software engineering, reliable systems, embedded systems, computer networks, cryptography, cryptology, authentication, ad hoc networks.
Research Profile (http://vcresearch.berkeley.edu/node/15560)

**Umesh Vazirani, *Professor*.** Quantum computation, hamiltonian complexity, analysis of algorithms.
Research Profile (http://vcresearch.berkeley.edu/node/15573)

**Alexandra von Meier, *Adjunct Professor*.** Energy (ENE), Electric Grids, Power Distribution.

**David Wagner, *Professor*.** Security (SEC).
Research Profile (http://vcresearch.berkeley.edu/faculty/david-wagner)

**Martin Wainwright, *Professor*.** Statistical machine learning, High-dimensional statistics, information theory, Optimization and algorithmss.
Research Profile (http://vcresearch.berkeley.edu/node/15701)

**Laura Waller, *Assistant Professor*.** Physical Electronics (PHY); Signal Processing (SP); Computational imaging; Optics and Imaging; Biosystems & Computational Biology (BIO); Graphics (GR).
Research Profile (http://vcresearch.berkeley.edu/faculty/laura-waller)

**Jean Walrand, *Professor*.** Communications & Networking (COMNET), Performance evaluation; Game theory.
Research Profile (http://vcresearch.berkeley.edu/faculty/jean-walrand)

**John Wawrzynek, *Professor*.** Computer Architecture & Engineering (ARC).
Research Profile (http://vcresearch.berkeley.edu/faculty/john-wawrzynek)

**Adam Wolisz, *Adjunct Professor*.** Communications & Networking (COMNET); Computer Architecture & Engineering (ARC), System Performance Evaluation.

**Ming C. Wu, *Professor*.** Si photonics, optoelectronics, nanophotonics, optical MEMS, Optofluidics; Micro/Nano Electro Mechanical Systems (MEMS); Physical Electronics (PHY).

**Eli Yablonovitch, *Professor*.** Optoelectronics Research Group, high speed optical communications, photonic crystals at optical and microwave frequencies, the milli-Volt switch, optical antennas and solar cells.; Physical Electronics (PHY).
Research Profile (http://vcresearch.berkeley.edu/faculty/eli-yablonovitch)

**Katherine A. Yelick, *Professor*.** Programming Systems (PS); Scientific Computing (SCI); Biosystems & Computational Biology (BIO); parallel programming techniques.
Research Profile (http://vcresearch.berkeley.edu/faculty/katherine-yelick)

**Nir Yosef, *Assistant Professor*.** Computational biology.
Research Profile (http://vcresearch.berkeley.edu/faculty/nir-yosef)

**Bin Yu, *Professor*.** Neuroscience, remote sensing, networks, statistical machine learning, high-dimensional inference, massive data problems, document summarization.
Research Profile (http://vcresearch.berkeley.edu/node/14282)

**Avideh Zakhor, *Professor*.** Signal Processing (SP); Artificial Intelligence (AI); Control, Intelligent Systems, and Robotics (CIR); Graphics (GR).
Research Profile (http://vcresearch.berkeley.edu/faculty/avideh-zakhor)

## Lecturers

**Gerald Friedland, *Lecturer*.**

## Visiting Faculty

**Eric Friedman**

**Laura Grigori**

**Justin Hsia, *Biosystems & Computational Biology (BIO)*.**

**Christopher Hunn**

**Georgios Michelogiannakis**

**Omur Ozel**

**Barath Raghavan**

**David Richerby**

**Johannes Royset**

**Patrick Virtue**

**Nicholas Weaver, *Operating Systems & Networking (OSNT)*.**

## Emeritus Faculty

**David Attwood, *Professor Emeritus*.** Short wavelength electromagnetics; Soft X-ray microscopy; Coherence; EUV lithography.
Research Profile (http://vcresearch.berkeley.edu/faculty/david-attwood)

**Elwyn R. Berlekamp, *Professor Emeritus*.** Computer science, electrical engineering, mathematics, combinatorial game theory, algebraic coding theory.
Research Profile (http://vcresearch.berkeley.edu/node/14435)

**Manuel Blum, *Professor Emeritus*.** Recursive function, cryptographic protocols, program checking.

**Robert K. Brayton, *Professor Emeritus*.** Design, Modeling and Analysis (DMA); Advanced methods in combinational and sequential logic synthesis and formal verification.

Research Profile (http://vcresearch.berkeley.edu/faculty/robert-k-brayton)

**Robert W. Brodersen, *Professor Emeritus*.** Design, Modeling and Analysis (DMA); Integrated Circuits (INC); Signal Processing (SP).

**Thomas F. Budinger, *Professor Emeritus*.** Image processing, biomedical electronics, quantitative aging, cardiovascular physiology, bioastronautics, image reconstruction, nuclear magnetic resonance, positron emission, tomography, reconstruction tomography, inverse problem mathematics.
Research Profile (http://vcresearch.berkeley.edu/node/14405)

**Nathan W. Cheung, *Professor Emeritus*.** Nanofabrication; Heterogeneous integration of microsystems; Plasma and ion-beam processing technologies; Electronic materials.
Research Profile (http://vcresearch.berkeley.edu/faculty/nathan-w-cheung)

**Leon O. Chua, *Professor Emeritus*.** Biosystems & Computational Biology (BIO); Control, Intelligent Systems, and Robotics (CIR), Cellular neural networks; Cellular automata; Complexity;; Nanoelectronics; Nonlinear circuits and systems; Nonlinear dynamics; Chaos;.
Research Profile (http://vcresearch.berkeley.edu/faculty/leon-o-chua)

**Mike Clancy, *Professor Emeritus*.** Science education, cognitive development, educational software.
Research Profile (http://vcresearch.berkeley.edu/faculty/michael-clancy)

**Richard J. Fateman, *Professor Emeritus*.** Artificial Intelligence (AI); Scientific Computing (SCI), Computer algebra systems; Programming environments and systems; Programming languages and compilers; Symbolic mathematical computation; Document image analysis, multimodal input of mathematics.
Research Profile (http://vcresearch.berkeley.edu/faculty/richard-j-fateman)

**Jerome A. Feldman, *Professor Emeritus*.** Artificial Intelligence (AI); Biosystems & Computational Biology (BIO); Security (SEC); cognitive science.
Research Profile (http://vcresearch.berkeley.edu/faculty/jerome-feldman)

**Domenico Ferrari, *Professor Emeritus*.** UC Berkeley Unix Project, high-speed network testbeds and the design of real-time communication services and network protocols for multimedia traffic.

**Susan L. Graham, *Professor Emeritus*.** Graphics (GR); Human-Computer Interaction (HCI); Programming Systems (PS); Scientific Computing (SCI); Software development environments, software engineering.
Research Profile (http://vcresearch.berkeley.edu/faculty/susan-l-graham)

**Paul R. Gray, *Professor Emeritus*.** Design, Modeling and Analysis (DMA); Integrated Circuits (INC).
Research Profile (http://vcresearch.berkeley.edu/faculty/paul-r-gray)

**T. Kenneth Gustafson, *Professor Emeritus*.** Solid-State Devices; Basic electromagnetic and quantum applications.

**Michael A. Harrison, *Professor Emeritus*.** Multimedia; User interfaces; Software environments.

**Brian K. Harvey, *Professor Emeritus*.** Education (EDUC).
Research Profile (http://vcresearch.berkeley.edu/faculty/brian-harvey)

**David A. Hodges, *Professor Emeritus*.** Integrated Circuits (INC).

**Chenming Hu, *Professor Emeritus*.** Semiconductor Device Technologies.
Research Profile (http://vcresearch.berkeley.edu/faculty/chenming-calvin-hu)

**William M. Kahan, *Professor Emeritus*.** Computer Architecture & Engineering (ARC); Scientific Computing (SCI); Computer architecture; Scientific computing; Numerical analysis.
Research Profile (http://vcresearch.berkeley.edu/faculty/william-m-kahan)

**Edward L. Keller, *Professor Emeritus*.** Computational neuroscience; bioengineering; neurophysiology of the oculomotor system.

**Kam Y. Lau, *Professor Emeritus*.** Communications & Networking (COMNET); Optoelectronic devices; Microwave and millimeter wave signal transport over optical fiber links.
Research Profile (http://vcresearch.berkeley.edu/faculty/kam-y-lau)

**Edwin R. Lewis, *Professor Emeritus*.** Http://vcresearch.berkeley.edu/faculty/edwin-r-lewis.

**Allan J. Lichtenberg, *Professor Emeritus*.** Nano-Optoelectronics, Electromagnetics/Plasmas; Energy (ENE).
Research Profile (http://vcresearch.berkeley.edu/faculty/allan-j-lichtenberg)

**Michael A. Lieberman, *Professor Emeritus*.** Plasma-assisted materials processing; Energy (ENE).
Research Profile (http://vcresearch.berkeley.edu/faculty/michael-lieberman)

**Kenneth K. Mei, *Professor Emeritus*.** Nano-Optoelectronics, Electromagnetics/Plasmas.

**David G. Messerschmitt, *Professor Emeritus*.** Communications & Networking (COMNET); Signal Processing (SP); Business and economics issues in the software industry.

**Robert G. Meyer, *Professor Emeritus*.** Integrated Circuits (INC).
Research Profile (http://vcresearch.berkeley.edu/faculty/robert-g-meyer)

**Nelson Morgan, *Professor Emeritus*.** Signal Processing (SP).

**+ Richard Muller, *Professor Emeritus*.** Astrophysics, geophysics, physics, elementary particle physics, cosmic micro wave background, supernovae for cosmology, origin of the earth's magnetic flips, Nemesis theory, glacial cycles, red sprites, lunar impacts, iridium measurement.
Research Profile (http://vcresearch.berkeley.edu/node/15154)

**Andrew R. Neureuther, *Professor Emeritus*.** Integrated Circuits (INC); Solid-State Devices.
Research Profile (http://vcresearch.berkeley.edu/faculty/andrew-r-neureuther)

**William G. Oldham, *Professor Emeritus*.** Integrated circuits; Semiconductor manufacturing.
Research Profile (http://vcresearch.berkeley.edu/faculty/william-g-oldham)

**Beresford N. Parlett, *Professor Emeritus*.**

**Elijah Polak, *Professor Emeritus*.** Control, Intelligent Systems, and Robotics (CIR), Numerical methods for engineering optimization.
Research Profile (http://vcresearch.berkeley.edu/faculty/elijah-polak)

**Chittoor V. Ramamoorthy, *Professor Emeritus*.** Software engineering.

**Lawrence A. Rowe, *Professor Emeritus*.** Multimedia Technology.
Research Profile (http://vcresearch.berkeley.edu/faculty/lawrence-rowe)

**Steven E. Schwarz, *Professor Emeritus*.** Solid-State Devices; Nano-Optoelectronics, Electromagnetics/Plasmas.

**Carlo H. Sequin, *Professor Emeritus*.** Geometric modeling, Artistic geometry, Mathematical visualizations.; Graphics (GR); Human-Computer Interaction (HCI); CAD tools.

**Jerome R. Singer, *Professor Emeritus*.**

**Alan J. Smith, *Professor Emeritus*.** Computer Architecture & Engineering (ARC); Operating Systems & Networking (OSNT); Computer System Performance Analysis, I/O Systems, Cache Memories, Memory Systems.

**Michael Stonebraker, *Professor Emeritus*.** Database Technology.

**Aram J. Thomasian, *Professor Emeritus*.** Http://vcresearch.berkeley.edu/faculty/aram-thomasian.

**Theodore Van Duzer, *Professor Emeritus*.** Superconductor Electronics.
Research Profile (http://vcresearch.berkeley.edu/faculty/theodore-van-duzer)

**Pravin Varaiya, *Professor Emeritus*.** Communications & Networking (COMNET); Control, Intelligent Systems, and Robotics (CIR); Energy (ENE); Control; Networks; Power systems; Transportation.

**William J. Welch, *Professor Emeritus*.** Nano-Optoelectronics, Electromagnetics/Plasmas.
Research Profile (http://vcresearch.berkeley.edu/faculty/william-j-welch)

**Richard M. White, *Professor Emeritus*.** Energy (ENE); Solid-State Devices.

**Eugene Wong, *Professor Emeritus*.** Communications & Networking (COMNET).
Research Profile (http://vcresearch.berkeley.edu/faculty/eugene-wong)

**Felix F. Wu, *Professor Emeritus*.** Electric power systems analysis; generation and transmission systems planning and investment; power system control and communications; electric energy industry restructuring.
Research Profile (http://vcresearch.berkeley.edu/faculty/felix-f-wu)

**Lotfi A. Zadeh, *Professor Emeritus*.** Artificial intelligence, linguistics, control theory, logic, fuzzy sets, decision analysis, expert systems neural networks, soft computing, computing with words, computational theory of perceptions and precisiated natural language.
Research Profile (http://vcresearch.berkeley.edu/faculty/lotfi-zadeh)

## Business Administration Faculty

**Cameron Anderson, *Professor*.** Status hierarchies, psychology of power, self and interpersonal perception.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/anderson-cameron)

**Ned Augenblick, *Assistant Professor*.** Theoretical and empirical analysis of online markets.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/augenblick-ned)

**Aaron Bodoh-Creed, *Assistant Professor*.** Industrial organization, market design, psychology and economics.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/bodohcreed-aaron)

**Severin Borenstein, *Professor*.** Energy policy and climate change, electricity deregulation, airline competition, oil and gasoline market pricing and competition.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/borenstein-severin)

**Dana Carney, *Associate Professor*.** Ethics, social cognition, social judgment and decision making, nonverbal communication, power and influence, prejudice and discrimination.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/carney-dana)

**Jennifer Chatman, *Professor*.** Organizational culture and firm performance, group demography, norms in social groups.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/chatman-jennifer)

**Henry Chesbrough, *Adjunct Professor*.**

**Victor Couture, *Assistant Professor*.** Urban economics, transportation.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/couture-victor)

**Clayton Critcher, *Assistant Professor*.** Judgment and decision making, consumer experience, the self, moral psychology, social cognition.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/critcher-clayton)

**Ernesto Dal Bo, *Professor*.** Political economy, democratic institutions and collective decision-making, influence and corruption, coercion, conflict.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/dalbo-ernesto)

**Lucas Davis, *Associate Professor*.** Energy and environmental economics, applied microeconomics, public finance.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/davis-lucas)

**Rui de Figueiredo, *Associate Professor*.** Game theory, methodology and econometrics, non-market strategy, institutions and organizations, bureaucratic organization, American politics.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/defigueiredo-rui)

**Mathijs de Vaan, *Assistant Professor*.** Economic sociology, social network analysis, causal inference.
Research Profile (http://mathijsdevaan.com)

**Patricia Dechow, *Professor*.** Accounting accruals, quality and reliability of earnings, use of earnings information in predicting stock returns.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/dechow-patricia)

**+ Stefano DellaVigna, *Professor*.** Behavioral economics.
Research Profile (http://eml.berkeley.edu/~sdellavi)

**Sunil Dutta, *Professor*.** Performance measures, incentive contracts, accounting information, cost of capital, equity valuation.

Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/dutta-sunil)

**Omri Even-Tov, *Assistant Professor*.** Corporate debt, relation between accounting information, bond returns, and stock returns, analysts as information intermediaries.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/eventov-omri)

**Ellen Evers, *Assistant Professor*.** Judgment and decision making, collecting, pattern perception, moral psychology.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/evers-ellen)

**Pnina Feldman, *Assistant Professor*.** Operations economics, operations management incorporating strategic consumer behavior, pricing strategies, operations-marketing interface, behavioral operations.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/feldman-pnina)

**Frederico Finan, *Professor*.** Applied microeconomics, development economics, political economy.
Research Profile (https://www.econ.berkeley.edu/profile/frederico-finan)

**Lee Fleming, *Professor*.** Strategies for product invention, integration of scientific and empirical search strategies, recombination of diverse technologies, innovation.
Research Profile (http://ieor.berkeley.edu/people/faculty/fleming)

**William Fuchs, *Assistant Professor*.** Dynamics, asymmetric information, contracting with limited enforcement.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/fuchs-william)

**Nicolae Garleanu, *Professor*.** Asset pricing, liquidity, contracts, financial innovations, security design, auctions.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/garleanu-nicolae)

**Paul Gertler, *Professor*.** Impact evaluation, health economics.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/gertler-paul)

**Andreea Gorbatai, *Assistant Professor*.** Social structures, social norms, open innovation, collective entrepreneurship.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/gorbatai-andreea)

**Pierre-Olivier Gourinchas, *Professor*.** International macroeconomics and finance.
Research Profile (http://socrates.berkeley.edu/~pog)

**Brett Green, *Assistant Professor*.** Information economics, dynamic games, contract theory, sports economics.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/green-brett)

**Jose Guajardo, *Assistant Professor*.** Business model innovation, business analytics, service innovation, operations strategy, operation-marketing interface.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/guajardo-jose)

**Heather Haveman, *Professor*.** Organizational theory, economic sociology, historical sociology, entrepreneurship, organizational development.
Research Profile (http://sociology.berkeley.edu/faculty/heather-haveman)

**Terrence Hendershott, *Professor*.** Management of information systems, role of information technology in financial markets, electronic communications networks and stock market design.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/hendershott-terrence)

**Benjamin Hermalin, *Professor*.** Corporate governance, executive compensation, economics of leadership and organization, contract theory, competitive strategy and industrial organization.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/hermalin-benjamin)

**Teck Ho, *Professor*.** Behavioral pricing and revenue model design, bounded rationality, emotional gaming, strategic intelligence quotient.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/ho-teck)

**Ming Hsu, *Assistant Professor*.** Marketing, customer insights, neuroscience, consumer decision-making.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/hsu-ming)

**Ganesh Iyer, *Professor*.** Competitive marketing strategy, distribution channels, marketing information, internet institutions and competition, bounded rationality.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/iyer-ganesh)

**Paul Jansen, *Adjunct Professor*.**

**Przemyslaw Jeziorski, *Assistant Professor*.** Industrial organization, quantitative marketing, dynamic games.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/jeziorski-przemyslaw)

**Yuichiro Kamada, *Assistant Professor*.** Revision games, solution concepts for games, social networks, market design, communication, political economy.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/kamada-yuichiro)

**Zsolt Katona, *Associate Professor*.** Online marketing, search advertising, network economics, social networks.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/katona-zsolt)

**Michael Katz, *Professor*.** Economics of network industries, intellectual property licensing, telecommunications policy, cooperative research and development.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/katz-michael)

**Amir Kermani, *Assistant Professor*.** Monetary policy, macroeconomics and housing, securitization market and political economy.
Research Profile (http://faculty.haas.berkeley.edu/amir)

**Jonathan Kolstad, *Assistant Professor*.** Health economics, industrial organization, public economies, applied microeconomics.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/kolstad-jonathan)

**Yaniv Konchitchki, *Assistant Professor*.** Macro-accounting, linkages between accounting information, stock returns, and the macroeconomy.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/konchitchki-yaniv)

**Laura Kray, *Professor*.** Negotiation, gender stereotypes, counterfactual mindsets, group decision making, organizational justice.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/kray-laura)

**Alastair Lawrence, *Assistant Professor*.** Financial disclosures and reporting issues, SEC comment letters, how investors demand financial information, auditing issues.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/lawrence-alastair)

**Thomas Lee, *Associate Adjunct Professor*.**

**Jonathan Leonard, *Professor*.** Employee incentives, affirmative action, job creation, workplace regulation.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/leonard-jonathan)

**Martin Lettau, *Professor*.** Finance, asset pricing, stocks, bonds.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/lettau-martin)

**Ming Leung, *Assistant Professor*.** Organizational theory, economic sociology, markets, categorization, strategy.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/leung-ming)

**David Levine, *Professor*.** Organizational learning, economic development, management, workplace, health and education in poor nations.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/levine-david)

**Ross Levine, *Professor*.** Financial regulation and economic growth, income inequality, poverty, financial crises, political economy, international capital flows, entrepreneurship.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/levine-ross)

**Dmitry Livdan, *Associate Professor*.** Asset pricing, informational economics, corporate finance.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/livdan-dmitry)

**+ Richard Lyons, *Professor*.** Exchange rate economics, microstructure finance, international finance.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/lyons-richard)

**+ Ulrike Malmendier, *Professor*.** Corporate finance, behavioral economics, behavioral finance, economics of organizations, contract theory, law and economics.
Research Profile (http://eml.berkeley.edu/~ulrike)

**Gustavo Manso, *Associate Professor*.** Corporate finance, entrepreneurship, financial institutions, financial markets.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/manso-gustavo)

**Kellie McElhaney, *Associate Adjunct Professor*.**

**Conrad Miller, *Assistant Professor*.** Hiring, job networks, affirmative action in the labor market, spatial labor market frictions.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/miller-conrad)

**Don Moore, *Associate Professor*.** Overconfidence in decision-making, negotiation, and ethical choice.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/moore-don)

**John Morgan, *Professor*.** Competition in online markets, elections and polling, communication in organizations, experimental economics.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/morgan-john)

**Adair Morse, *Assistant Professor*.** Household finance, entrepreneurship, corruption & governance, asset management, development.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/morse-adair)

**Noel Nellis, *Adjunct Professor*.**

**Leif Nelson, *Professor*.** Human judgment and decision making, consumer preferences and choices, consumption experience and consumer well being.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/nelson-leif)

**Alexander Nezlobin, *Assistant Professor*.** Equity valuation, managerial performance measurement, real options, profitability analysis, monopoly regulation.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/nezlobin-alexander)

**Terrance Odean, *Professor*.** Behavioral finance, investor behavior, investor welfare, influence of individual investors on asset prices.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/odean-terrance)

**Marcus Opp, *Assistant Professor*.** Corporate finance, contract theory, DSGE models, trade theory.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/opp-marcus)

**Christopher Palmer, *Assistant Professor*.** Mortgage finance, housing markets, foreclosure crisis, structured finance, gentrification, applied econometrics.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/palmer-christopher)

**Yiangos Papanastasiou, *Assistant Professor*.** Dynamic pricing, operations.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/papanastasiou-yiangos)

**Minjung Park, *Assistant Professor*.** Marketing and microeconometrics, industrial organization, firm behavior .
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/park-minjung)

**Christine Parlour, *Professor*.** Banking, market design.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/parlour-christine)

**Panos Patatoukas, *Assistant Professor*.** Measuring and forecasting economic activity using financial statement analysis, valuation, cross-industry economic links, supply-chain performance, financial reporting.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/patatoukas-panos)

**Trond Petersen, *Professor*.** Organizations, social stratification, inequality, economic sociology, comparative studies, quantitative methods.
Research Profile (http://sociology.berkeley.edu/faculty/trond-petersen)

**Jo-Ellen Pozner Zeitlin, *Assistant Professor*.** Organizational stigma, status, reputation, misconduct, and legitimacy, corporate governance, ethics and leadership.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/pozner-joellen)

**Kristiana Raube, *Adjunct Professor*.**

**Andrew Rose, *Professor*.** International trade patterns, contagion in currency crises, exchange rate determination, banking and exchange crises in developing countries, exchange rate regimes.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/rose-andrew)

**Christine Rosen, *Associate Professor*.** History of business and the environment, business history, green chemistry, sustainable business strategies.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/rosen-christine)

**Raul Sanchez de la Sierra, *Assistant Professor*.** Development economics, political economy, taxation, government.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/sanchez-de-la-sierra-raul)

**Juliana Schroeder, *Assistant Professor*.** Social cognition, judgment and decision-making, interpersonal and intergroup processes.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/schroeder-juliana)

**Carl Shapiro, *Professor*.** Design and use of patents, anti-trust economics, intellectual property and licensing.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/shapiro-carl)

**Stephen Shortell, *Professor*.** Organizational correlates of quality and outcomes of care, evaluation of total quality management and community-based health improvement initiatives.
Research Profile (http://sph.berkeley.edu/stephen-shortell)

**Nora Silver, *Adjunct Professor*.**

**Richard Sloan, *Professor*.** Accounting information and stock returns, earnings management, role of analysts and auditors as information intermediaries.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/sloan-richard)

**David Sraer, *Assistant Professor*.** Behavioral finance, corporate finance, entrepreneurship and venture capital, organizations.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/sraer-david)

**Sameer Srivastava, *Assistant Professor*.** Organizational sociology, organizational theory, network analysis, culture and cognition, economic sociology, research design and methods.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/srivastava-sameer)

**Richard Stanton, *Professor*.** Mortgage and lease markets, term structure modeling, mutual funds and risk management, employee stock options.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/stanton-richard)

**Toby Stuart, *Professor*.** Corporate strategy, entrepreneurship.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/stuart-toby)

**Steven Tadelis, *Professor*.** E-commerce, economics of organizations, procurement contracting, theory of the firm and industrial organization, contract theory, game theory.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/tadelis-steven)

**Terry Taylor, *Associate Professor*.** Social responsibility in and economics of operations management, supply chain management, marketing-operations interface.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/taylor-terry)

**David Teece, *Professor*.** Role of product and process development, intellectual property, competitive performance, innovation and organization of industry.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/teece-david)

**+ Laura Tyson, *Professor*.** Changes in global economy, emerging market economies, US trade policy.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/tyson-laura)

**J. Miguel Villas-Boas, *Professor*.** Competitive strategy, customer relationship management, internet strategies, organization design.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/villasboas-miguel)

**Annette Vissing-Jorgensen, *Professor*.** Household consumption and portfolio choice, stock market participation, returns to entrepreneurial investment, corporate governance.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/vissingjorgensen-annette)

**Johan Walden, *Associate Professor*.** Asset pricing, heavy-tailed risks, networks and capital markets.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/walden-johan)

**William (Reed) Walker, *Assistant Professor*.** Environmental economics, labor and public economics.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/walker-reed)

**Nancy Wallace, *Professor*.** Housing price indices, mortgage prepayment and pricing models, option pricing models, executive stock option valuable.

Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/wallace-nancy)

**James Wilcox, *Professor*.** Banking, business conditions, conversions.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/wilcox-james)

**Catherine Wolfram, *Professor*.** Energy markets, environmental regulation.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/wolfram-catherine)

**Candace Yano, *Professor*.** Supply chain management, service systems management, production-quality interface issues, marketing-production interface issues.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/yano-candace)

**Noam Yuchtman, *Assistant Professor*.** Educational institutions, human capital, historical development, labor market institutions, law and economics, political institutions, social interactions.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/yuchtman-noam)

**Xiao-Jun Zhang, *Professor*.** Financial statement analysis, financial accounting theory, international accounting.
Research Profile (http://facultybio.haas.berkeley.edu/faculty-list/zhang-xiaojun)

## Affiliated Faculty

**Vinod Aggarwal, *Affiliated Professor*.**

**Joseph Farrell, *Affiliated Professor*.**

**Morten Hansen, *Affiliated Professor*.**

**Robert Merges, *Affiliated Professor*.**

## Lecturers

**Wasim Azhar, *Continuing Lecturer*.**

**Homa Bahrami, *Senior Continuing Lecturer*.**

**Cristina Banks, *Senior Continuing Lecturer*.**

**+ Sara Beckman, *Senior Lecturer SOE*.**

**Steven Blank, *Continuing Lecturer*.**

**Rada Brooks, *Continuing Lecturer*.**

**David Charron, *Continuing Lecturer*.**

**John Danner, *Continuing Lecturer*.**

**Timothy Dayonot, *Senior Continuing Lecturer*.**

**Stephen Etter, *Continuing Lecturer*.**

**William Falik, *Continuing Lecturer*.**

**William Fanning, *Continuing Lecturer*.**

**C. Sean Foote, *Continuing Lecturer*.**

**Peter Goodson, *Continuing Lecturer*.**

**Ernest Gundling, *Continuing Lecturer*.**

**Lynne Heinrich, *Continuing Lecturer*.**

**Daniel Himelstein, *Continuing Lecturer*.**

**Andrew Isaacs, *Senior Continuing Lecturer*.**

**Arina Isaacson, *Continuing Lecturer*.**

**Gregory La Blanc, *Continuing Lecturer*.**

**Sumon Mazumdar, *Continuing Lecturer*.**

**Samuel Olesky, *Continuing Lecturer*.**

**Arturo Perez-Reyes, *Continuing Lecturer*.**

**John (Jack) Phillips, *Continuing Lecturer*.**

**Mark Rittenberg, *Continuing Lecturer*.**

**David Robinson, *Senior Continuing Lecturer*.**

**Alan Ross, *Continuing Lecturer*.**

**Holly Schroth, *Senior Continuing Lecturer*.**

**Frank Schultz, *Continuing Lecturer*.**

**Fred Selinger, *Continuing Lecturer*.**

**F. Victor Stanton, *Senior Continuing Lecturer*.**

**Sarah Tasker, *Continuing Lecturer*.**

**Peter Thigpen, *Continuing Lecturer*.**

**Paul Tiffany, *Senior Continuing Lecturer*.**

**Lynn Upshaw, *Continuing Lecturer*.**

**Steven Wood, *Continuing Lecturer*.**

**Cort Worthington, *Continuing Lecturer*.**

## Emeritus Faculty

**David Aaker, *Professor Emeritus*.**

**K. Roland Artle, *Professor Emeritus*.**

**Alan Cerf, *Professor Emeritus*.**

**Robert Cole, *Professor Emeritus*.**

**Robert Edelstein, *Professor Emeritus*.**

**Edwin Epstein, *Professor Emeritus*.**

**Joseph Garbarino, *Professor Emeritus*.**

**Mark Garman, *Professor Emeritus*.**

**Michael Gerlach, *Associate Professor Emeritus*.**

**Rashi Glazer, *Professor Emeritus*.**

**Nils Hakansson, *Professor Emeritus*.**

**Robert SN, *Associate Professor Emeritus*.** Japan, Europe, U.S., competitive strategy, industry policy, antitrust regulation, mergers

and acquisitions, telecommunications and transportation industries, comparative industry policies, performance in emerging technologies. Research Profile (http://vcresearch.berkeley.edu/node/14793)

**Leo Helzel, *Adjunct Professor Emeritus*.**

**Hayne Leland, *Professor Emeritus*.**

**James Lincoln, *Professor Emeritus*.**

**Thomas Marschak, *Professor Emeritus*.**

**Terry Marsh, *Associate Professor Emeritus*.**

**Barbara Mellers, *Professor Emeritus*.**

**Robert Meyer, *Professor Emeritus*.**

**Raymond Miles, *Professor Emeritus*.**

**David Mowery, *Professor Emeritus*.**

**John Myers, *Professor Emeritus*.**

**Charles O'Reilly, *Professor Emeritus*.**

**David Pyle, *Professor Emeritus*.**

**Karlene Roberts, *Professor Emeritus*.**

**Mark Rubinstein, *Professor Emeritus*.**

**Pablo Spiller, *Professor Emeritus*.**

**Barry Staw, *Professor Emeritus*.**

**George Strauss, *Professor Emeritus*.**

**Philip Tetlock, *Professor Emeritus*.**

**+ M. Frances Van Loo, *Associate Professor Emeritus*.**

**Hal Varian, *Professor Emeritus*.**

**David Vogel, *Professor Emeritus*.**

**Oliver Williamson, *Professor Emeritus*.**

**Janet Yellen, *Professor Emeritus*.**