Mechanical Engineering and Business Administration

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

The Mechanical Engineering 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 is limited to a maximum of 50 students.

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

Accreditation

The ME undergraduate degree program in the College of Engineering is accredited by ABET. The Undergraduate Business Degree Program is accredited by The Association to Advance Collegiate Schools of Business (AACSB).

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 is required.
2. Students must complete the College Requirements and the Major Requirements.
3. Students must complete the degree program in eight semesters. (Summer Session is not required for degree completion in eight semesters.)
4. All Haas business courses must be taken for a letter grade, including core substitutions, with the exception of UGBA 194 (http://guide.berkeley.edu/archive/2019-20/search/?P=UGBA%20194), UGBA 198 (http://guide.berkeley.edu/archive/2019-20/search/?P=UGBA%20198) and UGBA 199 (http://guide.berkeley.edu/archive/2019-20/search/?P=UGBA%20199) (only offered Pass/No Pass).
5. All technical courses that can be used to fulfill a requirement must be taken for a letter grade.
6. 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.
7. Students must complete their business prerequisite courses (including Reading & Composition A & B) by the spring semester of their sophomore (2nd) year.
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 (http://guide.berkeley.edu/archive/2019-20/undergraduate/colleges-schools/haas-business/#collegerequirementstext).

Lower Division Requirements

UGBA 10	Principles of Business	3
ECON 1	Introduction to Economics	4
STAT 20	Introduction to Probability and Statistics	4
or STAT 21	Introductory Probability and Statistics for Business	
or STAT 131A	Statistical Methods for Data Science	
or STAT 134	Concepts of Probability	
or COMPSCI C8 & STAT 88	Foundations of Data Science and Probability and Mathematical Statistics in Data Science	
MATH 1A	Calculus	4
MATH 1B	Calculus	4
MATH 53	Multivariable Calculus	4
MATH 54	Linear Algebra and Differential Equations	4
CHEM 1A & 1AL	General Chemistry and General Chemistry Laboratory [1]	5
or CHEM 4A	General Chemistry and Quantitative Analysis	
PHYSICS 7A	Physics for Scientists and Engineers	4
PHYSICS 7B	Physics for Scientists and Engineers	4
ENGIN 7	Introduction to Computer Programming for Scientists and Engineers	4
ENGIN 25	Visualization for Design	2
ENGIN 26	Three-Dimensional Modeling for Design	2
ENGIN 27	Introduction to Manufacturing and Tolerancing	2
MEC ENG 40	Thermodynamics	3
MEC ENG C85	Introduction to Solid Mechanics	3
Reading & Composition Parts A & B		4-4

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

Upper Division Requirements

ME Upper Division

MEC ENG 100	Electronics for the Internet of Things	4
MEC ENG 102B	Mechatronics Design	4
MEC ENG 103	Experimentation and Measurements	4
MEC ENG 104	Engineering Mechanics II	3
MEC ENG 106	Fluid Mechanics	3

MEC ENG 108	Mechanical Behavior of Engineering Materials	4
MEC ENG 109	Heat Transfer	3
MEC ENG 132	Dynamic Systems and Feedback	3
Technical electives, minimum 15 units [1,2,3]		15
Select at least one course from the Design Elective list:		
ENGIN 128	Advanced Engineering Design Graphics [3]	
MEC ENG 101	Introduction to Lean Manufacturing Systems [3]	
MEC ENG 110	Introduction to Product Development [3]	
MEC ENG C117	Structural Aspects of Biomaterials [4]	
MEC ENG 119	Introduction to MEMS (Microelectromechanical Systems) [3]	
MEC ENG 130	Design of Planar Machinery [3]	
MEC ENG 135	Design of Microprocessor-Based Mechanical Systems [4]	
MEC ENG 146	Energy Conversion Principles [3]	
MEC ENG 165	Ocean-Environment Mechanics [3]	
MEC ENG C176	Orthopedic Biomechanics [4]	
MEC ENG C17	Designing for the Human Body [3]	
Select at least one course from the Quantitative Science elective list:		
ENGIN 117	Methods of Engineering Analysis [3]	
ENGIN 177	Advanced Programming with MATLAB [3]	
MEC ENG 120	Computational Biomechanics Across Multiple Scales [3]	
MEC ENG 136	Introduction to Control of Unmanned Aerial Vehicles [3]	
MEC ENG C18	Engineering Analysis Using the Finite Element Method [3]	

1 Technical electives: 15 units of technical electives (http://www.me.berkeley.edu/undergraduate/course-information/undergraduate-technical-electives) are required, of which at least 9 units must be upper division mechanical engineering courses. Any upper division course taught by mechanical engineering faculty may be used as part of the 9 units of upper division mechanical engineering courses. In addition, ENGIN 117, ENGIN 128, ENGIN 150, and ENGIN 177 can count toward the 9 unit upper division ME course requirement. Students may receive up to three units of technical elective credit for work on a research project in either MEC ENG 196 or MEC ENG H194.

2 Up to three units of technical elective credit may be lower division and may be chosen from the following approved lower division courses: ASTRON 7A, ASTRON 7B, BIO ENG 10, BIOLOGY 1A plus BIOLOGY 1AL, BIOLOGY 1B, CHEM 1B, CHEM 3A, CHEM 3B, CHEM 4B, CIV ENG 11, CIV ENG 60, CIV ENG 70, CIV ENG 93, COMPSCI C8, COMPSCI 61A, COMPSCI 61B, COMPSCI 61C, COMPSCI 70, DES INV 15, DES INV 90E, ENGIN 11, EECS 16B/EL ENG 16B, EPS 50, INTEGBI C32, MATH 55, MAT SCI 45, MCELLBI 32, PHYSICS 7C, STAT 20, STAT 21.

3 Technical electives cannot include:

- Any course taken on a Pass/No Pass basis
- Courses numbered 24, 39, 84, or 88
- Any of the following courses: BIO ENG 100, CHM ENG 185, COMPSCI C79, COMPSCI 195, COMPSCI H195, DES INV courses (except DES INV 15, DES INV 90E, DES INV 190E), ENGIN 125, ENGIN 157AC, ENGIN 180, ENGIN 185, ENGIN 187, IND ENG 95, IND ENG 171, 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.

UGBA Upper Division		
UGBA 100	Business Communication	2
UGBA 101A	Microeconomic Analysis for Business Decisions	3
UGBA 101B	Macroeconomic Analysis for Business Decisions	3
UGBA 102A	Financial Accounting	3
UGBA 102B	Managerial Accounting	3
UGBA 103	Introduction to Finance	4
UGBA 104	Introduction to Business Analytics	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. M.E.T. Special Topics courses will count as upper division business units.		
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	Course Not Available	3
UGBA 115	Competitive Strategy	3
UGBA 117	Special Topics in Economic Analysis and Policy	1-4
UGBA 118	International Trade	3
UGBA 119	Leading Strategy Implementation	3
UGBA 120AA	Intermediate Financial Accounting 1	4
UGBA 120AB	Intermediate Financial Accounting 2	4
UGBA 120B	Advanced Financial Accounting	4
UGBA 121	Federal Income Tax Accounting	4
UGBA 122	Financial Information Analysis	4
UGBA 123	Operating and Financial Reporting Issues in the Financial Services Industry	3
UGBA W125	Course Not Available	3
UGBA 126	Auditing	4
UGBA 127	Special Topics in Accounting	1-4
UGBA 128	Strategic Cost Management	3
UGBA 129	Course Not Available	3
UGBA 131	Corporate Finance and Financial Statement Analysis	3
UGBA 132	Financial Institutions and Markets	3
UGBA 133	Investments	3
UGBA 136F	Behavioral Finance	3
UGBA 137	Special Topics in Finance	1-4
UGBA 141	Production and Operations Management	3

UGBA 143	Game Theory and Business Decisions	3
UGBA 147	Special Topics in Operations and Information Technology Management	1-4
UGBA 151	Management of Human Resources	3
UGBA 152	Negotiation and Conflict Resolution	3
UGBA 154	Power and Politics in Organizations	3
UGBA 155	Leadership	3
UGBA 156AC	Course Not Available	3
UGBA 157	Special Topics in the Management of Organizations	1-4
UGBA 160	Customer Insights	3
UGBA 161	Market Research: Tools and Techniques for Data Collection and Analysis	3
UGBA 162	Brand Management and Strategy	3
UGBA 162A	Product Branding and Branded Entertainment	2
UGBA 165	Advertising Strategy	3
UGBA 167	Special Topics in Marketing	1-4
UGBA 168B	Course Not Available	3
UGBA 169	Pricing	3
UGBA 170	Course Not Available	2
UGBA C172	History of American Business	3
UGBA 175	Legal Aspects of Management	3
UGBA 176	Innovations in Communications and Public Relations	2
UGBA 177	Special Topics in Business and Public Policy	1-4
UGBA 178	Introduction to International Business	3
UGBA 179	International Consulting for Small and Medium-Sized Enterprises	3
UGBA 180	Introduction to Real Estate and Urban Land Economics	3
UGBA 183	Introduction to Real Estate Finance	3
UGBA 184	Urban and Real Estate Economics	3
UGBA 187	Special Topics in Real Estate Economics and Finance	1-4
UGBA 190S	Strategy for the Information Technology Firm	3
UGBA 190T	Special Topics in Innovation and Design	1-4
UGBA 190V	Course Not Available	2
UGBA 191C	Communication for Leaders	2
UGBA 191I	Improvisational Leadership	3
UGBA 191P	Leadership and Personal Development	3
UGBA 192A	Leading Nonprofit and Social Enterprises	3
UGBA 192B	Strategic Philanthropy	2
UGBA 192L	Applied Impact Evaluation	2
UGBA 192N	Topics in Social Sector Leadership	1-5
UGBA 192P	Sustainable Business Consulting Projects	3
UGBA 192T	Topics in Corporate Social Responsibility	1-4
UGBA 193C	Curricular Practical Training for International Students	0.0
UGBA 193I	Business Abroad	4-6
UGBA 194	Undergraduate Colloquium on Business Topics	1
UGBA 195A	Entrepreneurship	3
UGBA 195P	Entrepreneurship: How to Successfully start a New Business	3
UGBA 195S	Entrepreneurship To Address Global Poverty	3
UGBA 195T	Topics in Entrepreneurship	1-3
UGBA 196	Special Topics in Business Administration	1-4
UGBA 198	Directed Study	1-4
UGBA 199	Supervised Independent Study and Research	1-4

University of California Requirements

Entry Level Writing (http://guide.berkeley.edu/archive/2019-20/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/archive/2019-20/undergraduate/colleges-schools/haas-business/american-history-institutions-requirement)

The American History and Institutions requirements are based on the principle that a U.S. 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/archive/2019-20/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/archive/2019-20/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

Historical Studies

International Studies

Philosophy and Values (will be satisfied with UGBA 107)

Physical Science (will be satisfied with Physics 7B)

Social and 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.
- Reading & Composition courses cannot be used to fulfill breadth requirements.

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.

University of California Requirements

Entry Level Writing (https://www.ucop.edu/elwr)

All students who will enter the University of California as freshmen must demonstrate their command of the English language by fulfilling the Entry Level Writing Requirement. Satisfaction 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/archive/2019-20/undergraduate/education/#universityrequirementstext)

The American History and Institutions requirements are based on the principle that a U.S. resident graduated 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/archive/2019-20/undergraduate/education/#campusrequirementstext)

The American Cultures requirement is a Berkeley campus requirement, one that all undergraduate students at Berkeley need to pass in order to graduate. You satisfy the requirement by passing, with a grade not lower than C- or P, an American Cultures course. You may take an American Cultures course any time during your undergraduate career at Berkeley. The requirement was instituted in 1991 to introduce students to the diverse cultures of the United States through a comparative framework. Courses are offered in more than fifty departments in many different disciplines at both the lower and upper division level.

The American Cultures requirement and courses constitute an approach that responds directly to the problem encountered in numerous disciplines of how better to present the diversity of American experience to the diversity of American students whom we now educate.

Faculty members from many departments teach American Cultures courses, but all courses have a common framework. The courses focus on themes or issues in United States history, society, or culture; address theoretical or analytical issues relevant to understanding race, culture, and ethnicity in American society; take substantial account of groups drawn from at least three of the following: African Americans, indigenous peoples of the United States, Asian Americans, Chicano/Latino Americans, and European Americans; and are integrative and comparative in that students study each group in the larger context of American society, history, or culture.

This is not an ethnic studies requirement, nor a Third World cultures requirement, nor an adjusted Western civilization requirement. These courses focus upon how the diversity of America's constituent cultural traditions have shaped and continue to shape American identity and experience.

Visit the Class Schedule (http://classes.berkeley.edu) or the American Cultures website (http://americancultures.berkeley.edu) for the specific American Cultures courses offered each semester. For a complete list of approved American Cultures courses at UC Berkeley and California Community Colleges, please see the American Cultures Subcommittee's website (https://academic-senate.berkeley.edu/committees/amcult). See your academic adviser if you have questions about your responsibility to satisfy the American Cultures breadth requirement.

				Freshman
	Fall	**Units**	**Spring**	**Units**
MATH 1A[1]		4	MATH 1B[6]	4
CHEM 1A & 1AL (or CHEM 4A)[2]		4	PHYSICS 7A[7]	4
ENGIN 25		2	UGBA 10	3
ECON 1 (Breadth-Social and Behavioral Sciences)[3,4]		4	Reading & Composition Part B Course	4
Reading & Composition Part A Course[5]		4	STAT 20, 21, 131A, or 134[11]	4
M.E.T. Special Topics Course (UGBA 196)[12]		2	ENGIN 7	4
		20		23

				Sophomore
	Fall	**Units**	**Spring**	**Units**
MATH 54		4	MATH 53	4
ENGIN 26		2	PHYSICS 7B (Breadth-Physical Science)[3]	4
ENGIN 27		2	MEC ENG 40	3
MEC ENG 100		4	Breadth-International Studies[3]	3
Breadth-Arts and Literature/AC[3]		4	MEC ENG C85	3
Breadth-Historical Studies/AC[3]		4		
		20		17

				Junior
	Fall	**Units**	**Spring**	**Units**
MEC ENG 104		3	MEC ENG 108	4
MEC ENG 106		3	MEC ENG 109	3
MEC ENG 132		3	Tech Elective (QS Requirement)[8,9,10]	3
UGBA 100		2	UGBA Elective[13]	3
UGBA 101A (also Tech Elective) [8,9,10]		3	UGBA 101B (also Tech Elective)[8,9,10]	3
UGBA 106		3		
		17		16

				Senior
	Fall	**Units**	**Spring**	**Units**
MEC ENG 103		4	MEC ENG 102B	4
Tech Elective (Design Requirement)[8,9,10]		3	UGBA 102B	3
UGBA 102A		3	UGBA 105	3
UGBA 103		4	UGBA 107 (Breadth-Philosophy & Values)[3]	3
UGBA 104		3	Tech Elective[8,9,10]	3
M.E.T. Special Topics (UGBA 196)[12]		2	UGBA Elective[13]	2
		19		18

Total Units: 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 CHEM 1A/CHEM 1AL may be fulfilled with a score of 3, 4 or 5 on the AP Chemistry exam, a score of 5, 6 or 7 on the IB Higher Level Chemistry exam, or a grade of A, B or C on the A-Level Chemistry exam. CHEM 4A is intended for students majoring in chemistry or a closely-related field.

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. Some American Cultures courses will also fulfill the Arts & Literature or Historical Studies breadth requirement; use Requirements filters to search the Class Schedule (http://classes.berkeley.edu) for courses that apply. See "College Requirements (http://guide.berkeley.edu/archive/2019-20/undergraduate/degree-programs/mechanical-engineering-business-administration/#newitemtext)" tab 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 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, or a score of 5, 6 or 7 on the IB Higher Level English Literature exam or the IB Higher Level English Language and Literature exam.

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

8 Technical electives: 15 units of technical electives (http://www.me.berkeley.edu/undergraduate/course-information/undergraduate-technical-electives) are required, of which at least 9 units must be upper division mechanical engineering courses. Of these 9 units, 3 units must be a design course selected from the following: ENGIN 128, ENGIN 150, MEC ENG 101, MEC ENG 110, MEC ENG C117, MEC ENG 119, MEC ENG 130, MEC ENG 135, MEC ENG 146, MEC ENG 165, MEC ENG C176, MEC ENG C178. Also, one of the technical elective courses must be selected from the quantitative science list: ENGIN 117, ENGIN 177, MEC ENG 120, MEC ENG C180. Any upper division course taught by mechanical engineering faculty may be used as part of the 9 units of upper division mechanical engineering courses. In addition, ENGIN 117, ENGIN 128, and ENGIN 177 can count toward the 9 unit upper division ME course requirement. Students may receive up to three units of technical elective credit for work on a research project in either MEC ENG 196 or MEC ENG H194.

[9] Up to three units of technical elective credit may be lower division and may be chosen from the following approved lower division courses: ASTRON 7A, ASTRON 7B, BIO ENG 10, BIOLOGY 1A plus BIOLOGY 1AL, BIOLOGY 1B, CHEM 1B, CHEM 3A, CHEM 3B, CHEM 4B, CIV ENG 11, CIV ENG 60, CIV ENG 70, CIV ENG 93, COMPSCI C8, COMPSCI 61A, COMPSCI 61B, COMPSCI 61C, COMPSCI 70, DES INV 15, DES INV 90E, ENGIN 11, EECS 16B/EL ENG 16B, EPS 50, MATH 55, MAT SCI 45, MCELLBI 32, PHYSICS 7C, STAT 20, STAT 21.

[10] Technical electives cannot include:

- Any course taken on a Pass/No Pass basis
- Courses numbered 24, 39, 84, or 88
- Any of the following courses: BIO ENG 100, CHM ENG 185, COMPSCI C79, COMPSCI 195, COMPSCI H195, DES INV courses (except DES INV 15, DES INV 90E, DES INV 190E), ENGIN 125, ENGIN 157AC, ENGIN 180, ENGIN 185, ENGIN 187, IND ENG 95, IND ENG 171, 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, MEC ENG 191K.

[11] Students can also take STAT C8 or COMPSCI C8 plus the STAT 88 connector to fulfill the statistics prerequisite. Both courses must be taken to satisfy the requirement, although they do not need to be taken in the same semester. STAT C8 or COMPSCI C8 will also fulfill the three units of lower division coursework that can count toward the ME Tech Elective requirement.

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

[13] Students must complete a minimum of 38 units of upper division business coursework. See UGBA Elective course list under “Major Requirements (http://guide.berkeley.edu/archive/2019-20/undergraduate/degree-programs/mechanical-engineering-business-administration/#majorrequirementstext)” tab.

Mechanical Engineering

LEARNING GOALS

The objectives of the Mechanical Engineering undergraduate program are to produce graduates who do the following:

1. Vigorously engage in post-baccalaureate endeavors, whether in engineering graduate study, in engineering practice, or in the pursuit of other fields such as science, law, medicine, business or public policy.
2. Apply their mechanical engineering education to address the full range of technical and societal problems with creativity, imagination, confidence and responsibility.
3. Actively seek out positions of leadership within their profession and their community.
4. Serve as ambassadors for engineering by exhibiting the highest ethical and professional standards, and by communicating the importance and excitement of this dynamic field.
5. Retain the intellectual curiosity that motivates lifelong learning and allows for a flexible response to the rapidly evolving challenges of the 21st century.

SKILLS

Mechanical Engineering graduates have the following:

1. An ability to apply knowledge of mathematics, science, and engineering.
2. An ability to design and conduct experiments as well as to analyze and interpret data.
3. An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
4. An ability to function on multi-disciplinary teams.
5. An ability to identify, formulate, and solve engineering problems.
6. An understanding of professional and ethical responsibility.
7. An ability to communicate effectively.
8. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
9. A recognition of the need for and an ability to engage in life-long learning.
10. A knowledge of contemporary issues.
11. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Business Administration

MISSION

Guided by the missions of the undergraduate program, and the University's mission of teaching, research, and service, the mission of the Haas School of Business is to develop leaders who redefine how we do business.

The Haas School of Business Undergraduate Program has developed student learning goals for the Business major that provide faculty and students with a shared understanding of the purpose of the major as well as what graduating seniors are expected to know or to be able to do at the end of their course of study as it relates to the school’s mission.

The learning goals are assessed to determine whether students are achieving the outcomes. The assessment results are used to inform curricular design and other program offerings. All steps require input and participation from the business school community, particularly the faculty. The resulting learning goals, which have their origin in the core curriculum, were shaped over several months by faculty and administration and are listed below.

LEARNING GOALS

1. Students will be skilled in critical thinking and decision making, as supported by the appropriate use of analytical and quantitative techniques.
2. Students will apply functional area concepts and theories appropriately.
3. Students will be effective communicators who can prepare and deliver oral and written presentations using appropriate technologies.
4. Students will be sensitive to the ethical requirements of business activities.
5. Students will tackle strategic and organizational challenges with innovative solutions.

For a visual representation of the relationship between the core curriculum and the expected outcomes, please see the Haas School of Business website (http://www.haas.berkeley.edu/Undergrad/learninggoals.html).

Expand all course descriptions [+]Collapse all course descriptions [-]

MEC ENG 24 Freshman Seminars 1 Unit

Terms offered: Fall 2020, Spring 2020, Fall 2019
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 when topic changes.

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

Grading/Final exam status: Offered for pass/not pass grade only. Final Exam To be decided by the instructor when the class is offered.

Freshman Seminars: Read Less [-]

MEC ENG 40 Thermodynamics 3 Units

Terms offered: Fall 2020, Summer 2020 10 Week Session, Spring 2020
This course introduces the scientific principles that deal with energy conversion among different forms, such as heat, work, internal, electrical, and chemical energy. The physical science of heat and temperature, and their relations to energy and work, are analyzed on the basis of the four fundamental thermodynamic laws (zeroth, first, second, and third). These principles are applied to various practical systems, including heat engines, refrigeration cycles, air conditioning, and chemical reacting systems.
Thermodynamics: Read More [+]
Objectives & Outcomes

Course Objectives: 2) to develop analytic ability in real-world engineering applications using thermodynamics principles.
The objectives of this course are:
1) to provide the fundamental background of thermodynamics principles, and

Student Learning Outcomes: (a) an ability to apply knowledge of mathematics, science, and engineering
(e) an ability to identify, formulate, and solve engineering problems
(f) an understanding of professional and ethical responsibility
(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
(i) a recognition of the need for, and an ability to engage in life-long learning
(j) a knowledge of contemporary issues
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Rules & Requirements

Prerequisites: CHEM 1A, ENGIN 7, MATH 1B, and PHYSICS 7B

Hours & Format

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

Summer: 10 weeks - 4.5 hours of lecture and 1.5 hours of discussion per week

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Thermodynamics: Read Less [-]

MEC ENG C85 Introduction to Solid Mechanics 3 Units

Terms offered: Fall 2020, Spring 2020, Fall 2019
A review of equilibrium for particles and rigid bodies. Application to truss structures. The concepts of deformation, strain, and stress. Equilibrium equations for a continuum. Elements of the theory of linear elasticity. The states of plane stress and plane strain. Solution of elementary elasticity problems (beam bending, torsion of circular bars). Euler buckling in elastic beams.
Introduction to Solid Mechanics: Read More [+]

Rules & Requirements

Prerequisites: Mathematics 53 and 54 (may be taken concurrently); Physics 7A

Credit Restrictions: Students will receive no credit for Mechanical Engineering C85/Civil and Environmental Engineering C30 after completing Mechanical Engineering W85. A deficient grade in Mechanical Engineering W85 may be removed by taking Mechanical Engineering C85/Civil and Environmental Engineering C30.

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
10 weeks - 4.5 hours of lecture and 1.5 hours of discussion per week

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Instructors: Armero, Papadopoulos, Zohdi, Johnson

Also listed as: CIV ENG C30

Introduction to Solid Mechanics: Read Less [-]

MEC ENG W85 Introduction to Solid Mechanics 3 Units

Terms offered: Summer 2020 8 Week Session, Summer 2019 8 Week Session, Summer 2018 8 Week Session
A review of equilibrium for particles and rigid bodies. Application to truss structures. The concepts of deformation, strain, and stress. Equilibrium equations for a continuum. Elements of the theory of linear elasticity. The states of plane stress and plane strain. Solution of elementary elasticity problems (beam bending, torsion of circular bars). Euler buckling in elastic beams.
Introduction to Solid Mechanics: Read More [+]

Objectives & Outcomes

Course Objectives: To learn statics and mechanics of materials

Student Learning Outcomes: -
Correctly draw free-body
-
Apply the equations of equilibrium to two and three-dimensional solids
-
Understand the concepts of stress and strain
-
Ability to calculate deflections in engineered systems
-
Solve simple boundary value problems in linear elastostatics (tension, torsion, beam bending)

Rules & Requirements

Prerequisites: MATH 53 and MATH 54 (may be taken concurrently); PHYSICS 7A

Credit Restrictions: Students will receive no credit for MEC ENG W85 after completing MEC ENG C85. A deficient grade in MEC ENG W85 may be removed by taking MEC ENG C85.

Hours & Format

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

Summer:
6 weeks - 7.5 hours of web-based lecture and 2.5 hours of web-based discussion per week
8 weeks - 6 hours of web-based lecture and 2 hours of web-based discussion per week
10 weeks - 4.5 hours of web-based lecture and 1.5 hours of web-based discussion per week

Online: This is an online course.

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Instructor: Govindjee

Also listed as: CIV ENG W30

Introduction to Solid Mechanics: Read Less [-]

MEC ENG 98 Supervised Independent Group Studies 1 - 4 Units

Terms offered: Fall 2020, Spring 2020, Fall 2019
Organized group study on various topics under the sponsorship and direction of a member of the Mechanical Engineering faculty.
Supervised Independent Group Studies: Read More [+]
Rules & Requirements

Prerequisites: Consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

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

Summer: 10 weeks - 1.5-6 hours of directed group study per week

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Supervised Independent Group Studies: Read Less [-]

MEC ENG 100 Electronics for the Internet of Things 4 Units

Terms offered: Fall 2020, Spring 2020, Fall 2019
Electronics and Electrical Engineering 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 offers a broad survey of Electrical Engineering ideas to non-majors. In the laboratory students will learn in-depth how to design and build systems that exchange information with or are controlled from the cloud. Examples include solar harvesters, robots, and smart home devices. In the course project, the students will integrate what they have learned and build an Internet-of-Things application of their choice. The course has a mandatory lab fee.
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. This course teaches 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.
The course has two objectives: (a) to teach students 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, and (b) to offer a broad survey of modern Electrical Engineering including analog electronics: analysis of RLC circuits, filtering, diodes and rectifiers, op-amps, A2D and D2A converters; digital electronics: combinatorial and sequential logic, flip-flops, counters, memory; applications: communication systems, signal processing, computer architecture; basics of manufacturing of integrated circuits.

Student Learning Outcomes: an ability to communicate effectively
an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
an ability to identify, formulate, and solve engineering problems
an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Rules & Requirements

Prerequisites: ENGIN 7, COMPSCI 10, COMPSCI 61A, COMPSCI C8, or equivalent background in computer programing; MATH 1A or equivalent background in calculus; PHYSICS 7A or equivalent background in physics

Credit Restrictions: Student will not receive credit for this course if they have taken EE49

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: Mechanical Engineering/Undergraduate

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

MEC ENG 101 Introduction to Lean Manufacturing Systems 3 Units

Terms offered: Spring 2019, Spring 2018, Spring 2017
Fundamentals of lean manufacturing systems including manufacturing fundamentals, unit operations and manufacturing line considerations for work in process (WIP), manufacturing lead time (MLT), economics, quality monitoring; high mix/low volume (HMLV) systems fundamentals including just in time (JIT), kanban, buffers and line balancing; class project/case studies for design and analysis of competitive manufacturing systems.
Introduction to Lean Manufacturing Systems: Read More [+]

Objectives & Outcomes

Course Objectives: This course will enable students to analyze manufacturing lines in order to understand the production process and improve production efficiency. The course provides practical knowledge and skills that can be applied in industry, covering the complete manufacturing system from production planning to quality control. Students are given a chance to practice and implement what they learn during lectures by conducting projects with local or global manufacturing companies.

Student Learning Outcomes: Students will understand the whole scope of manufacturing systems from production planning to quality control, which can be helpful to set up manufacturing lines for various products. Students will be capable of identifying sources of manufacturing problems by analyzing the production line and produce multi-level solutions to optimize manufacturing efficiency.

Rules & Requirements

Prerequisites: Completion of all lower division requirements for an engineering major, or consent of instructor

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 3 hours of discussion per week

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Instructors: Dornfeld, McMains

Introduction to Lean Manufacturing Systems: Read Less [-]

MEC ENG 102B Mechatronics Design 4 Units

Terms offered: Fall 2020, Spring 2020, Fall 2019
Introduction to design and realization of mechatronics systems. Micro computer architectures. Basic computer IO devices. Embedded microprocessor systems and control, IO programming such as analogue to digital converters, PWM, serial and parallel outputs. Electrical components such as power supplies, operational amplifiers, transformers and filters. Shielding and grounding. Design of electric, hydraulic and pneumatic actuators. Design of sensors. Design of power transmission systems. Kinematics and dynamics of robotics devices. Basic feedback design to create robustness and performance.
Mechatronics Design: Read More [+]

Objectives & Outcomes

Course Objectives: Introduce students to design and design techniques of mechatronics systems; provide guidelines to and experience with design of variety of sensors and actuators; design experience in programming microcomputers and various IO devices; exposure to and design experience in synthesis of mechanical power transfer components; understanding the role of dynamics and kinematics of robotic devices in design of mechatronics systems; exposure to and design experience in synthesis of feedback systems; provide experience in working in a team to design a prototype mechatronics device.

Student Learning Outcomes: By the end of this course, students should: Know how to set up micro computers and interface them with various devices; know how to understand the microcomputers architectures, IO devices and be able to program them effectively; understand the design of actuators and sensors; know how to do shielding and grounding for various mechatronics projects, know how to create feedback systems, know the role of dynamics and kinematics of robotic devices in design and control of mechatronics systems; know how to design mechanical components such as transmissions, bearings, shafts, and fasteners.

Rules & Requirements

Prerequisites: ENGIN 25, ENGIN 26, ENGIN 27; and EECS 16A or MEC ENG 100. Please note that junior transfer students are exempt from ENGIN 26

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Mechatronics Design: Read Less [-]

MEC ENG 103 Experimentation and Measurements 4 Units

Terms offered: Fall 2020, Spring 2020, Fall 2019
This course introduces students to modern experimental techniques for mechanical engineering, and improves students' teamwork and communication skills. Students will work in a laboratory setting on systems ranging in complexity from desktop experiments with only a few instruments up to systems such as an internal combustion engine with a wide variety of sensors. State-of-the-art software for data acquisition and analysis will be introduced and used throughout the course. The role of error and uncertainty, and uncertainty propagation, in measurements and analysis will be examined. Design of experiments will be addressed through examples and homework. The role and limitations of spectral analysis of digital data will be discussed.
Experimentation and Measurements: Read More [+]
Objectives & Outcomes

Course Objectives: Introduce students to modern experimental techniques for mechanical engineering; provide exposure to and experience with a variety of sensors, including those to measure temperature, displacement, velocity, acceleration and strain; examine the role of error and uncertainty in measurements and analysis; exposure to and experience in using commercial software for data acquisition and analysis; discuss the role and limitations of spectral analysis of digital data; provide experience in working in a team in all aspects of the laboratory exercises, including set-up, data collection, analysis, technical report writing and oral presentation.

Student Learning Outcomes: (a) an ability to apply knowledge of mathematics, science, and engineering
(b) an ability to design and conduct experiments, as well as to analyze and interpret data
(c) an ability to function on multi-disciplinary teams
(d) an ability to identify, formulate, and solve engineering problems
(e) an understanding of professional and ethical responsibility
(f) an ability to communicate effectively
(g) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
(h) a recognition of the need for, and an ability to engage in life-long learning
(j) a knowledge of contemporary issues
(i) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Rules & Requirements

Prerequisites: MEC ENG 40; MEC ENG C85 / CIV ENG C30; MEC ENG 100; MEC ENG 106 (can be taken concurrently), and MEC ENG 109 (can be taken concurrently)

Credit Restrictions: Students will not receive credit for this course if they have taken both ME 102A and ME 107.

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Instructors: Johnson, Makiharju, Chen

Experimentation and Measurements: Read Less [-]

MEC ENG 104 Engineering Mechanics II 3 Units

Terms offered: Fall 2020, Summer 2020 10 Week Session, Spring 2020
This course is an introduction to the dynamics of particles and rigid bodies. The material, based on a Newtonian formulation of the governing equations, is illustrated with numerous examples ranging from one-dimensional motion of a single particle to planar motions of rigid bodies and systems of rigid bodies.
Engineering Mechanics II: Read More [+]
Rules & Requirements

Prerequisites: MEC ENG C85 and ENGIN 7

Hours & Format

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

Summer: 10 weeks - 4.5 hours of lecture and 1.5 hours of discussion per week

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Instructor: Ma

Engineering Mechanics II: Read Less [-]

MEC ENG 106 Fluid Mechanics 3 Units

Terms offered: Fall 2020, Summer 2020 10 Week Session, Spring 2020
This course introduces the fundamentals and techniques of fluid mechanics with the aim of describing and controlling engineering flows.
Fluid Mechanics: Read More [+]
Rules & Requirements

Prerequisites: MEC ENG C85 / CIV ENG C30 and MEC ENG 104 (104 may be taken concurrently)

Hours & Format

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

Summer: 10 weeks - 4.5 hours of lecture and 1.5 hours of discussion per week

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Fluid Mechanics: Read Less [-]

MEC ENG 108 Mechanical Behavior of Engineering Materials 4 Units

Terms offered: Fall 2020, Spring 2020, Fall 2019
This course covers elastic and plastic deformation under static and dynamic loads. Failure by yielding, fracture, fatigue, wear, and environmental factors are also examined. Topics include engineering materials, heat treatment, structure-property relationships, elastic deformation and multiaxial loading, plastic deformation and yield criteria, dislocation plasticity and strengthening mechanisms, creep, stress concentration effects, fracture, fatigue, and contact deformation.
Mechanical Behavior of Engineering Materials: Read More [+]
Objectives & Outcomes

Course Objectives: The central theme of this course is the mechanical behavior of engineering materials, such as metals, ceramics, polymers, and composites, subjected to different types of loading. The main objectives are to provide students with basic understanding of phase transformation by heat treating and stress-induced hardening, linear and nonlinear elastic behavior, deformation under multiaxial loading, plastic deformation and yield criteria, dislocation plasticity and strengthening mechanisms, creep, stress concentration effects, brittle versus ductile fracture, fracture mechanisms at different scales, fatigue, contact deformation, and wear.

Student Learning Outcomes: (a) an ability to apply knowledge of mathematics, science, and engineering
(b) an ability to design and conduct experiments, as well as to analyze and interpret data
(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
(e) an ability to identify, formulate, and solve engineering problems
(i) a recognition of the need for, and an ability to engage in life-long learning
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Rules & Requirements

Prerequisites: MEC ENG C85 / CIV ENG C30

Hours & Format

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

Summer: 10 weeks - 4.5 hours of lecture, 1.5 hours of discussion, and 3 hours of laboratory per week

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Mechanical Behavior of Engineering Materials: Read Less [-]

MEC ENG 109 Heat Transfer 3 Units

Terms offered: Fall 2020, Summer 2020 10 Week Session, Spring 2020
This course covers transport processes of mass, momentum, and energy from a macroscopic view with emphasis both on understanding why matter behaves as it does and on developing practical problem solving skills. The course is divided into four parts: introduction, conduction, convection, and radiation.
Heat Transfer: Read More [+]
Rules & Requirements

Prerequisites: MEC ENG 40 and MEC ENG 106

Hours & Format

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

Summer:
8 weeks - 5.5 hours of lecture and 1.5 hours of discussion per week
10 weeks - 4.5 hours of lecture and 1.5 hours of discussion per week

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Heat Transfer: Read Less [-]

MEC ENG 110 Introduction to Product Development 3 Units

Terms offered: Summer 2020 10 Week Session, Spring 2020, Summer 2019 10 Week Session
The course provides project-based learning experience in innovative new product development, with a focus on mechanical engineering systems. Design concepts and techniques are introduced, and the student's design ability is developed in a design or feasibility study chosen to emphasize ingenuity and provide wide coverage of engineering topics. Relevant software will be integrated into studio sessions, including solid modeling and environmental life cycle analysis. Design optimization and social, economic, and political implications are included.
Introduction to Product Development: Read More [+]
Rules & Requirements

Prerequisites: Junior or higher standing

Hours & Format

Fall and/or spring: 15 weeks - 3-3 hours of lecture and 0-1 hours of voluntary per week

Summer: 10 weeks - 4.5-4.5 hours of lecture and 0-1 hours of voluntary per week

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Introduction to Product Development: Read Less [-]

MEC ENG C115 Molecular Biomechanics and Mechanobiology of the Cell 4 Units

Terms offered: Spring 2020, Spring 2019, Spring 2016
This course applies methods of statistical continuum mechanics to subcellar biomechanical phenomena ranging from nanoscale (molecular) to microscale (whole cell and cell population) biological processes at the interface of mechanics, biology, and chemistry.
Molecular Biomechanics and Mechanobiology of the Cell: Read More [+]
Objectives & Outcomes

Course Objectives: This course, which is open to senior undergraduate students or graduate students in diverse disciplines ranging from engineering to biology to chemistry and physics, is aimed at exposing students to subcellular biomechanical phenomena spanning scales from molecules to the whole cell.

Student Learning Outcomes: The students will develop tools and skills to (1) understand and analyze subcelluar biomechanics and transport phenomena, and (2) ultimately apply these skills to novel biological and biomedical applications

Rules & Requirements

Prerequisites: MATH 54 and PHYSICS 7A; BIO ENG 102, MEC ENG C85 / CIV ENG C30 or instructor's consent

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Instructor: Mofrad

Also listed as: BIO ENG C112

Molecular Biomechanics and Mechanobiology of the Cell: Read Less [-]

MEC ENG C117 Structural Aspects of Biomaterials 4 Units

Terms offered: Fall 2020, Spring 2019, Spring 2018
This course covers the structure and mechanical functions of load bearing tissues and their replacements. Natural and synthetic load-bearing biomaterials for clinical applications are reviewed. Biocompatibility of biomaterials and host response to structural implants are examined. Quantitative treatment of biomechanical issues and constitutive relationships of tissues are covered in order to design biomaterial replacements for structural function. Material selection for load bearing applications including reconstructive surgery, orthopedics, dentistry, and cardiology are addressed. Mechanical design for longevity including topics of fatigue, wear, and fracture are reviewed. Case studies that examine failures of devices are presented.
Structural Aspects of Biomaterials: Read More [+]
Rules & Requirements

Prerequisites: BIOLOGY 1A and MAT SCI 45; CIV ENG 130, CIV ENG 130N, or BIO ENG 102

Credit Restrictions: Students will receive no credit for Mechanical Engineering C117 after completing Mechanical Engineering C215/ Bioengineering C222.

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Instructor: Pruitt

Also listed as: BIO ENG C117

Structural Aspects of Biomaterials: Read Less [-]

MEC ENG 118 Introduction to Nanotechnology and Nanoscience 3 Units

Terms offered: Spring 2020, Spring 2017, Spring 2015
This course introduces engineering students (juniors and seniors) to the field of nanotechnology and nanoscience. The course has two components: (1) Formal lectures. Students receive a set of formal lectures introducing them to the field of nanotechnology and nanoscience. The material covered includes nanofabrication technology (how one achieves the nanometer length scale, from "bottom up" to "top down" technologies), the interdisciplinary nature of nanotechnology and nanoscience (including areas of chemistry, material science, physics, and molecular biology), examples of nanoscience phenomena (the crossover from bulk to quantum mechanical properties), and applications (from integrated circuits, quantum computing, MEMS, and bioengineering). (2) Projects. Students are asked to read and present a variety of current journal papers to the class and lead a discussion on the various works.
Introduction to Nanotechnology and Nanoscience: Read More [+]
Rules & Requirements

Prerequisites: Chemistry 1A and Physics 7B. Physics 7C and Engineering 45 (or the equivalent) recommended

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Instructors: Lin, Sohn

Introduction to Nanotechnology and Nanoscience: Read Less [-]

MEC ENG 119 Introduction to MEMS (Microelectromechanical Systems) 3 Units

Terms offered: Fall 2020, Fall 2019, Fall 2017
Fundamentals of microelectromechanical systems including design, fabrication of microstructures; surface-micromachining, bulk-micromachining, LIGA, and other micro machining processes; fabrication principles of integrated circuit device and their applications for making MEMS devices; high-aspect-ratio microstructures; scaling issues in the micro scale (heat transfer, fluid mechanics and solid mechanics); device design, analysis, and mask layout.
Introduction to MEMS (Microelectromechanical Systems): Read More [+]
Rules & Requirements

Prerequisites: PHYSICS 7B and MEC ENG 100

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Introduction to MEMS (Microelectromechanical Systems): Read Less [-]

MEC ENG 120 Computational Biomechanics Across Multiple Scales 3 Units

Terms offered: Fall 2016, Spring 2015, Spring 2014
This course applies the methods of computational modeling and continuum mechanics to biomedical phenomena spanning various length scales ranging from molecular to cellular to tissue and organ levels. The course is intended for upper level undergraduate students who have been exposed to undergraduate continuum mechanics (statics and strength of materials.)
Computational Biomechanics Across Multiple Scales: Read More [+]
Rules & Requirements

Prerequisites: MEC ENG C85 / CIV ENG C30

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Instructor: Mofrad

Computational Biomechanics Across Multiple Scales: Read Less [-]

MEC ENG 122 Processing of Materials in Manufacturing 3 Units

Terms offered: Spring 2020, Spring 2018, Spring 2017
Fundamentals of manufacturing processes (metal forming, forging, metal cutting, welding, joining, and casting); selection of metals, plastics, and other materials relative to the design and choice of manufacturing processes; geometric dimensioning and tolerancing of all processes.
Processing of Materials in Manufacturing: Read More [+]
Rules & Requirements

Prerequisites: MEC ENG C85 / CIV ENG C30 and MEC ENG 108

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Processing of Materials in Manufacturing: Read Less [-]

MEC ENG 125 Industry-Associated Capstones in Mechanical Engineering (iACME) 4 Units

Terms offered: Spring 2018
iACME provide opportunities for Mechanical Engineering undergraduates to tackle real-world engineering problems. Student teams, consisting of no more than four students, will apply to work on specific industry-initiated projects. Teams will be selected based on prior experience in research/internships, scholastic achievements in ME courses, and most importantly, proposed initial approaches toward tackling the specific project. ME faculty, alumni of the Mechanical Engineering Department, and industry participants will mentor selected teams. Projects fall within a wide range of mechanical engineering disciplines, e.g. biomedical, automotive/transportation, energy, design, etc.
Industry-Associated Capstones in Mechanical Engineering (iACME): Read More [+]

Objectives & Outcomes

Course Objectives: The purpose of this course is to:

•
learn the fundamental concepts of approaching practical engineering problems;
•
enhance skills in communication with clients and other engineers;
•
enhance skills in design, prototyping, testing, and analysis.

Student Learning Outcomes: (a) an ability to apply knowledge of mathematics, science, and engineering
(b) an ability to design and conduct experiments, as well as to analyze and interpret data
(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
(d) an ability to function on multi-disciplinary teams
(e) an ability to identify, formulate, and solve engineering problems
(f) an understanding of professional and ethical responsibility
(g) an ability to communicate effectively
(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
(i) a recognition of the need for, and an ability to engage in life-long learning
(j) a knowledge of contemporary issues
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Rules & Requirements

Prerequisites: Senior standing and a minimum GPA of 3.0

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

Grading/Final exam status: Letter grade. Alternate method of final assessment during regularly scheduled final exam group (e.g., presentation, final project, etc.).

Instructors: O'Connell , Sohn

Industry-Associated Capstones in Mechanical Engineering (iACME): Read Less [-]

MEC ENG 127 Introduction to Composite Materials 3 Units

Terms offered: Spring 2011, Spring 2010, Fall 2007
Imagine a material that offers mechanical properties that are competitive with aluminum and steel but are at fractions of their weight – these materials are termed as composites. Composite materials are used for many applications such as aircraft structures, biomedical devices, racing car bodies, and many others for their capability to be stronger, lighter, and cheaper when compared to traditional materials. In this class, students will delve into the theory to design composite structures, processing techniques to manufacture them, and structural testing methods for validation. Starting from traditional fiber-reinforced composite materials, this course will also bring in new concepts such as nanocomposites and bioinspired composites.
Introduction to Composite Materials: Read More [+]

Objectives & Outcomes

Course Objectives: The course objectives are to train students to be able to design composite structures, select composite materials, conduct stress analyses of selected practical applications using laminated plate theories and appropriate strength criteria, and be familiar with the properties and response of composite structures subjected to mechanical loading under static and cyclic conditions.

Student Learning Outcomes: A knowledge of contemporary issues.
An ability to design and conduct experiments, as well as to analyze and interpret data.
An understanding of professional and ethical responsibility.
The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
A recognition of the need for, and an ability to engage in life-long learning.
An ability to apply knowledge of mathematics, science, and engineering.
An ability to communicate effectively.
An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.

An ability to function on multi-disciplinary teams.
An ability to identify, formulate, and solve engineering problems.
An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
Students completing this course will have the facility for designing robust composite structures subjected to various types of loads.
Students will also be able to assess the effects of long-term loading, including damage generation, delamination fracture and fatigue failure.
Additionally, students will be exposed to how composites are used in various applications in aerospace, biomedical, sports, among other fields.

Rules & Requirements

Prerequisites: MEC ENG C85 / CIV ENG C30

Credit Restrictions: Students will receive no credit for MEC ENG 127 after completing MEC ENG 127. A deficient grade in MEC ENG 127 may be removed by taking MEC ENG 127.

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

MEC ENG 130 Design of Planar Machinery 3 Units

Terms offered: Fall 2020, Fall 2019, Fall 2018
Synthesis, analysis, and design of planar machines. Kinematic structure, graphical, analytical, and numerical analysis and synthesis. Linkages, cams, reciprocating engines, gear trains, and flywheels.
Design of Planar Machinery: Read More [+]
Rules & Requirements

Prerequisites: MEC ENG 104

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Instructor: Youssefi

Design of Planar Machinery: Read Less [-]

MEC ENG 131 Vehicle Dynamics and Control 4 Units

Terms offered: Spring 2020, Spring 2019, Spring 2018
Physical understanding of automotive vehicle dynamics including simple lateral, longitudinal and ride quality models. An overview of active safety systems will be introduced including the basic concepts and terminology, the state-of-the-art development, and basic principles of systems such as ABS, traction control, dynamic stability control, and roll stability control. Passive, semi-active and active suspension systems will be analyzed. Concepts of autonomous vehicle technology including drive-by-wire and steer-by-wire systems, adaptive cruise control and lane keeping systems. Design of software control systems for an actual 1/10 scale race vehicle.
Vehicle Dynamics and Control: Read More [+]
Objectives & Outcomes

Course Objectives: At the end of the course the students should be able to:
a.
Formulate simple but accurate dynamic models for automotive longitudinal, lateral and ride quality analysis.
b.
Assess the stability of dynamic systems using differential equation theory, apply frequency-response methods to assess system response to external disturbances, sensor noise and parameter variations.
c.
Have a basic understanding of modern automotive safety systems including ABS, traction control, dynamic stability control and roll control.
d.
Follow the literature on these subjects and perform independent design, research and development work in this field.
e.
Expected to design feedback control systems for an actual 1/010 scaled vehicle platform which will be distributed to every group of two students in the class

Student Learning Outcomes: (a) an ability to apply knowledge of mathematics, science, and engineering
(b) an ability to design and conduct experiments, as well as to analyze and interpret data
(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
(d) an ability to function on multi-disciplinary teams
(e) an ability to identify, formulate, and solve engineering problems
(g) an ability to communicate effectively
(j) a knowledge of contemporary issues
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Rules & Requirements

Prerequisites: MATH 1B, MATH 53, MATH 54, PHYSICS 7A, PHYSICS 7B, ENGIN 7 (or alternate programming course), and MEC ENG 132

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Instructor: Borrelli

MEC ENG 132 Dynamic Systems and Feedback 3 Units

Terms offered: Fall 2020, Summer 2020 10 Week Session, Spring 2020
Physical understanding of dynamics and feedback. Linear feedback control of dynamic systems. Mathematical tools for analysis and design. Stability. Modeling systems with differential equations. Linearization. Solution to linear, time-invariant differential equations.
Dynamic Systems and Feedback: Read More [+]

Rules & Requirements

Prerequisites: MATH 53, MATH 54, PHYSICS 7A, and PHYSICS 7B

Hours & Format

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

Summer: 10 weeks - 4.5 hours of lecture and 1.5 hours of laboratory per week

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Dynamic Systems and Feedback: Read Less [-]

MEC ENG 133 Mechanical Vibrations 3 Units

Terms offered: Spring 2020, Spring 2019, Fall 2016
An introduction to the theory of mechanical vibrations including topics of harmonic motion, resonance, transient and random excitation, applications of Fourier analysis and convolution methods. Multidegree of freedom discrete systems including principal mode, principal coordinates and Rayleigh's principle.
Mechanical Vibrations: Read More [+]

Objectives & Outcomes

Course Objectives: Introduce basic aspects of vibrational analysis, considering both single and multi-degree-of-freedom systems. Discuss the use of exact and approximate methods in the analysis of complex systems. Familiarize students with the use of MATLAB as directed toward vibration problems.

Student Learning Outcomes: (a) an ability to apply knowledge of mathematics, science, and engineering
(b) an ability to design and conduct experiments, as well as to analyze and interpret data
(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
(e) an ability to identify, formulate, and solve engineering problems
(f) an understanding of professional and ethical responsibility
(g) an ability to communicate effectively
(i) a recognition of the need for, and an ability to engage in life-long learning
(j) a knowledge of contemporary issues
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Upon completion of the course students shall be able to: Derive the equations of motion for vibratory systems. Linearize nonlinear systems so as to allow a linear vibrational analysis. Compute the natural frequency (or frequencies) of vibratory systems and determine the system's modal response. Determine the overall response based upon the initial conditions and/or steady forcing input. Design a passive vibration absorber to ameliorate vibrations in a forced system.

Rules & Requirements

Prerequisites: MEC ENG 104

Hours & Format

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

Summer: 10 weeks - 5 hours of lecture per week

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Mechanical Vibrations: Read Less [-]

MEC ENG C134 Feedback Control Systems 4 Units

Terms offered: Fall 2020, Spring 2020, Fall 2019
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: EECS 16A or MEC ENG 100; MEC ENG 132 or EL ENG 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: Mechanical Engineering/Undergraduate

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

Also listed as: EL ENG C128

Feedback Control Systems: Read Less [-]

MEC ENG 135 Design of Microprocessor-Based Mechanical Systems 4 Units

Terms offered: Spring 2020, Spring 2019, Spring 2018
This course provides preparation for the conceptual design and prototyping of mechanical systems that use microprocessors to control machine activities, acquire and analyze data, and interact with operators. The architecture of microprocessors is related to problems in mechanical systems through study of systems, including electro-mechanical components, thermal components and a variety of instruments. Laboratory exercises lead through studies of different levels of software.
Design of Microprocessor-Based Mechanical Systems: Read More [+]
Rules & Requirements

Prerequisites: ENGIN 7

Hours & Format

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

Summer: 10 weeks - 4.5 hours of lecture and 4.5 hours of laboratory per week

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Instructor: Kazerooni

Design of Microprocessor-Based Mechanical Systems: Read Less [-]

MEC ENG 136 Introduction to Control of Unmanned Aerial Vehicles 3 Units

Terms offered: Fall 2020, Fall 2019, Fall 2018
This course introduces students to the control of unmanned aerial vehicles (UAVs). The course will cover modeling and dynamics of aerial vehicles, and common control strategies. Laboratory exercises allow students to apply knowledge on a real system, by programming a microcontroller to control a UAV.
Introduction to Control of Unmanned Aerial Vehicles: Read More [+]
Objectives & Outcomes

Course Objectives: Introduce the students to analysis, modeling, and control of unmanned aerial vehicles. Lectures will cover:

- Principle forces acting on a UAV, including aerodynamics of propellers
- The kinematics and dynamics of rotations, and 3D modeling of vehicle dynamics
- Typical sensors, and their modeling
- Typical control strategies, and their pitfalls
- Programming a microcontroller

During the laboratory sessions, students will apply these skills to create a model-based controller for a UAV.

Student Learning Outcomes: (a) an ability to apply knowledge of mathematics, science, and engineering
(b) an ability to design and conduct experiments, as well as to analyze and interpret data
(g) an ability to communicate effectively
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

Rules & Requirements

Prerequisites: MEC ENG 104 is recommended. Corequisite: MEC ENG 132

Credit Restrictions: Student will not receive credit for this course if they have taken Mechanical Engineering 236U.

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Instructor: Mueller

Introduction to Control of Unmanned Aerial Vehicles: Read Less [-]

MEC ENG 138 Introduction to Micro/Nano Mechanical Systems Laboratory 3 Units

Terms offered: Spring 2018, Spring 2015, Spring 2013
This hands-on laboratory course focuses on the mechanical engineering principles that underlie the design, fabricaton, and operation of micro/nanoscale mechanical systems, including devices made by nanowire/nanotube syntheses; photolithography/soft lithography; and molding processes. Each laboratory will have different focuses for basic understanding of MEMS/NEMS systems from prototype constructions to experimental testings using mechanical, electrical, or optical techniques.
Introduction to Micro/Nano Mechanical Systems Laboratory: Read More [+]

Rules & Requirements

Prerequisites: PHYSICS 7B and MEC ENG 106; EECS 16A or MEC ENG 100. MEC ENG 118 or MEC ENG 119 are highly recommended but not mandatory

Credit Restrictions: Students will receive no credit for Mechanical Engineering 238 after taking Mechanical Engineering 138.

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Introduction to Micro/Nano Mechanical Systems Laboratory: Read Less [-]

MEC ENG 140 Combustion Processes 3 Units

Terms offered: Fall 2020, Fall 2019, Fall 2018
Fundamentals of combustion, flame structure, flame speed, flammability, ignition, stirred reaction, kinetics and nonequilibrium processes, pollutant formation. Application to engines, energy production and fire safety.
Combustion Processes: Read More [+]

Rules & Requirements

Prerequisites: MEC ENG 40, MEC ENG 106, and MEC ENG 109 (106 and 109 may be taken concurrently)

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Instructors: Fernandez-Pello, Chen

Combustion Processes: Read Less [-]

MEC ENG 146 Energy Conversion Principles 3 Units

Terms offered: Fall 2018, Spring 2018, Fall 2016
This course covers the fundamental principles of energy conversion processes, followed by development of theoretical and computational tools that can be used to analyze energy conversion processes. The course also introduces the use of modern computational methods to model energy conversion performance characteristics of devices and systems. Performance features, sources of inefficiencies, and optimal design strategies are explored for a variety of applications, which may include conventional combustion based and Rankine power systems, energy systems for space applications, solar, wind, wave, thermoelectric, and geothermal energy systems.
Energy Conversion Principles: Read More [+]

Rules & Requirements

Prerequisites: MEC ENG 40, MEC ENG 106, and MEC ENG 109 (106 and 109 may be taken concurrently)

Hours & Format

Fall and/or spring: 15 weeks - 3-3 hours of lecture and 0-1 hours of discussion per week

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Instructor: Carey

Energy Conversion Principles: Read Less [-]

MEC ENG 150A Solar-Powered Vehicles: Analysis, Design and Fabrication 3 Units

Terms offered: Summer 2015 10 Week Session, Summer 2014 10 Week Session, Spring 2014

This course addresses all aspects of design, analysis, construction and economics of solar-powered vehicles. It begins with an examination of the fundamentals of photovoltaic solar power generation, and the capabilities and limitations that exist when using this form of renewable energy. The efficiency of energy conversion and storage will be evaluated across an entire system, from the solar energy that is available to the mechanical power that is ultimately produced. The structural and dynamic stability, as well as the aerodynamics, of vehicles will be studied. Safety and economic concerns will also be considered. Students will work in teams to design, build and test a functioning single-person vehicle capable of street use.

Solar-Powered Vehicles: Analysis, Design and Fabrication: Read More [+]

Objectives & Outcomes

Course Objectives: This course provides a structured environment within which students can participate in a substantial engineering project from start to finish. It provides the opportunity for students to engage deeply in the analysis, design and construction of a functioning vehicle powered by a renewable source. Through participation in this course, students should strengthen their understanding of how their engineering education can be used to address the multidisciplinary problems with creativity, imagination, confidence and responsibility. Students will recognize the importance of effective communication in effectively addressing such problems.

Student Learning Outcomes: This course will strengthen students' abilities: to apply knowledge of mathematics, science, and engineering to real projects; to design a component or process that is part of a larger system; to function on multi-disciplinary teams; to identify, formulate, and solve engineering problems; to communicate effectively; to understand the impact of engineering solutions in a context beyond the classroom; to appreciate the importance of engaging in life-long learning and understanding contemporary issues; and to recognize and use the techniques, skills, and modern engineering tools necessary for successful project completion.

Rules & Requirements

Prerequisites: MATH 54, PHYSICS 7A, and upper division status in engineering

Hours & Format

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

Summer: 10 weeks - 3 hours of lecture and 4.5 hours of laboratory per week

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Solar-Powered Vehicles: Analysis, Design and Fabrication: Read Less [-]

MEC ENG 151 Advanced Heat Transfer 3 Units

Terms offered: Spring 2017, Spring 2014, Spring 2008

Basic principles of heat transfer and their application. Subject areas include steady-state and transient system analyses for conduction, free and forced convection, boiling, condensation and thermal radiation.

Advanced Heat Transfer: Read More [+]

Rules & Requirements

Prerequisites: MEC ENG 40, MEC ENG 106, and MEC ENG 109 (106 and 109 may be taken concurrently)

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Advanced Heat Transfer: Read Less [-]

MEC ENG 151A Conductive and Radiative Transport 3 Units

Terms offered: Fall 2020, Fall 2019, Fall 2018
Fundamentals of conductive heat transfer. Analytical and numerical methods for heat conduction in rigid media. Fundamentals of radiative transfer. Radiative properties of solids, liquids and gas media. Radiative transport modeling in enclosures and participating media.
Conductive and Radiative Transport: Read More [+]
Objectives & Outcomes

Course Objectives: The course will provide students with knowledge of the physics of conductive transport in solids, the analysis of steady and transient heat conduction by both analytical and numerical methods and the treatment of phase change problems. Furthermore, the course will provide students with knowledge of radiative properties, the mechanisms of radiative transfer and will present theory and methods of solution of radiative transfer problems in participating and nonparticipating media.

Student Learning Outcomes: Students will gain knowledge of the mechanisms of conductive transfer and will develop the ability to quantify steady and transient temperature in important engineering problems often encountered (e.g. manufacturing, materials processing, bio-thermal treatment and electronics cooling) by applying analytical methods and by constructing numerical algorithms. Students will also gain knowledge of the fundamental radiative properties and the mechanisms of radiative transport in enclosures, absorbing, emitting and scattering media as well as the interaction of thermal radiation with other modes of heat transfer.

Rules & Requirements

Prerequisites: Undergraduate courses in engineering thermodynamics, fluid dynamics and heat transfer (MEC ENG 40, MEC ENG 106, and MEC ENG 109). Each student must have access to a PC, Macintosh or workstation machine with scientific programming capabilities for use in homework and projects

Credit Restrictions: Students who have taken ME 151 or ME 250A will not receive credit.

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Instructor: Grigoropoulos

Conductive and Radiative Transport: Read Less [-]

MEC ENG 151B Convective Transport and Computational Methods 3 Units

Terms offered: Spring 2020, Spring 2019
The transport of heat and mass in fluids in motion; free and forced convection in laminar and turbulent flow over surfaces and within ducts. Fundamentals of computational methods used for solving the governing transport equations will also be covered.
Convective Transport and Computational Methods: Read More [+]
Objectives & Outcomes

Course Objectives: This course will provide students with knowledge of the physics of convective transport and an introduction to computational tools that can model convective processes in important applications such as electronics cooling, aerospace thermal management. The course also teaches students to construct computational models of natural and forced convection processes in boundary layers nears surfaces, in enclosures and in ducts or pipes that can be used to design heat exchangers and thermal management equipment for applications.

Student Learning Outcomes: (a) an ability to apply knowledge of mathematics, science, and engineering
(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
(d) an ability to function on multi-disciplinary teams
(e) an ability to identify, formulate, and solve engineering problems
(g) an ability to communicate effectively
(j) a knowledge of contemporary issues
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
Students will gain a knowledge of the mechanisms of convective heat and mass transfer for flow over surfaces and within ducts, and will develop the ability to construct computer programs that implement computation methods that predict the flow and temperature fields and heat transfer performance for convective flows of interest in engineering applications.

Rules & Requirements

Prerequisites: Undergraduate courses in engineering thermodynamics, fluid dynamics and heat transfer (MEC ENG 40, MEC ENG 106, and MEC ENG 109). Each student must have access to a PC, Macintosh or workstation machine with scientific programming capabilities for use in homework and projects

Credit Restrictions: Students should not receive credit for this course if they have taken ME 252 or ME 250B.

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Instructor: Carey

Convective Transport and Computational Methods: Read Less [-]

MEC ENG 153 Applied Optics and Radiation 3 Units

Terms offered: Not yet offered
Fundamentals of electromagnetic theory, principles of optics, waves, diffraction theory, interference, geometrical optics, scattering, theory of molecular spectra, optical and spectroscopic instrumentation. Lasers and laser materials processing, laser spectroscopy. Modern optics, plasmonics.
Applied Optics and Radiation: Read More [+]
Objectives & Outcomes

Course Objectives: The course will provide students with knowledge of the fundamental principles of optics to analyze optical phenomena and develop the background and skills to design optical instrumentation applied to engineering fields, including additive manufacturing, radiometry and spectroscopy.

Student Learning Outcomes: ABET Outcomes
(a) an ability to apply knowledge of mathematics, science, and engineering
(b) an ability to design and conduct experiments, as well as to analyze and interpret data
(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
(e) an ability to identify, formulate, and solve engineering problems
(g) an ability to communicate effectively
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice
Students will gain knowledge of the EM theory, optical properties of materials, principles of spectroscopy for gases, liquids and solids, principles and applications of lasers and optical diagnostics. Students will develop the ability to design optical instrumentation systems in the context of key industrial applications, including additive manufacturing, materials processing, bio-optics, semiconductor industry applications, reacting systems, forensics.

Rules & Requirements

Prerequisites: Undergraduate courses in physics (e.g. 7A,B,C). Each student must have access to a PC, Macintosh or workstation machine with scientific programming capabilities for use in homework and projects

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Instructor: Grigoropoulos

Applied Optics and Radiation: Read Less [-]

MEC ENG 154 Thermophysics for Applications 3 Units

Terms offered: Fall 2020, Fall 2019, Spring 2019
Development of classical thermodynamics from statistical treatment of microscale molecular behavior; Boltzmann distribution; partition functions; statistical-mechanical evaluation of thermodynamic properties; equilibrium; chemical equilibrium; phase transitions; molecular collisions; Maxwell-Boltzmann distribution; collision theory; elementary kinetic theory; molecular dynamics simulation of molecular collisions; kinetic Monte Carlo simulations of gas-phase and gas-surface reactions. Implications are explored for a variety of applications, which may include advanced combustion systems, renewable power systems, microscale transport in high heat flux electronics cooling, aerospace thermal management, and advanced materials processing.
Thermophysics for Applications: Read More [+]
Objectives & Outcomes

Course Objectives: To introduce students to the statistical foundation of thermodynamics and provide skills to perform advanced calculations for analysis of advanced energy conversion processes and devices.

Student Learning Outcomes: a knowledge of contemporary issues
an ability to apply knowledge of mathematics, science, and engineering
an ability to communicate effectively
an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
an ability to function on multi-disciplinary teams
an ability to identify, formulate, and solve engineering problems
an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Rules & Requirements

Prerequisites: MEC ENG 40

Credit Restrictions: Student will not receive credit for this course if they have taken ME 254.

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Instructors: Frenklach, Carey

Thermophysics for Applications: Read Less [-]

MEC ENG 160 Ocean Engineering Seminar 2 Units

Terms offered: Spring 2020, Spring 2019
Lectures on new developments in ocean, offshore, and arctic engineering.
Ocean Engineering Seminar: Read More [+]
Objectives & Outcomes

Course Objectives: To provide exposure of the field of ocean engineering, arctic engineering and related subject areas to students with the intention to show the broad and interdisciplinary nature of this field, particularly recent or new developments.

Student Learning Outcomes: (f) an understanding of professional and ethical responsibility
(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
(i) a recognition of the need for, and an ability to engage in life-long learning
(j) a knowledge of contemporary issues
Students will learn of new developments in ocean, offshore, and arctic engineering, connecting much of what is learned in other courses to practical applications and active research topics.

Rules & Requirements

Repeat rules: Course may be repeated for credit with instructor consent.

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Instructors: Makiharju, Alam

Ocean Engineering Seminar: Read Less [-]

MEC ENG 163 Engineering Aerodynamics 3 Units

Terms offered: Fall 2019, Fall 2018, Fall 2016
Introduction to the lift, drag, and moment of two-dimensional airfoils, three-dimensional wings, and the complete airplane. Calculations of the performance and stability of airplanes in subsonic flight. The course run on two loosely aligned parallel tracks: a traditional sequence of lectures covering the basic topics in aerodynamics and a set of projects on vortex dynamics and aerodynamics that are loosely aligned with lectures. The distinguishing factor will be the extend of the projects assigned to the graduate level participants, which will be substantially more involved than those expected from the senior level participants.
Engineering Aerodynamics: Read More [+]
Rules & Requirements

Prerequisites: MEC ENG 40, MEC ENG 106

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Instructor: Savas

Engineering Aerodynamics: Read Less [-]

MEC ENG 164 Marine Statics and Structures 3 Units

Terms offered: Fall 2012, Fall 2011, Fall 2009
Terminology and definition of hull forms, conditions of static equilibrium and stability of floating submerged bodies. Effects of damage on stability. Structural loads and response. Box girder theory. Isotropic and orthotropic plate bending and bucking.
Marine Statics and Structures: Read More [+]
Rules & Requirements

Prerequisites: Civil and Environmental Engineering 130 or 130N or consent of instructor

Credit Restrictions: Students will receive no credit for 164 after taking C164/Ocean Engineering C164; 2 units after taking 151.

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Instructor: Mansour

Formerly known as: C164

Marine Statics and Structures: Read Less [-]

MEC ENG 165 Ocean-Environment Mechanics 3 Units

Terms offered: Spring 2020, Spring 2018, Spring 2017
Ocean environment. Physical properties and characteristics of the oceans. Global conservation laws. Surface-waves generation. Gravity-wave mechanics, kinematics, and dynamics. Design consideration of ocean vehicles and systems. Model-testing techniques. Prediction of resistance and response in waves--physical modeling and computer models.
Ocean-Environment Mechanics: Read More [+]
Rules & Requirements

Prerequisites: MEC ENG 106 or CIV ENG 100

Credit Restrictions: Students will receive no credit for 165 after taking C165/Ocean Engineering C165.

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Instructor: Yeung

Formerly known as: C165

Ocean-Environment Mechanics: Read Less [-]

MEC ENG 167 Microscale Fluid Mechanics 3 Units

Terms offered: Spring 2018, Spring 2016, Spring 2015
Phenomena of physical, technological, and biological significance in flows of gases and liquids at the microscale. The course begins with familiar equations of Newtonian fluid mechanics, then proceeds to the study of essentially 1-D flows in confined geometries with the lubrication equations. Next is a study of the flow of thin films spreading under gravity or surface tension gradients. Lubrication theory of compressible gases leads to consideration of air bearings. Two- and 3-D flows are treated with Stokes' equations. Less familiar physical phenomena of significance and utility at the microscale are then considered: intermolecular forces in liquids, slip, diffusion and bubbles as active agents. A review of relevant aspects of electricity and magnetism precedes a study of electrowetting and electrokinetically driven liquid flows.
Microscale Fluid Mechanics: Read More [+]
Rules & Requirements

Prerequisites: 40, 106, 109, (106 and 109 may be taken concurrently) Physics 7B or equivalent

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Instructors: Morris, Szeri

Microscale Fluid Mechanics: Read Less [-]

MEC ENG 168 Mechanics of Offshore Systems 3 Units

Terms offered: Fall 2020, Spring 2019, Fall 2017
This course covers major aspects of offshore engineering including ocean environment, loads on offshore structures, cables and mooring, underwater acoustics and arctic operations.
Mechanics of Offshore Systems: Read More [+]
Objectives & Outcomes

Course Objectives: To provide a basic to intermediate level of treatment of engineering systems that operate in coastal, offshore, and arctic environment. Students will acquire an understanding of the unique and essential character of the marine fields and the analysis tools to handle the engineering aspects of them.

Student Learning Outcomes: (a) an ability to apply knowledge of mathematics, science, and engineering
(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
(d) an ability to function on multi-disciplinary teams
(e) an ability to identify, formulate, and solve engineering problems
(j) a knowledge of contemporary issues
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Rules & Requirements

Prerequisites: MEC ENG C85 / CIV ENG C30 and MEC ENG 106; MEC ENG 165 is recommended

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Instructor: Alam

Mechanics of Offshore Systems: Read Less [-]

MEC ENG 170 Engineering Mechanics III 3 Units

Terms offered: Spring 2020, Spring 2019, Spring 2018
This course builds upon material learned in 104, examining the dynamics of particles and rigid bodies moving in three dimensions. Topics include non-fixed axis rotations of rigid bodies, Euler angles and parameters, kinematics of rigid bodies, and the Newton-Euler equations of motion for rigid bodies. The course material will be illustrated with real-world examples such as gyroscopes, spinning tops, vehicles, and satellites. Applications of the material range from vehicle navigation to celestial mechanics, numerical simulations, and animations.
Engineering Mechanics III: Read More [+]
Rules & Requirements

Prerequisites: MEC ENG 104 or consent of instructor

Hours & Format

Fall and/or spring: 15 weeks - 3-3 hours of lecture and 0-1 hours of discussion per week

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Instructors: O'Reilly, Casey

Engineering Mechanics III: Read Less [-]

MEC ENG 173 Fundamentals of Acoustics 3 Units

Terms offered: Spring 2017, Spring 2013, Spring 2011
Plane and spherical sound waves. Sound intensity. Propagation in tubes and horns. Resonators. Standing waves. Radiation from oscillating surface. Reciprocity. Reverberation and diffusion. Electro-acoustic loud speaker and microphone problems. Environmental and architectural acoustics. Noise measurement and control. Effects on man.
Fundamentals of Acoustics: Read More [+]
Rules & Requirements

Prerequisites: MEC ENG 104

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Instructor: Johnson

Fundamentals of Acoustics: Read Less [-]

MEC ENG 174 Nonlinear and Random Vibrations 3 Units

Terms offered: Not yet offered
Oscillations in nonlinear systems having one or two degrees of freedom. Graphical, iteration, perturbation, and asymptotic methods. Self-excited oscillations and limit cycles. Random variables and random processes. Analysis of linear and nonlinear, discrete and continuous, mechanical systems under stationary and non-stationary excitations.
Nonlinear and Random Vibrations: Read More [+]
Objectives & Outcomes

Course Objectives: To give a compact, consistent, and reasonably connected account of the theory of nonlinear vibrations and uncertainty analysis. Applications will be mentioned whenever feasible. A secondary purpose is to survey some topics of contemporary research.

Student Learning Outcomes: Acquired necessary knowledge and scientific maturity to apply methods of nonlinear and uncertainty analysis in engineering design and optimization.

An ability to apply knowledge of mathematics, science, and engineering. An ability to identify, formulate, and solve engineering problems. The broad education necessary to understand the impact of engineering solutions in a global and societal context. A knowledge of contemporary issues. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
This course provides valuable training in the modeling and analysis of mechanical engineering systems using nonlinear and uncertainty analysis. It also serves to reinforce and emphasize the connection between fundamental engineering science and practical problem solving.

Rules & Requirements

Prerequisites: MEC ENG 104

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Instructor: Ma

Nonlinear and Random Vibrations: Read Less [-]

MEC ENG 175 Intermediate Dynamics 3 Units

Terms offered: Fall 2020, Fall 2019, Fall 2018
This course introduces and investigates Lagrange's equations of motion for particles and rigid bodies. The subject matter is particularly relevant to applications comprised of interconnected and constrained discrete mechanical components. The material is illustrated with numerous examples. These range from one-dimensional motion of a single particle to three-dimensional motions of rigid bodies and systems of rigid bodies.
Intermediate Dynamics: Read More [+]
Objectives & Outcomes

Course Objectives: Introduce students to the notion of exploiting differential geometry to gain insight into the dynamics of a mechanical system. Familiarize the student with classifications and applications of generalized forces and kinematical constraints. Enable the student to establish Lagrange's equations of motion for a single particle, a system of particles and a single rigid body. Establish equivalence of equations of motion using the Lagrange and Newton-Euler approaches. Discuss the developments of analytical mechanics drawing from applications in navigation, vehicle dynamics, toys, gyroscopes, celestial mechanics, satellite dynamics and computer animation.

Student Learning Outcomes: This course provides valuable training in the modeling and analysis of mechanical engineering systems using systems of particles and/or rigid bodies. It also serves to reinforce and emphasize the connection between fundamental engineering science and practical problem-solving.
a) An ability to apply knowledge of mathematics, science, and engineering.
e) An ability to identify, formulate, and solve engineering problems.
h) The broad education necessary to understand the impact of engineering solutions in a global and societal context.
j) A knowledge of contemporary issues.
k) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Rules & Requirements

Prerequisites: MEC ENG 104

Credit Restrictions: Students will receive no credit for MEC ENG 175 after completing MEC ENG 271.

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Instructors: O'Reilly, Casey

Intermediate Dynamics: Read Less [-]

MEC ENG C176 Orthopedic Biomechanics 4 Units

Terms offered: Fall 2020, Fall 2019, Spring 2019
Statics, dynamics, optimization theory, composite beam theory, beam-on-elastic foundation theory, Hertz contact theory, and materials behavior. Forces and moments acting on human joints; composition and mechanical behavior of orthopedic biomaterials; design/analysis of artificial joint, spine, and fracture fixation prostheses; musculoskeletal tissues including bone, cartilage, tendon, ligament, and muscle; osteoporosis and fracture-risk predication of bones; and bone adaptation. MATLAB-based project to integrate the course material.
Orthopedic Biomechanics: Read More [+]

Rules & Requirements

Prerequisites: MEC ENG C85 / CIV ENG C30 or BIO ENG 102 (concurrent enrollment OK). Proficiency in MatLab or equivalent. Prior knowledge of biology or anatomy is not assumed

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Instructor: Keaveny

Also listed as: BIO ENG C119

Orthopedic Biomechanics: Read Less [-]

MEC ENG C178 Designing for the Human Body 4 Units

Terms offered: Fall 2019, Fall 2018, Fall 2017
The course provides project-based learning experience in understanding product design, with a focus on the human body as a mechanical machine. Students will learn the design of external devices used to aid or protect the body. Topics will include forces acting on internal materials (e.g., muscles and total replacement devices), forces acting on external materials (e.g., prothetics and crash pads), design/analysis of devices aimed to improve or fix the human body, muscle adaptation, and soft tissue injury. Weekly laboratory projects will incorporate EMG sensing, force plate analysis, and interpretation of data collection (e.g., MATLAB analysis) to integrate course material to better understand contemporary design/analysis/problems.
Designing for the Human Body: Read More [+]

Objectives & Outcomes

Course Objectives: The purpose of this course is twofold:

- to learn the fundamental concepts of designing devices to interact with the human body;
- to enhance skills in mechanical engineering and bioengineering by analyzing the behavior of various complex biomedical problems;
- To explore the transition of a device or discovery as it goes from “benchtop to bedside”.

Student Learning Outcomes: RELATIONSHIP OF THE COURSE TO ABET PROGRAM OUTCOMES
(a) an ability to apply knowledge of mathematics, science, and engineering
(b) an ability to design and conduct experiments, as well as to analyze and interpret data
(d) an ability to function on multi-disciplinary teams
(e) an ability to identify, formulate, and solve engineering problems
(f) an understanding of professional and ethical responsibility
(g) an ability to communicate effectively
(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
(i) a recognition of the need for, and an ability to engage in life-long learning
(j) a knowledge of contemporary issues
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Working knowledge of design considerations for creating a device to protect or aid the human body, force transfer and distribution, data analysis, and FDA approval process for new devices. Understanding of basic concepts in orthopaedic biomechanics and the ability to apply the appropriate engineering concepts to solve realistic biomechanical problems, knowing clearly the assumptions involved. Critical analysis of current literature and technology.

Rules & Requirements

Prerequisites: PHYSICS 7A, MATH 1A, and MATH 1B. Proficiency in MatLab or equivalent. Prior knowledge of biology or anatomy is not assumed

Credit Restrictions: There will be no credit given for MEC ENG C178 / BIO ENG C137 after taking MEC ENG 178.

Hours & Format

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

MEC ENG 179 Augmenting Human Dexterity 4 Units

Terms offered: Spring 2020
This course provides hands-on experience in designing prostheses and assistive technologies using user-centered design. Students will develop a fundamental understanding of the state-of-the-art, design processes and product realization. Teams will prototype a novel solution to a disabilities-related challenge, focusing on upper-limb mobility or dexterity. Lessons will cover biomechanics of human manipulation, tactile sensing and haptics, actuation and mechanism robustness, and control interfaces. Readings will be selected from texts and academic journals available through the UCB online library system and course notes. Guest speakers will be invited to address cutting edge breakthroughs relevant to assistive technology and design.
Augmenting Human Dexterity: Read More [+]
Objectives & Outcomes

Course Objectives: The course objectives are to:
- Learn the fundamental principles of biomechanics, dexterous manipulation, and electromechanical systems relevant for non-invasive, cutting-edge assistive device and prosthesis design.
- Enhance skill in the areas of human-centered design, teamwork and communication through the practice of conducting labs and a project throughout the semester.

Student Learning Outcomes: (a) an ability to apply knowledge of mathematics, science, and engineering
(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
(e) an ability to identify, formulate, and solve engineering problems
(f) an understanding of professional and ethical responsibility
(g) an ability to communicate effectively
(j) a knowledge of contemporary issues

Rules & Requirements

Prerequisites: MEC ENG 132; MEC ENG C178 / BIO ENG C137 or MEC ENG C176 / BIO ENG C119; and proficiency with Matlab or equivalent program

Credit Restrictions: Students will receive no credit for MEC ENG 179 after completing MEC ENG 270.

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Instructor: Stuart

Augmenting Human Dexterity: Read Less [-]

MEC ENG C180 Engineering Analysis Using the Finite Element Method 3 Units

Terms offered: Spring 2020, Fall 2019, Spring 2019
This is an introductory course on the finite element method and is intended for seniors in engineering and applied science disciplines. The course covers the basic topics of finite element technology, including domain discretization, polynomial interpolation, application of boundary conditions, assembly of global arrays, and solution of the resulting algebraic systems. Finite element formulations for several important field equations are introduced using both direct and integral approaches. Particular emphasis is placed on computer simulation and analysis of realistic engineering problems from solid and fluid mechanics, heat transfer, and electromagnetism. The course uses FEMLAB, a multiphysics MATLAB-based finite element program that possesses a wide array of modeling capabilities and is ideally suited for instruction. Assignments will involve both paper- and computer-based exercises. Computer-based assignments will emphasize the practical aspects of finite element model construction and analysis.
Engineering Analysis Using the Finite Element Method: Read More [+]
Rules & Requirements

Prerequisites: Engineering 7 or 77 or Computer Science 61A; Mathematics 53 and 54; senior status in engineering or applied science

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Also listed as: CIV ENG C133

Engineering Analysis Using the Finite Element Method: Read Less [-]

MEC ENG 185 Introduction to Continuum Mechanics 3 Units

Terms offered: Fall 2020, Fall 2019, Fall 2018
This course is a general introduction to the fundamental concepts of the mechanics of continuous media. Topics covered include the kinematics of deformation, the concept of stress, and the conservation laws for mass, momentum and energy. This is followed by an introduction to constitutive theory with applications to well-established models for viscous fluids and elastic solids. The concepts are illustrated through the solution of tractable initial-boundary-value problems. This course presents foundation-level coverage of theory underlying a number of sub-fields, including Fluid Mechanics, Solid Mechanics and Heat Transfer.
Introduction to Continuum Mechanics: Read More [+]

Objectives & Outcomes

Course Objectives: Students will gain a deep understanding of the concepts and methods underlying modern continuum mechanics. The course is designed to equip students with the background needed to pursue advanced work in allied fields.

Student Learning Outcomes: ABET Outcomes:
(a) an ability to apply knowledge of mathematics, science, and engineering,
(e) an ability to identify, formulate, and solve engineering problems,
(g) an ability to communicate effectively,
(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context,
(i) a recognition of the need for, and an ability to engage in life-long learning,
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Rules & Requirements

Prerequisites: PHYSICS 7A, MATH 53, and MATH 54; some prior exposure to the elementary mechanics of solids and fluids

Credit Restrictions: Students will not receive credit if they have taken ME 287.

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Instructors: Casey, Johnson, Papadopoulos, Steigmann

Introduction to Continuum Mechanics: Read Less [-]

MEC ENG 190L Practical Control System Design: A Systematic Loopshaping Approach 1 Unit

Terms offered: Spring 2018, Fall 2015, Spring 2014
After a review of basic loopshaping, we introduce the loopshaping design methodology of McFarlane and Glover, and learn how to use it effectively. The remainder of the course studies the mathematics underlying the new method (one of the most prevalent advanced techniques used in industry) justifying its validity.
Practical Control System Design: A Systematic Loopshaping Approach: Read More [+]

Rules & Requirements

Prerequisites: MEC ENG 132, MEC ENG C134/EL ENG C128, or similar introductory experience regarding feedback control systems

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Instructor: Packard

Practical Control System Design: A Systematic Loopshaping Approach: Read Less [-]

MEC ENG 190M Model Predictive Control 1 Unit

Terms offered: Spring 2015, Fall 2009
Basics on optimization and polyhedra manipulation. Analysis and design of constrained predictive controllers for linear and nonlinear systems.
Model Predictive Control: Read More [+]

Rules & Requirements

Prerequisites: MEC ENG 132

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Instructor: Borrelli

Model Predictive Control: Read Less [-]

MEC ENG 190Y Practical Control System Design: A Systematic Optimization Approach 1 Unit

Terms offered: Spring 2013, Spring 2010, Spring 2009
The Youla-parametrization of all stabilizing controllers allows certain time-domain and frequency-domain closed-loop design objectives to be cast as convex optimizations, and solved reliably using off-the-shelf numerical optimization codes. This course covers the Youla parametrization, basic elements of convex optimization, and finally control design using these techniques.
Practical Control System Design: A Systematic Optimization Approach: Read More [+]
Rules & Requirements

Prerequisites: MEC ENG 132, MEC ENG C134/EL ENG C128, or similar introductory experience regarding feedback control systems

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Instructor: Packard

Practical Control System Design: A Systematic Optimization Approach: Read Less [-]

MEC ENG 191K Professional Communication 3 Units

Terms offered: Fall 2020, Summer 2020 First 6 Week Session, Summer 2020 Second 6 Week Session
This course is designed to enhance students' written and oral communication skills. Written work consists of informal documents--correspondence, internal reports, and reviews--and formal work--proposals, conference papers, journal articles, and websites. Presentations consist of informal and formal reports, including job and media interviews, phone interviews, conference calls, video conferences, progress reports, sales pitches, and feasibility studies.
Professional Communication: Read More [+]
Rules & Requirements

Prerequisites: Reading and Composition parts A and B

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 - 5.5 hours of lecture per week

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Professional Communication: Read Less [-]

MEC ENG 193A Special Topics in Biomechanical Engineering 1 - 4 Units

Terms offered: Spring 2017
This 193 series covers current topics of research interest in biomechanical engineering. The course content may vary semester to semester. Check with the department for current term topics.
Special Topics in Biomechanical Engineering: Read More [+]
Objectives & Outcomes

Course Objectives: Course objectives will vary.

Student Learning Outcomes: Student outcomes will vary.

Rules & Requirements

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

Hours & Format

Fall and/or spring:
6 weeks - 2.5-10 hours of lecture per week
8 weeks - 2-7.5 hours of lecture per week
10 weeks - 1.5-6 hours of lecture per week
15 weeks - 1-4 hours of lecture per week

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Instructor: Faculty

Special Topics in Biomechanical Engineering: Read Less [-]

MEC ENG 193B Special Topics in Controls 1 - 4 Units

Terms offered: Fall 2020, Fall 2019, Fall 2018
This 193 series covers current topics of research interest in controls. The course content may vary semester to semester. Check with the department for current term topics.
Special Topics in Controls: Read More [+]

Objectives & Outcomes

Course Objectives: Will vary with course.

Student Learning Outcomes: Will vary with course.

Rules & Requirements

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

Hours & Format

Fall and/or spring:
6 weeks - 2.5-10 hours of lecture per week
8 weeks - 2-7.5 hours of lecture per week
10 weeks - 1.5-6 hours of lecture per week
15 weeks - 1-4 hours of lecture per week

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Special Topics in Controls: Read Less [-]

MEC ENG 193C Special Topics in Design 1 - 4 Units

Terms offered: Fall 2018, Fall 2016
This 193 series covers current topics of research interest in design. The course content may vary semester to semester. Check with the department for current term topics.
Special Topics in Design: Read More [+]

Objectives & Outcomes

Course Objectives: Will vary with course.

Student Learning Outcomes: Will vary with course.

Rules & Requirements

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

Hours & Format

Fall and/or spring:
6 weeks - 2.5-10 hours of lecture per week
8 weeks - 2-7.5 hours of lecture per week
10 weeks - 1.5-6 hours of lecture per week
15 weeks - 1-4 hours of lecture per week

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Instructor: Faculty

Special Topics in Design: Read Less [-]

MEC ENG 193D Special Topics in Dynamics 1 - 4 Units

Terms offered: Prior to 2007
This 193 series covers current topics of research interest in dynamics. The course content may vary semester to semester. Check with the department for current term topics.
Special Topics in Dynamics: Read More [+]

Objectives & Outcomes

Course Objectives: Will vary with course.

Student Learning Outcomes: Will vary with course.

Rules & Requirements

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

Hours & Format

Fall and/or spring:
6 weeks - 2.5-10 hours of lecture per week
8 weeks - 2-7.5 hours of lecture per week
10 weeks - 1.5-6 hours of lecture per week
15 weeks - 1-4 hours of lecture per week

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Instructor: Faculty

Special Topics in Dynamics: Read Less [-]

MEC ENG 193E Special Topics in Energy Science and Technology 1 - 4 Units

Terms offered: Spring 2020, Spring 2019, Spring 2018
This 193 series covers current topics of research interest in energy science and technology. The course content may vary semester to semester. Check with the department for current term topics.
Special Topics in Energy Science and Technology: Read More [+]

Objectives & Outcomes

Course Objectives: Will vary with course.

Student Learning Outcomes: Will vary with course.

Rules & Requirements

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

Hours & Format

Fall and/or spring:
6 weeks - 2.5-10 hours of lecture per week
8 weeks - 2-7.5 hours of lecture per week
10 weeks - 1.5-6 hours of lecture per week
15 weeks - 1-4 hours of lecture per week

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Instructor: Faculty

Special Topics in Energy Science and Technology: Read Less [-]

MEC ENG 193F Special Topics in Fluids 1 - 4 Units

Terms offered: Prior to 2007
This 193 series covers current topics of research interest in fluids. The course content may vary semester to semester. Check with the department for current term topics.
Special Topics in Fluids: Read More [+]

Objectives & Outcomes

Course Objectives: Will vary with course.

Student Learning Outcomes: Will vary with course.

Rules & Requirements

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

Hours & Format

Fall and/or spring:
6 weeks - 2.5-10 hours of lecture per week
8 weeks - 2-7.5 hours of lecture per week
10 weeks - 1.5-6 hours of lecture per week
15 weeks - 1-4 hours of lecture per week

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Instructor: Faculty

Special Topics in Fluids: Read Less [-]

MEC ENG 193G Special Topics in Manufacturing 1 - 4 Units

Terms offered: Prior to 2007
This 193 series covers current topics of research interest in manufacturing. The course content may vary semester to semester. Check with the department for current term topics.
Special Topics in Manufacturing: Read More [+]

Objectives & Outcomes

Course Objectives: Will vary by course.

Student Learning Outcomes: Will vary by course.

Rules & Requirements

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

Hours & Format

Fall and/or spring:
6 weeks - 2.5-10 hours of lecture per week
8 weeks - 2-7.5 hours of lecture per week
10 weeks - 1.5-6 hours of lecture per week
15 weeks - 1-4 hours of lecture per week

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Instructor: Faculty

Special Topics in Manufacturing: Read Less [-]

MEC ENG 193H Special Topics in Materials 1 - 4 Units

Terms offered: Spring 2020
This 193 series covers current topics of research interest in materials. The course content may vary semester to semester. Check with the department for current term topics.
Special Topics in Materials: Read More [+]

Objectives & Outcomes

Course Objectives: Will vary with course.

Student Learning Outcomes: Will vary with course.

Rules & Requirements

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

Hours & Format

Fall and/or spring:
6 weeks - 2.5-10 hours of lecture per week
8 weeks - 2-7.5 hours of lecture per week
10 weeks - 1.5-6 hours of lecture per week
15 weeks - 1-4 hours of lecture per week

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Instructor: Faculty

Special Topics in Materials: Read Less [-]

MEC ENG 193I Special Topics in Mechanics 1 - 4 Units

Terms offered: Prior to 2007
This 193 series covers current topics of research interest in mechanics. The course content may vary semester to semester. Check with the department for current term topics.
Special Topics in Mechanics: Read More [+]

Objectives & Outcomes

Course Objectives: Will vary with course.

Student Learning Outcomes: Will vary with course.

Rules & Requirements

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

Hours & Format

Fall and/or spring:
6 weeks - 2.5-10 hours of lecture per week
8 weeks - 2-7.5 hours of lecture per week
10 weeks - 1.5-6 hours of lecture per week
15 weeks - 1-4 hours of lecture per week

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Instructor: Faculty

Special Topics in Mechanics: Read Less [-]

MEC ENG 193J Special Topics in MEMS/Nano 1 - 4 Units

Terms offered: Prior to 2007
This 193 series covers current topics of research interest in MEMS/nano. The course content may vary semester to semester. Check with the department for current term topics.
Special Topics in MEMS/Nano: Read More [+]

Objectives & Outcomes

Course Objectives: Will vary with course.

Student Learning Outcomes: Will vary with course.

Rules & Requirements

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

Hours & Format

Fall and/or spring:
6 weeks - 2.5-10 hours of lecture per week
8 weeks - 2-7.5 hours of lecture per week
10 weeks - 1.5-6 hours of lecture per week
15 weeks - 1-4 hours of lecture per week

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Instructor: Faculty

Special Topics in MEMS/Nano: Read Less [-]

MEC ENG 193K Special Topics in Ocean Engineering 1 - 4 Units

Terms offered: Prior to 2007
This 193 series covers current topics of research interest in ocean engineering. The course content may vary semester to semester. Check with the department for current term topics.
Special Topics in Ocean Engineering: Read More [+]

Objectives & Outcomes

Course Objectives: Will vary by course.

Student Learning Outcomes: Will vary by course.

Rules & Requirements

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

Hours & Format

Fall and/or spring:
6 weeks - 2.5-10 hours of lecture per week
8 weeks - 2-7.5 hours of lecture per week
10 weeks - 1.5-6 hours of lecture per week
15 weeks - 1-4 hours of lecture per week

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Instructor: Faculty

Special Topics in Ocean Engineering: Read Less [-]

MEC ENG H194 Honors Undergraduate Research 2 - 4 Units

Terms offered: Fall 2020, Summer 2020 8 Week Session, Summer 2020 Second 6 Week Session

Final report required. Students who have completed a satisfactory number of advanced courses may pursue original research under the direction of one of the members of the faculty. A maximum of three units of H194 may be used to fulfill technical elective requirements in the Mechanical Engineering program (unlike 198 or 199, which do not satisfy technical elective requirements). Students can use a maximum of three units of graded research units (H194 or 196) towards their technical elective requirement.

Honors Undergraduate Research: Read More [+]

Rules & Requirements

Prerequisites: 3.3 cumulative GPA or higher, consent of instructor and adviser, and senior standing

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2-4 hours of independent study per week

Summer:
6 weeks - 1-5 hours of independent study per week
8 weeks - 4-8 hours of independent study per week

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Honors Undergraduate Research: Read Less [-]

MEC ENG 196 Undergraduate Research 2 - 4 Units

Terms offered: Fall 2020, Summer 2020 Second 6 Week Session, Spring 2020

Students who have completed a satisfactory number of advanced courses may pursue original research under the direction of one of the members of the staff. A maximum of three units of 196 may be used to fulfill technical elective requirements in the Mechanical Engineering program (unlike 198 or 199, which do not satisfy technical elective requirements). Students can use a maximum of three units of graded research units (H194 or 196) towards their technical elective requirement. Final report required.

Undergraduate Research: Read More [+]

Rules & Requirements

Prerequisites: Consent of instructor and adviser; junior or senior standing

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2-4 hours of independent study per week

Summer:
6 weeks - 5-10 hours of independent study per week
8 weeks - 4-8 hours of independent study per week

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Undergraduate Research: Read Less [-]

MEC ENG 197 Undergraduate Engineering Field Studies 1 - 4 Units

Terms offered: Fall 2015, Summer 2015 10 Week Session
Supervised experience relative to specific aspects of practice in engineering. Under guidance of a faculty member, the student will work in industry, primarily in an internship setting or another type of short-time status. Emphasis is to attain practical experience in the field.
Undergraduate Engineering Field Studies: Read More [+]
Objectives & Outcomes

Student Learning Outcomes: (h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
(j) a knowledge of contemporary issues
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Rules & Requirements

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 3-12 hours of internship per week

Summer:
6 weeks - 8-30 hours of internship per week
10 weeks - 5-18 hours of internship per week

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Undergraduate Engineering Field Studies: Read Less [-]

MEC ENG 198 Directed Group Studies for Advanced Undergraduates 1 - 4 Units

Terms offered: Spring 2020, Spring 2019, Spring 2018
Group study of a selected topic or topics in Mechanical Engineering. Credit for 198 or 199 courses combined may not exceed 4 units in any single term. See College for other restrictions.
Directed Group Studies for Advanced Undergraduates: Read More [+]
Rules & Requirements

Prerequisites: Upper division standing and good academic standing

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

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

Summer: 10 weeks - 1.5-6 hours of directed group study per week

Additional Details

Subject/Course Level: Mechanical Engineering/Undergraduate

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

Directed Group Studies for Advanced Undergraduates: Read Less [-]

MEC ENG 199 Supervised Independent Study 1 - 4 Units

Terms offered: Fall 2020, Spring 2020, Fall 2019
Supervised independent study. Enrollment restrictions apply; see the introduction to Courses and Curricula section of this catalog.
Supervised Independent Study: Read More [+]
Rules & Requirements

Prerequisites: Consent of instructor and major adviser

Repeat rules: Course may be repeated for credit without restriction.

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: Mechanical Engineering/Undergraduate

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

Supervised Independent Study: Read Less [-]

MEC ENG C200 Design, Evaluate, and Scale Development Technologies 3 Units

Terms offered: Fall 2020, Fall 2019, Spring 2019, Fall 2018
This required course for the Designated Emphasis in Development Engineering will include projects and case studies, many related to projects at UC Berkeley, such as those associated with the Development Impact Labs (DIL). Student teams will work with preliminary data to define the problem. They will then collect and analyze interview and survey data from potential users and begin to design a solution. Students will explore how to use novel monitoring technologies and “big data” for product improvement and evaluation. The student teams will use the case studies (with improvements based on user feedback and data analysis) to develop a plan for scaling and evaluation with a rigorous controlled trial.
Design, Evaluate, and Scale Development Technologies: Read More [+]
Objectives & Outcomes

Course Objectives: Students will use multiple qualitative and quantitative methods to learn about user needs, to come up with new concepts and solutions, and to understand how new products and services achieve or fail to achieve their goals in a development setting.

Student Learning Outcomes: Students will be able to apply the skills to current challenges in development engineering
Students will develop a set of skills that will allow them to flourish in a climate of complex problem solving and design challenges in development engineering
Students will learn how to learn from users using qualitative and quantitative tools including surveys, interviews, new monitoring technologies, statistical analyses and experimental designs
Students will learn to participate in and lead innovation and creativity in collaborative settings

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructors: Agogino, Levine

Also listed as: DEV ENG C200

Design, Evaluate, and Scale Development Technologies: Read Less [-]

MEC ENG C201 Modeling and Simulation of Advanced Manufacturing Processes 3 Units

Terms offered: Prior to 2007
This course provides the student with a modern introduction to the basic industrial practices, modeling techniques, theoretical background, and computational methods to treat classical and cutting edge manufacturing processes in a coherent and self-consistent manner.,Terms offered: Spring 2020, Spring 2019, Spring 2018
This course provides the student with a modern introduction to the basic industrial practices, modeling techniques, theoretical background, and computational methods to treat classical and cutting edge manufacturing processes in a coherent and self-consistent manner.
Modeling and Simulation of Advanced Manufacturing Processes: Read More [+]
Objectives & Outcomes

Course Objectives: An introduction to modeling and simulation of modern manufacturing processes.

Rules & Requirements

Prerequisites: An undergraduate course in strength of materials or 122

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Zohdi

Also listed as: MAT SCI C286/NUC ENG C226

Modeling and Simulation of Advanced Manufacturing Processes: Read Less [-]

MEC ENG C201 Modeling and Simulation of Advanced Manufacturing Processes 3 Units

Terms offered: Prior to 2007
This course provides the student with a modern introduction to the basic industrial practices, modeling techniques, theoretical background, and computational methods to treat classical and cutting edge manufacturing processes in a coherent and self-consistent manner.,Terms offered: Spring 2020, Spring 2019, Spring 2018
This course provides the student with a modern introduction to the basic industrial practices, modeling techniques, theoretical background, and computational methods to treat classical and cutting edge manufacturing processes in a coherent and self-consistent manner.
Modeling and Simulation of Advanced Manufacturing Processes: Read More [+]

Objectives & Outcomes

Course Objectives: An introduction to modeling and simulation of modern manufacturing processes.

Rules & Requirements

Prerequisites: An undergraduate course in strength of materials or 122

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Zohdi

Also listed as: MAT SCI C286/NUC ENG C226

Modeling and Simulation of Advanced Manufacturing Processes: Read Less [-]

MEC ENG C202 Computational Design of Multifunctional/Multiphysical Composite Materials 3 Units

Terms offered: Spring 2012
The course is self-contained and is designed in an interdisciplinary manner for graduate students in engineering, materials science, physics, and applied mathematics who are interested in methods to accelerate the laboratory analysis and design of new materials. Examples draw primarily from various mechanical, thermal, diffusive, and electromagnetic applications.
Computational Design of Multifunctional/Multiphysical Composite Materials: Read More [+]

Rules & Requirements

Prerequisites: An undergraduate degree in the applied sciences or engineering

Hours & Format

Fall and/or spring: 15 weeks - 3-3 hours of lecture and 0-1 hours of discussion per week

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Zohdi

Also listed as: MAT SCI C287

Computational Design of Multifunctional/Multiphysical Composite Materials: Read Less [-]

MEC ENG 203 Nanoscale Processing of Materials 3 Units

Terms offered: Fall 2019
This course surveys sub-micrometer pattern-transfer techniques and methods for handling materials with one or more sub-micrometer dimensions. The optical and mechanical principles underlying a spectrum of candidate lithography techniques are introduced, and extensive examples of industrial applications are discussed. Class material also covers techniques for assembling structures from zero-, one- and two-dimensional materials including nanoparticles, nanotubes, nanowires, and single- and few-atomic-layer sheets of van der Waals solids such as graphene and molybdenite.
Nanoscale Processing of Materials: Read More [+]
Objectives & Outcomes

Course Objectives: The objectives of the course are to:
•
Make students aware of current capabilities and innovations in sub-micrometer lithography and in the handling of nanoscale materials;
•
Equip students to select an appropriate lithography or processing technique for a given application from among multiple alternatives;
•
Provide students with an understanding of the transformations of material that occur in sub-micrometer lithography techniques, such that they can understand why certain processing routes might be preferable to others for particular applications.

Student Learning Outcomes: •
Articulate the key requirements (i.e. resolution, maximum defect density, and multi-layer alignment precision) of micro- and nano-patterning processes to be used in a range of applications, such as semiconductors, hard disk-drives, large-area photovoltaics, and biomedical microdevices.
•
Identify which of a set of available micro-/nano-patterning processes (e.g. extreme-UV lithography, directed self-assembly, multiple e-beam lithography, and imprint lithography) are suitable for a given patterning application.
•
Accurately explain and distinguish between the physical transformations of material that occur in a number of sub-micrometer patterning processes, including imprint lithography, micro-contact printing, micro-embossing, and micro-gravure.

•
Identify a number of currently open research questions relating to nanoscale processing of materials and suggest possible creative solutions to them.
•
Use numerical simulation techniques to model the behavior of one or more lithographic techniques, including nanoimprint, photolithography, or electron-beam lithography. Use insights from modeling to optimize key process parameters and to make trade-offs in the geometrical design of a pattern that is to be fabricated.

Rules & Requirements

Prerequisites: An understanding of solid mechanics and statics, or permission of instructor. Experience programming in Matlab is desirable for simulation assignments

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

MEC ENG 204 Advanced Manufacturing Systems Analysis, AMS 3 Units

Terms offered: Spring 2017, Spring 2016, Spring 2015
This course is designed to prepare students for technical leadership in industry. The objective is to provide insight and understanding on the main concepts and practices involved in analyzing, managing systems to deliver high quality, cost effectiveness and sustainable advantages. The impact of this class on the Mechanical Engineering program includes delivering core production concepts and advanced skills that blend vision and advanced manufacturing elements. This course is highly recommended for students on the Product Design track in Mechanical Engineering's Master of Engineering program.
Advanced Manufacturing Systems Analysis, AMS: Read More [+]
Objectives & Outcomes

Course Objectives: The objective of this course is to ensure that our students:
a.
Gain solid foundations on the analysis of Advanced Manufacturing Systems Analysis (AMS), including flow analysis concepts, frameworks and methodologies.
b.
Understand and apply sustainable engineering practices.
c.
Put into practice decision-making activities based on solid academic rigor, quantitative tools and simulation models oriented for AMS
d.
Align their AMS to a company's strategy to deliver business advantage.

Rules & Requirements

Prerequisites: This course is open to graduate students, with priority given to students in Mechanical Engineering's Master of Engineering program

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Advanced Manufacturing Systems Analysis, AMS: Read Less [-]

MEC ENG C205 Critical Making 4 Units

Terms offered: Spring 2020, Spring 2019, Spring 2018
Critical Making will operationalize and critique the practice of “making” through both foundational literature and hands on studio culture. As hybrid practitioners, students will develop fluency in readily collaging and incorporating a variety of physical materials and protocols into their practice. Students will envision and create future computational experiences that critically explore social and culturally relevant technological themes. No previous technical knowledge is required to take this course. Class projects involve basic programming, electronic circuitry, and digital fabrication design. Tutorials and instruction will be provided, but students will be expected to develop basic skills in these areas to complete course projects.
Critical Making: Read More [+]
Hours & Format

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

Summer:
6 weeks - 4 hours of lecture and 8 hours of studio per week
8 weeks - 4 hours of lecture and 4 hours of studio per week
10 weeks - 3 hours of lecture and 3 hours of studio per week

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Formerly known as: New Media 203

Also listed as: NWMEDIA C203

Critical Making: Read Less [-]

MEC ENG 206 Engineering Design and Prototyping: Pedagogy & Assessment 3 Units

Terms offered: Prior to 2007
This course explores contemporary research in engineering design and prototyping, as well as related cognitive issues in engineering curricular development, pedagogy, and assessment. One recurring theme throughout the course will be the duality between learning and design: design-based research, design as a pedagogy for integrative learning and the role of cognition and the learning sciences in the practice of engineering design. It has been motivated by several reforms: (1) National efforts to better train and educate engineers for the engineering workplace in the 21st Century: to better prepare engineers to face multidisciplinary problems and product design in competitive industries and improve their skills in teamwork and communication.
Engineering Design and Prototyping: Pedagogy & Assessment: Read More [+]
Objectives & Outcomes

Course Objectives: This course has been developed to bridge student’s previous knowledge of disciplinary research in design and prototyping with engineering education research.

- Provide learners the opportunity to question (usually tacit) assumptions about what engineering is, what the purpose and process of engineering education is, and who gets to be an engineer.
- Understand design as a pedagogy for integrative learning and the role of cognition and the learning sciences in the practice of engineering design and prototyping.
- Provide the participants with an understanding of theories and practices in content, assessment, and pedagogy for teaching engineering design and prototyping.
- Familiarize learners with quantitative and qualitative methodologies for data analysis associated with the assessment of design and prototyping interventions.
- Promote critical thinking and a social construction of knowledge by having face-to-face and online discussions of readings from a variety of sources.

Student Learning Outcomes: Students will be able to:

- Identify their own role in shaping engineering and engineering education, and explore paths of connecting their research in Mechanical Engineering (or a related field) educational interests in design and prototyping;
- Think critically, reflectively and holistically about engineering and education;
- Become aware of the theoretical and practical issues of learning, instruction, and assessment as these concern the design of educational environments and technologies;
- Apply design research methods to inform and validate designs involving educational issues.
- Articulate their own view of the design of educational tools and become more confident about their ability to work as an engineer and educational designer.

Hours & Format

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

MEC ENG C210 Advanced Orthopedic Biomechanics 4 Units

Terms offered: Fall 2020, Fall 2019, Spring 2019
Students will learn the application of engineering concepts including statics, dynamics, optimization theory, composite beam theory, beam-on-elastic foundation theory, Hertz contact theory, and materials behavior. Topics will include forces and moments acting on human joints; composition and mechanical behavior of orthopedic biomaterials; design/analysis of artificial joint, spine, and fracture fixation prostheses; musculoskeletal tissues including bone, cartilage, tendon, ligament, and muscle; osteoporosis and fracture-risk predication of bones; and bone adaptation. Students will be challenged in a MATLAB-based project to integrate the course material in an attempt to gain insight into contemporary design/analysis/problems.
Advanced Orthopedic Biomechanics: Read More [+]
Objectives & Outcomes

Course Objectives: The purpose of this course is twofold:

- to learn the fundamental concepts of orthopaedic biomechanics;
- to enhance skills in mechanical engineering and bioengineering by analyzing the mechanical behavior of various complex biomedical problems.

Student Learning Outcomes: Working knowledge of various engineering concepts such as composite beam theory, beam-on-elastic-foundation theory, Hertz contact theory and MATLAB-based optimization design analysis. Understanding of basic concepts in orthopaedic biomechanics and the ability to apply the appropriate engineering concepts to solve realistic biomechanical problems, knowing clearly the assumptions involved.

Rules & Requirements

Prerequisites: ME C85/CE C30 or Bio Eng 102; concurrent enrollment OK. Proficiency in MatLab or equivalent. Prior knowledge of biology or anatomy is not assumed

Credit Restrictions: Students will not receive credit for this course if they have taken ME C176/Bio E C119.

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: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructors: O'Connell, Keaveny

Also listed as: BIO ENG C209

Advanced Orthopedic Biomechanics: Read Less [-]

MEC ENG 211 The Cell as a Machine 3 Units

Terms offered: Fall 2019, Fall 2015, Fall 2013
This course offers a modular and systems mechanobiology (or "machine") perspective of the cell. Two vitally important components of the cell machinery will be studied in depth: (1) the integrin-mediated focal adhesions system that enables the cell to adhere to, and communicate mechano-chemical signals with, the extracellular environment, and (2) the nuclear pore complex, a multi-protein gateway for traffic in and out of the nucleus that regulates gene expression and affects protein synthesis.
The Cell as a Machine: Read More [+]
Rules & Requirements

Prerequisites: Mathematics 54; Physics 7A; graduate standing

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Mofrad

The Cell as a Machine: Read Less [-]

MEC ENG C212 Heat and Mass Transport in Biomedical Engineering 3 Units

Terms offered: Spring 2008, Fall 2007, Spring 2006, Spring 2005
Fundamental processes of heat and mass transport in biological systems; organic molecules, cells, biological organs, whole animals. Derivation of mathematical models and discussion of experimental procedures. Applications to biomedical engineering.
Heat and Mass Transport in Biomedical Engineering: Read More [+]
Rules & Requirements

Prerequisites: 106 and 109 (106 and 109 may be taken concurrently)

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Formerly known as: Mechanical Engineering 212

Also listed as: BIO ENG C212

Heat and Mass Transport in Biomedical Engineering: Read Less [-]

MEC ENG C213 Fluid Mechanics of Biological Systems 3 Units

Terms offered: Spring 2019, Spring 2016, Spring 2014
Fluid mechanical aspects of various physiological systems, the circulatory, respiratory, and renal systems. Motion in large and small blood vessels. Pulsatile and peristaltic flows. Other biofluidmechanical flows: the ear, eye, etc. Instrumentation for fluid measurements in biological systems and for medical diagnosis and applications. Artificial devices for replacement of organs and/or functions, e.g. blood oxygenators, kidney dialysis machines, artificial hearts/circulatory assist devices.
Fluid Mechanics of Biological Systems: Read More [+]
Rules & Requirements

Prerequisites: 106 or equivalent; 265A or consent of instructor

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructors: Berger, Liepmann

Also listed as: BIO ENG C213

Fluid Mechanics of Biological Systems: Read Less [-]

MEC ENG C214 Advanced Tissue Mechanics 3 Units

Terms offered: Spring 2018, Spring 2017, Spring 2015
The goal of this course is to provide a foundation for characterizing and understanding the mechanical behavior of load-bearing tissues. A variety of mechanics topics will be introduced, including anisotropic elasticity and failure, cellular solid theory, biphasic theory, and quasi-linear viscoelasticity (QLV) theory. Building from this theoretical basis, we will explore the constitutive behavior of a wide variety of biological tissues. After taking this course, students should have sufficient background to independently study the mechanical behavior of most biological tissues. Formal discussion section will include a seminar series with external speakers.
Advanced Tissue Mechanics: Read More [+]
Rules & Requirements

Prerequisites: 102A, 176, 185; graduate standing 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: Mechanical Engineering/Graduate

Grading: Letter grade.

Also listed as: BIO ENG C214

Advanced Tissue Mechanics: Read Less [-]

MEC ENG C215 Advanced Structural Aspects of Biomaterials 4 Units

Terms offered: Fall 2020, Spring 2019, Spring 2018
This course covers the structure and mechanical functions of load bearing tissues and their replacements. Biocompatibility of biomaterials and host response to structural implants are examined. Quantitative treatment of biomechanical issues and constitutive relationships of materials are covered in order to design implants for structural function. Material selection for load bearing applications including reconstructive surgery, orthopedics, dentistry, and cardiology are addressed.
Advanced Structural Aspects of Biomaterials: Read More [+]
Rules & Requirements

Credit Restrictions: Students should not receive credit if they've taken ME ME C117 or Bio Eng C117.

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Also listed as: BIO ENG C222

Advanced Structural Aspects of Biomaterials: Read Less [-]

MEC ENG C216 Molecular Biomechanics and Mechanobiology of the Cell 4 Units

Terms offered: Spring 2020, Spring 2019, Spring 2016
This course develops and applies scaling laws and the methods of continuum and statistical mechanics to understand micro- and nano-scale mechanobiological phenomena involved in the living cell with particular attention the nucleus and the cytoskelton as well as the interactions of the cell with the extracellular matrix and how these interactions may cause changes in cell architecture and biology, consequently leading to functional adaptation or pathological conditions.
Molecular Biomechanics and Mechanobiology of the Cell: Read More [+]
Objectives & Outcomes

Course Objectives: This course, which is open to graduate students in diverse disciplines ranging from engineering to biology to chemistry and physics, is aimed at exposing students to subcellular biomechanical phenomena spanning scales from molecules to the whole cell.

Student Learning Outcomes: The students will develop tools and skills to (1) understand and analyze subcelluar biomechanics and transport phenomena, and (2) ultimately apply these skills to novel biological and biomedical applications.

Rules & Requirements

Prerequisites: Math 54; Physics 7A; BioE 102 or ME C85 or instructor’s consent

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Mofrad

Also listed as: BIO ENG C215

Molecular Biomechanics and Mechanobiology of the Cell: Read Less [-]

MEC ENG C217 Biomimetic Engineering -- Engineering from Biology 3 Units

Terms offered: Fall 2017, Spring 2014, Fall 2010
Study of nature's solutions to specific problems with the aim of determining appropriate engineering analogs. Morphology, scaling, and design in organisms applied to engineering structures. Mechanical principles in nature and their application to engineering devices. Mechanical behavior of biological materials as governed by underlying microstructure, with the potential for synthesis into engineered materials. Trade-offs between redundancy and efficiency. Students will work in teams on projects where they will take examples of designs, concepts, and models from biology and determine their potential in specific engineering applications.
Biomimetic Engineering -- Engineering from Biology: Read More [+]
Rules & Requirements

Prerequisites: Graduate standing in engineering or consent of instructor

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Dharan

Also listed as: BIO ENG C217/INTEGBI C217

Biomimetic Engineering -- Engineering from Biology: Read Less [-]

MEC ENG 218N Introduction to Nanotechnology and Nanoscience 3 Units

Terms offered: Spring 2020
UG and Grad. introduction to nanotechnology and nanoscience. The course has two components:1) Students receive a set of formal lectures introducing nanotechnology and nanoscience, covering nanofabrication technology (how one achieves the nanometer length scale, from "bottom up" to "top down" technologies), the interdisciplinary nature of nanotechnology and nanoscience (including areas of chemistry, material science, physics, and molecular biology), examples of nanoscience phenomena (the crossover from bulk to quantum mechanical properties) and applications from integrated circuits, quantum computing, MEMS, and bioengineering 2) Projects. Students are asked to present on a variety of current journal papers to the class & lead discussion.
Introduction to Nanotechnology and Nanoscience: Read More [+]

Objectives & Outcomes

Course Objectives: To introduce and provide a broad view of the nascent field of nanoscience and nanotechnology to undergraduates. To introduce students to inter- and multi-disciplinary science and engineering.

Student Learning Outcomes: A recognition of the need for, and an ability to engage in life-long learning. A knowledge of contemporary issues.
An ability to apply knowledge of mathematics, science, and engineering. An ability to function on multidisciplinary teams.
An ability to identify, formulate, and solve engineering problems. An ability to communicate effectively.
The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.

Rules & Requirements

Prerequisites: Chem 1A, Physics 7B, Physics 7C, Engineering 45. BIO 1A and Chem 1B preferred

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Lin

Introduction to Nanotechnology and Nanoscience: Read Less [-]

MEC ENG C218 Introduction to MEMS Design 4 Units

Terms offered: Spring 2020, Spring 2019, Spring 2018
Physics, fabrication, and design of micro-electromechanical systems (MEMS). Micro and nanofabrication processes, including silicon surface and bulk micromachining and non-silicon micromachining. Integration strategies and assembly processes. Microsensor and microactuator devices: electrostatic, piezoresistive, piezoelectric, thermal, magnetic transduction. Electronic position-sensing circuits and electrical and mechanical noise. CAD for MEMS. Design project is required.
Introduction to MEMS Design: Read More [+]

Rules & Requirements

Prerequisites: Graduate standing in engineering or science; undergraduates with 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: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructors: Nguyen, Pister

Formerly known as: Electrical Engineering C245, Mechanical Engineering C218

Also listed as: EL ENG C247B

Introduction to MEMS Design: Read Less [-]

MEC ENG 219 Introduction to Microelectromechanical Systems 3 Units

Terms offered: Fall 2020, Spring 2001, Spring 2000
Fundamentals of microelectromechanical systems including design, fabrication of microstructures; surface micromachining, bulk-micromachining, LIGA, and other micro machining processes; fabrication principles of integrated circuit device and their applications for making MEMS devices; high-aspect-ratio microstructures; scaling issues in the micro scale (heat transfer, fluid mechanics and solid mechanics); device design, analysis, and mask layout.
Introduction to Microelectromechanical Systems: Read More [+]
Objectives & Outcomes

Course Objectives: The course aims to provide basic understanding of micromachining processes, including surface micromachining, bulk micromachining and LIGA. Students should learn the design and fabrication aspects of MEMS by using computer-aided-design tools to design and draw their own microstructures.

Student Learning Outcomes: ABET: A recognition of the need for, and an ability to engage in life-long learning; a knowledge of contemporary issues; an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
ABET: An ability to apply knowledge of mathematics, science, and engineering; an ability to design a system, component, or process to meet desired needs; an ability to identify, formulate, and solve engineering problems.
Students completing this course will have: The ability to identify, formulate, and solve problems relating to MEMS manufacturing.
Students should be able to design micro-machining process flows by using fundamental skills learned in the class and combine with knowledge from other courses to construct their own micro-machines.
The ability to apply mathematics, basic science, and engineering science to the solution of MEMS manufacturing problems.
The ability to design a component and select a fabrication process or sequence of processes suitable for production of a MEMS device.
The ability to identify, formulate, and solve problems relating to MEMS manufacturing.
The ability to interpret the results of engineering investigations.

Rules & Requirements

Prerequisites: MEC ENG 100 and PHYSICS 7B

Credit Restrictions: Students will receive no credit for MEC ENG 219 after completing MEC ENG 219, or MEC ENG 219. A deficient grade in MEC ENG 219 may be removed by taking MEC ENG 219, or MEC ENG 219.

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Lin

Introduction to Microelectromechanical Systems: Read Less [-]

MEC ENG C219 Parametric and Optimal Design of MEMS 3 Units

Terms offered: Spring 2013, Spring 2012, Spring 2011
Parametric design and optimal design of MEMS. Emphasis on design, not fabrication. Analytic solution of MEMS design problems to determine the dimensions of MEMS structures for specified function. Trade-off of various performance requirements despite conflicting design requirements. Structures include flexure systems, accelerometers, and rate sensors.
Parametric and Optimal Design of MEMS: Read More [+]
Rules & Requirements

Prerequisites: Graduate standing or consent of instructor

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructors: Lin, Pisano

Formerly known as: 219

Also listed as: EL ENG C246

Parametric and Optimal Design of MEMS: Read Less [-]

MEC ENG 220 Precision Manufacturing 3 Units

Terms offered: Fall 2015, Fall 2013, Fall 2012
Introduction to precision engineering for manufacturing. Emphasis on design and performance of precision machinery for manufacturing. Topics include machine tool elements and structure, sources of error (thermal, static, dynamic, process related), precision machining processes and process models (diamond turning and abrasive (fixed and free) processes), sensors for process monitoring and control, metrology, actuators, machine design case studies and examples of precision component manufacture.
Precision Manufacturing: Read More [+]
Rules & Requirements

Prerequisites: 101, 102B, or consent of instructor

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Dornfeld

Precision Manufacturing: Read Less [-]

MEC ENG C220D Input/Output Methods for Compositional System Analysis 2 Units

Terms offered: Prior to 2007
Introduction to input/output concepts from control theory, systems as operators in signal spaces, passivity and
small-gain theorems, dissipativity theory, integral quadratic constraints. Compositional stabilility and
performance certification for interconnected systems from subsystems input/output properties. Case studies in
multi-agent systems, biological networks, Internet congestion control, and adaptive control.
Input/Output Methods for Compositional System Analysis: Read More [+]
Objectives & Outcomes

Course Objectives: Standard computational tools for control synthesis and verification do not scale well to large-scale, networked
systems in emerging applications. This course presents a compositional methodology suitable when the
subsystems are amenable to analytical and computational methods but the interconnection, taken as a whole, is
beyond the reach of these methods. The main idea is to break up the task of certifying desired stability and
performance properties into subproblems of manageable size using input/output properties. Students learn about
the fundamental theory, as well as relevant algorithms and applications in several domains.

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructors: Arcak, Packard

Also listed as: EL ENG C220D

Input/Output Methods for Compositional System Analysis: Read Less [-]

MEC ENG 221 Graduate Introduction to Lean Manufacturing Systems 3 Units

Terms offered: Spring 2019, Spring 2018, Fall 2006
Fundamentals of lean manufacturing systems including manufacturing fundamentals, unit operations and manufacturing line considerations for work in process (WIP), manufacturing lead time (MLT), economics, quality monitoring; high mix/low volume (HMLV) systems fundamentals including just in time (JIT), kanban, buffers and line balancing; class project/case studies for design and analysis of competitive manufacturing systems.
Graduate Introduction to Lean Manufacturing Systems: Read More [+]
Objectives & Outcomes

Course Objectives: This course will enable students to analyze manufacturing lines in order to understand the production process and improve production efficiency. The course provides practical knowledge and skills that can be applied in industry, covering the complete manufacturing system from production planning to quality control. Students are given a chance to practice and implement what they learn during lectures by conducting projects with local or global manufacturing companies.

Student Learning Outcomes: Students will understand the whole scope of manufacturing systems from production planning to quality control, which can be helpful to set up manufacturing lines for various products. Students will be capable of identifying sources of manufacturing problems by analyzing the production line and produce multi-level solutions to optimize manufacturing efficiency.

Rules & Requirements

Prerequisites: Graduate standing in Engineering, or consent of instructor

Credit Restrictions: Students will not receive credit for this course after taking ME 101.

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: McMains

Graduate Introduction to Lean Manufacturing Systems: Read Less [-]

MEC ENG C223 Polymer Engineering 3 Units

Terms offered: Fall 2019, Fall 2017, Fall 2015
A survey of the structure and mechanical properties of advanced engineering polymers. Topics include rubber elasticity, viscoelasticity, mechanical properties, yielding, deformation, and fracture mechanisms of various classes of polymers. The course will discuss degradation schemes of polymers and long-term performance issues. The class will include polymer applications in bioengineering and medicine.
Polymer Engineering: Read More [+]
Rules & Requirements

Prerequisites: Civil Engineering 130, Engineering 45

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Also listed as: BIO ENG C223

Polymer Engineering: Read Less [-]

MEC ENG 224 Mechanical Behavior of Engineering Materials 3 Units

Terms offered: Spring 2020, Fall 2018, Fall 2016
This course covers elastic and plastic deformation under static and dynamic loads. Prediction and prevention of failure by yielding, fracture, fatigue, creep, corrosion, and wear. Basic elasticity and plasticity theories are discussed.
Mechanical Behavior of Engineering Materials: Read More [+]
Rules & Requirements

Prerequisites: Civil and Environmental Engineering 130 or 130N; Engineering 45

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Mechanical Behavior of Engineering Materials: Read Less [-]

MEC ENG C225 Deformation and Fracture of Engineering Materials 4 Units

Terms offered: Spring 2020, Spring 2019, Spring 2018
This course covers deformation and fracture behavior of engineering materials for both monotonic and cyclic loading conditions.
Deformation and Fracture of Engineering Materials: Read More [+]
Rules & Requirements

Prerequisites: Civil Engineering 130, Engineering 45

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructors: Ritchie, Pruitt, Komvopoulos

Formerly known as: Materials Science and Engineering C212, Mechanical Engineering C225

Also listed as: MAT SCI C212

Deformation and Fracture of Engineering Materials: Read Less [-]

MEC ENG 226 Tribology 3 Units

Terms offered: Spring 2019, Fall 2016, Spring 2016
Surface interactions. Fundamentals of contact mechanics. Friction theories. Types of measurement of wear. Response of materials to surface tractions. Plastic deformation, void/crack nucleation and crack propagation. Delamination wear. Microstructural effects in wear processes. Mechanics of layered media. Solid film and boundary liquid film lubrication. Friction and wear of polymers and fiber-reinforced polymeric composites. Brief introduction to metal cutting and tool wear mechanisms.
Tribology: Read More [+]
Rules & Requirements

Prerequisites: 102B, 104, 108

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Komvopoulos

Tribology: Read Less [-]

MEC ENG 227 Mechanical Behavior of Composite Materials 3 Units

Terms offered: Spring 2013, Fall 2010, Fall 2008
Response of composite materials (fiber and particulate-reinforced materials) to static, cyclic, creep and thermomechanical loading. Manufacturing process-induced variability, and residual stresses. Fatigue behavior,fracture mechanics and damage development. Role of the reinforcement-matrix interface in mechanical behavior. Environmental effects. Dimensional stability and thermal fatigue. Application to polymer, metal, ceramic, and carbon matrix composites.
Mechanical Behavior of Composite Materials: Read More [+]
Rules & Requirements

Prerequisites: Graduate standing or consent of instructor

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Dharan

Mechanical Behavior of Composite Materials: Read Less [-]

MEC ENG 229 Design of Basic Electro-Mechanical Devices 3 Units

Terms offered: Spring 2020, Spring 2019, Spring 2018
Fundamental principles of magnetics, electro-magnetics, and magnetic materials as applied to design and operation of electro-mechanical devices. Type of device to be used in a particular application and dimensions of parts for the overall design will be discussed. Typical applications covered will be linear and rotary actuators, stepper motors, AC motors, and DC brush and brushless motors. A design project is required.
Design of Basic Electro-Mechanical Devices: Read More [+]
Rules & Requirements

Prerequisites: EECS 100, graduate standing or consent of instructor

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Design of Basic Electro-Mechanical Devices: Read Less [-]

MEC ENG 230A Predictive Control 2 Units

Terms offered: Fall 2018
Advanced optimization, polyhedra manipulation, and multiparametric programming. Robust Invariant set theory. Analysis and design of model predictive controllers (MPC) for linear and nonlinear systems. Stochastic MPC. Learning MPC. Computational oriented models of hybrid systems. Analysis and design of constrained predictive controllers for hybrid systems.
Predictive Control: Read More [+]
Objectives & Outcomes

Course Objectives: The course is designed for graduate students who want to expand their knowledge on model predictive control. 80% will be focusing on advanced theory. 20% on applications.

Student Learning Outcomes: At the end of the course, the students will write a theoretical paper on MPC and/or will design an application where the advanced theory is implemented.

Rules & Requirements

Prerequisites: ME C232 and ME C231A

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Borrelli

Predictive Control: Read Less [-]

MEC ENG 230B Advanced System Theory: Control-Oriented Robustness Analysis 2 Units

Terms offered: Prior to 2007
Theoretical development of the common methods in control system robustness analysis, including general dissipative systems and supply rates, structured singular value, and integral quadratic constraints. Transforming theory into pragmatic algorithms. Use cases in industrial examples.
Advanced System Theory: Control-Oriented Robustness Analysis: Read More [+]
Objectives & Outcomes

Course Objectives: The course is designed for graduate students who want to quickly expand their knowledge on robustness analysis comprising one part of a complete validation process for complex feedback systems. Students will learn about theory, algorithms, applications and existing software.

Student Learning Outcomes: Students will gain a deep understanding of the modeling assumptions and precise results offered by current state-of-the-art robustness analysis techniques. The wide applicability as well as the limitations of the techniques will be emphasized. The course concludes with a self-directed project, covering a theoretical, algorithmic or applications-oriented issue of interest to each individual student.

Rules & Requirements

Prerequisites: Basic graduate background in linear algebra and linear differential equations (ME C232 or EECS 221A or equivalent)

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Packard

Advanced System Theory: Control-Oriented Robustness Analysis: Read Less [-]

MEC ENG C231A Experiential Advanced Control Design I 3 Units

Terms offered: Fall 2020, Fall 2019, Fall 2018
Experience-based learning in the design of SISO and MIMO feedback controllers for linear systems. The student will master skills needed to apply linear control design and analysis tools to classical and modern control problems. In particular, the participant will be exposed to and develop expertise in two key control design technologies: frequency-domain control synthesis and time-domain optimization-based approach.
Experiential Advanced Control Design I: Read More [+]
Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Also listed as: EL ENG C220B

Experiential Advanced Control Design I: Read Less [-]

MEC ENG C231B Experiential Advanced Control Design II 3 Units

Terms offered: Spring 2020, Spring 2019, Spring 2018
Experience-based learning in the design, analysis, and verification of automatic control systems. The course emphasizes the use of computer-aided design techniques through case studies and design tasks. The student will master skills needed to apply advanced model-based control analysis, design, and estimation to a variety of industrial applications. The role of these specific design methodologies within the larger endeavor of control design is also addressed.
Experiential Advanced Control Design II: Read More [+]
Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Also listed as: EL ENG C220C

Experiential Advanced Control Design II: Read Less [-]

MEC ENG C232 Advanced Control Systems I 3 Units

Terms offered: Fall 2020, Fall 2019, Fall 2018
Input-output and state space representation of linear continuous and discrete time dynamic systems. Controllability, observability, and stability. Modeling and identification. Design and analysis of single and multi-variable feedback control systems in transform and time domain. State observer. Feedforward/preview control. Application to engineering systems.
Advanced Control Systems I: Read More [+]
Rules & Requirements

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructors: Borrelli, Horowitz, Tomizuka, Tomlin

Also listed as: EL ENG C220A

Advanced Control Systems I: Read Less [-]

MEC ENG 233 Advanced Control Systems II 3 Units

Terms offered: Spring 2020, Spring 2019, Spring 2018
Linear Quadratic Optimal Control, Stochastic State Estimation, Linear Quadratic Gaussian Problem, Loop Transfer Recovery, Adaptive Control and Model Reference Adaptive Systems, Self Tuning Regulators, Repetitive Control, Application to engineering systems.
Advanced Control Systems II: Read More [+]
Rules & Requirements

Prerequisites: 232

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructors: Tomizuka, Horowitz

Advanced Control Systems II: Read Less [-]

MEC ENG 234 Multivariable Control System Design 3 Units

Terms offered: Fall 2016, Spring 2015, Spring 2011
Analysis and synthesis techniques for multi-input (MIMO) control systems. Emphasis is on the effect that model uncertainty has on the design process.
Multivariable Control System Design: Read More [+]
Rules & Requirements

Prerequisites: 232 or EECS 221A, as well as firm foundation in classical control

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructors: Packard, Poolla

Multivariable Control System Design: Read Less [-]

MEC ENG 235 Design of Microprocessor-Based Mechanical Systems 4 Units

Terms offered: Spring 2020, Spring 2019, Spring 2018
This course provides preparation for the conceptual design and prototyping of mechanical systems that use microprocessors to control machine activities, acquire and analyze data, and interact with operators. The architecture of microprocessors is related to problems in mechanical systems through study of systems, including electro-mechanical components, thermal components, and a variety of instruments. Laboratory exercises lead through studies of different levels of software.
Design of Microprocessor-Based Mechanical Systems: Read More [+]
Rules & Requirements

Prerequisites: 132, or C134/Electrical Engineering and Computer Science C128, or any basic undergraduate course in controls

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

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

Summer: 10 weeks - 4.5 hours of lecture and 4.5 hours of laboratory per week

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Design of Microprocessor-Based Mechanical Systems: Read Less [-]

MEC ENG 236C Vehicle Dynamics & Control 4 Units

Terms offered: Not yet offered
Physical understanding of automotive vehicle dynamics: simple lateral, longitudinal and ride quality models. An overview of active safety systems will be intros including basic concepts and terminology, the state-of-the-art development, and basic principles of systems such as ABS, traction control, dynamic stability control, and roll stability control.Passive, semi-active and active suspension systems will be analyzed. Concepts of autonomous vehicle technology including drive-by-wire and steer-by-wire systems, adaptive cruise control and lane keeping systems. Design of software control systems for an actual 1/10 scale race vehicle.
Vehicle Dynamics & Control: Read More [+]
Objectives & Outcomes

Course Objectives: Develop skills in using professional computer-aided control system design and analysis tools, e.g, Matlab/Simulink and ROS, to explore properties of dynamic systems composed of a large number sub-systems such as sensors and actuators.
Develop the analytical skills necessary to quantitatively predict the behavior of open-loop and closed-loop systems.
Experimental design will be complemented with a careful analysis of the performance by simulation.
Feedback control systems will be presented that are currently being used in active safety systems, the student will be expected to design feedback control systems for an actual 1/10 scaled vehicle platform which will be distributed to every group of two students in the class.
Present and motivate the appropriate level of dynamic modeling that is required to analyze the performance of vehicle control systems.
The development of such models is as much of an art as a science in that the models must be kept as simple as possible so that real-time controller implementation can be achieved while retaining the fundamental stability and dynamic response characteristics.

Student Learning Outcomes: Assess the stability of dynamic systems using differential equation theory, apply frequency-response methods to assess system response to external disturbances, sensor noise and parameter variations.

Expected to design feedback control systems for an actual 1/010 scaled vehicle platform which will be distributed to every group of two students in the class

Follow the literature on these subjects and perform independent design, research and development work in this field
Formulate simple but accurate dynamic models for automotive longitudinal, lateral and ride quality analysis.

Have a basic understanding of modern automotive safety systems including ABS, traction control, dynamic stability control and roll control.

Students should be able to follow the literature on these subjects, perform independent design, be able to design vehicle dynamics control systems for a 1/10 scale vehicle.

Rules & Requirements

Prerequisites: Math 1B, Math 53, 54, Physics 7A-7B, ENGIN 7, Mechanical Engineering 132 or Mechanical Engineering 231A for MECENG graduate students

Credit Restrictions: Students will receive no credit for MEC ENG 236C after completing MEC ENG 131. A deficient grade in MEC ENG 236C may be removed by taking MEC ENG 131.

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of

MEC ENG 236U Control and Dynamics of Unmanned Aerial Vehicles 3 Units

Terms offered: Fall 2020, Fall 2019
This course is a room share with ME136, and teaches students the dynamic analysis and control of unmanned aerial vehicles (UAVs). The course covers modeling and dynamics of aerial vehicles, common control strategies, sensing and estimation. A laboratory sequence allows students to apply knowledge on a real quadcopter system, by programming a microcontroller to control a UAV.
Control and Dynamics of Unmanned Aerial Vehicles: Read More [+]
Objectives & Outcomes

Course Objectives: Introduce the students to analysis, modeling, and control of unmanned aerial vehicles. Lectures will cover:
•
Principle forces acting on a UAV, including aerodynamics of propellers
•
The kinematics and dynamics of rotations, and 3D modeling of vehicle dynamics
•
Typical sensors, and their modeling
•
Typical control strategies, and their pitfalls
•
Programming a microcontroller
During the laboratory sessions, students will apply these skills to create a model-based controller for a UAV.

Rules & Requirements

Prerequisites: Introductory control (Mechanical Engineering 132 or similar), Dynamics (Mechanical Engineering 104 or similar). Taken concurrently: a graduate controls class (Mechanical Engineering C232/ Electrical Engineering C220A or similar)

Credit Restrictions: Student will not receive credit for this course if they have taken Mechanical Engineering 136.

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Mueller

Control and Dynamics of Unmanned Aerial Vehicles: Read Less [-]

MEC ENG C236 Control and Optimization of Distributed Parameters Systems 3 Units

Terms offered: Fall 2017, Spring 2016, Spring 2015, Spring 2014
Distributed systems and PDE models of physical phenomena (propagation of waves, network traffic, water distribution, fluid mechanics, electromagnetism, blood vessels, beams, road pavement, structures, etc.). Fundamental solution methods for PDEs: separation of variables, self-similar solutions, characteristics, numerical methods, spectral methods. Stability analysis. Adjoint-based optimization. Lyapunov stabilization. Differential flatness. Viability control. Hamilton-Jacobi-based control.
Control and Optimization of Distributed Parameters Systems: Read More [+]

Rules & Requirements

Prerequisites: Engineering 77, Mathematics 54 (or equivalent), or consent of instructor

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Also listed as: CIV ENG C291F/EL ENG C291

Control and Optimization of Distributed Parameters Systems: Read Less [-]

MEC ENG 237 Control of Nonlinear Dynamic Systems 3 Units

Terms offered: Spring 2016, Spring 2015, Fall 2013
Fundamental properties of nonlinear systems. Stability of nonlinear systems via Lyapunov's Direct Method. Controllability and observability of nonlinear systems. Controller design of nonlinear systems including feedback linearization and sliding mode control. Design of nonlinear discrete and adaptive controllers. Nonlinear observers and compensators.
Control of Nonlinear Dynamic Systems: Read More [+]

Objectives & Outcomes

Course Objectives: To develop non-simulative/analytical tools to predict the stability and performance of nonlinear systems and to develop an appreciation for the differences between linear and nonlinear systems such as multiple equilibrium points, initial condition dependent stability. To develop controller synthesis methods for nonlinear and uncertain dynamic systems.

Student Learning Outcomes: The ability to design, evaluate and implement closed loop controllers for highly nonlinear and uncertain systems.

Rules & Requirements

Prerequisites: ME C232

Hours & Format

Fall and/or spring: 15 weeks - 3-3 hours of lecture and 0-1 hours of discussion per week

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Control of Nonlinear Dynamic Systems: Read Less [-]

MEC ENG C237 Nonlinear Systems 3 Units

Terms offered: Spring 2020, Spring 2019, Spring 2018
Basic graduate course in nonlinear systems. Nonlinear phenomena, planar systems, bifurcations, center manifolds, existence and uniqueness theorems. Lyapunov's direct and indirect methods, Lyapunov-based feedback stabilization. Input-to-state and input-output stability, and dissipativity theory. Computation techniques for nonlinear system analysis and design. Feedback linearization and sliding mode control methods.
Nonlinear Systems: Read More [+]
Rules & Requirements

Prerequisites: Math 54, or equivalent (undergraduate level Ordinary Differential Equations and Linear Algebra)

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructors: Arcak, Tomlin, Kameshwar

Also listed as: EL ENG C222

Nonlinear Systems: Read Less [-]

MEC ENG 238 Advanced Micro/Nano Mechanical Systems Laboratory 3 Units

Terms offered: Spring 2018, Spring 2013
This hands-on laboratory course focuses on the mechanical engineering principles that underlie the design, fabricaton, and operation of micro/nanoscale mechanical systems, including devices made by nanowire/nanotube syntheses; photolithography/soft lithography; and molding processes. Each laboratory will have different focuses for basic understanding of MEMS/NEMS systems from prototype constructions to experimental testings using mechanical, electrical, or optical techniques.
Advanced Micro/Nano Mechanical Systems Laboratory: Read More [+]
Rules & Requirements

Prerequisites: EE 16A or 40, Physics 7B, ME 106, (ME119 or ME118 are highly recommended but not mandatory)

Credit Restrictions: Students will receive no credit for Mechanical Engineering 238 after taking Mechanical Engineering 138.

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Advanced Micro/Nano Mechanical Systems Laboratory: Read Less [-]

MEC ENG 239 Advanced Design and Automation 4 Units

Terms offered: Fall 2019, Fall 2018, Fall 2014
This course will provide students with a solid understanding of smart products and the use of embedded microcomputers in products and machines. The course has two components: 1.) Formal lectures. Students receive a set of formal lectures on the design of smart machines and products that use embedded microcomputers. The materials cover machine components, actuators, sensors, basic electronic devices, embedded microprocessor systems and control, power transfer components, and mechanism design. 2.) Projects. Students will design and construct prototype products that use embedded microcomputers.
Advanced Design and Automation: Read More [+]
Rules & Requirements

Prerequisites: Graduate standing in engineering or science and one course in Control

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Kazerooni

Advanced Design and Automation: Read Less [-]

MEC ENG 240A Advanced Marine Structures I 3 Units

Terms offered: Fall 2013, Spring 2013, Spring 2012
This course introduces a probabilistic description of ocean waves and wave loads acting on marine structures. These topics are followed with discussion of structural strength and reliability analysis.
Advanced Marine Structures I: Read More [+]
Rules & Requirements

Prerequisites: Graduate standing; Statistics 25 or equivalent

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Mansour

Advanced Marine Structures I: Read Less [-]

MEC ENG 240B Advanced Marine Structures II 3 Units

Terms offered: Spring 2015, Fall 2014, Spring 2014
This course is concerned with the structural response of marine structures to environmental loads. Overall response of the structure as well as the behavior of its members under lateral and compressive loads are discussed.
Advanced Marine Structures II: Read More [+]
Rules & Requirements

Prerequisites: Consent of instructor

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Mansour

Advanced Marine Structures II: Read Less [-]

MEC ENG 241A Marine Hydrodynamics I 3 Units

Terms offered: Fall 2016, Fall 2015, Spring 2014
Navier-Stokes Equations. Boundary-layer theory, laminar, and turbulent. Frictional resistance. Boundary layer over water surface. Separated flow modeling. Steady and unsteady flow. Momentum theorems. Three-dimensional water-wave theory. Formulation of wave resistance of ships. Michell's solution. Wave patterns. Applications.
Marine Hydrodynamics I: Read More [+]
Objectives & Outcomes

Course Objectives: To provide students with a sufficient introduction to each of the topics of the course so that he/she will be able to understand the background of current literature in the hydrodynamics of marine vehicles, offshore engineering, and other ocean-related activities.

Student Learning Outcomes: Students with ocean- and marine-related interest will develop the necessary theoretical and experimental background to keep up with existing literature and begin research on contemporary topics.

Rules & Requirements

Prerequisites: Mechanical Engineering 165 recommended or graduate standing

Hours & Format

Fall and/or spring: 15 weeks - 3-3 hours of lecture and 0-1 hours of discussion per week

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Yeung

Marine Hydrodynamics I: Read Less [-]

MEC ENG 241B Marine Hydrodynamics II 3 Units

Terms offered: Spring 2017, Spring 2016, Fall 2014
Momentum analysis for bodies moving in a fluid. Added-mass theory. Matched asymptotic slender-body theory. Small bodies in a current. Theory of motion of floating bodies with and without forward speed. Radiation and diffraction potentials. Wave forces. Hydro-elasticity formulation. Ocean-wave energy. Memory effects in time domain. Second-order formulation. Impact hydrodynamics, Hydrofoil theory and lifting surface.
Marine Hydrodynamics II: Read More [+]

Objectives & Outcomes

Course Objectives: To provide students with a sufficient introduction to each of the topics of the course so that he/she will be able to understand the background of current literature in the hydrodynamics of marine vehicles, offshore engineering, and renewable ocean energy

Student Learning Outcomes: Students with ocean- and marine-related interest will develop the necessary theoretical and experimental background to keep up with existing literature and begin research on contemporary topics.

Rules & Requirements

Prerequisites: 260A or 241A, or CEE 200A recommended

Hours & Format

Fall and/or spring: 15 weeks - 3-3 hours of lecture and 0-1 hours of discussion per week

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Yeung

Marine Hydrodynamics II: Read Less [-]

MEC ENG 242 Ocean-Environment Fluid Mechanics 3 Units

Terms offered: Spring 2020
Viscous-fluid flow, boundary-layer theory surface waves, ship waves, and applications. Ocean environment. Physical properties and characteristics of the oceans. Global conservation laws. Surface-waves generation. Gravity-wave mechanics, kinematics, and dynamics. Design consideration of ocean vehicles and systems. Model-testing techniques. Prediction of resistance and response in waves--physical modeling and computer models.
Ocean-Environment Fluid Mechanics: Read More [+]

Objectives & Outcomes

Course Objectives: To provide training of mechanical engineers to understand the unique characteristics of the ocean environment, local and global scale, and to provide background on engineering and design tools that are commonly used by engineers working with system and component designs of ocean, marine energy, and ship systems.

Student Learning Outcomes: At the end of the course, the students should understand general scientific properties that characterize the main body of the oceans; understand components of drags that contribute to the resistance of a marine vehicle and the associated engineering skills in model-testing that quantify the drag characteristics of a ship hull; comprehend simple harmonic surface-wave theory, with strong realization of the underlying concepts of wave kinematics, wave energy, and group velocity.

Rules & Requirements

Prerequisites: ME 106 OR CEE 100 OR equivalent fluids/hydro undergraduate class

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Mäkiharju

Ocean-Environment Fluid Mechanics: Read Less [-]

MEC ENG 243 Advanced Methods in Free-Surface Flows 3 Units

Terms offered: Spring 2016, Fall 2012, Spring 2009
Analytical and numerical methods in free-surface problems. Elements of inviscid external lifting and nonlifting flows. Analytical solutions in special coordinates systems. Integral-equation methods: formulations and implementations. Multiple-bodies interaction problems. Free-surface Green functions in two and three dimensions. Hybrid integral-equation methods. Finite-element formulations. Variational forms in time-harmonic flows. Finite-difference forms, stability, and accuracy. Boundary-fitted coordinates methods. Unsteady linearized wave-body interaction in time domain. Nonlinear breaking waves calculations. Particle dynamics. Extensive hands-on experience of microcomputers and/or workstations in developing solution.
Advanced Methods in Free-Surface Flows: Read More [+]
Objectives & Outcomes

Course Objectives: To present a relatively broad spectrum of analytical and numerical methods commonly used in tackling wave-body interaction problems. Topics covered include classical techniques in special coordinate systems, modern computational techniques based on boundary-integral, finite-element, and boundary-fitted coordinates methods. Lectures focus on formulations and implementation techniques. Students are given opportunities to implement methods discussed in class on workstations or mainframe.

Student Learning Outcomes: Students will be conversant and have abilities to handle fluid-structure interactions problems with free-surface present.

Rules & Requirements

Prerequisites: ME 260A or CEE 200A; ME 241B recommended or with Instructor's permission

Hours & Format

Fall and/or spring: 15 weeks - 3-3 hours of lecture and 0-1 hours of discussion per week

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Yeung

Advanced Methods in Free-Surface Flows: Read Less [-]

MEC ENG 245 Oceanic and Atmospheric Waves 3 Units

Terms offered: Spring 2018, Spring 2016, Spring 2015
Covers dynamics of wave propagation in the ocean and the atmosphere. Specifically, formulation and properties of waves over the surface of a homogenous fluid, interfacial waves in a two-/multi-layer density stratified fluid, and internal waves in a continuous stratification will be discussed.
Oceanic and Atmospheric Waves: Read More [+]
Rules & Requirements

Prerequisites: Mechanical Engineering 241A or 241B or 260A or Civil and Environmental Engineering 200A or equivalent courses

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Oceanic and Atmospheric Waves: Read Less [-]

MEC ENG 246 Advanced Energy Conversion Principles 3 Units

Terms offered: Fall 2018, Spring 2018, Fall 2016
Covers the fundamental principles of energy conversion processes, followed by development of theoretical and computational tools that can be used to analyze energy conversion processes. Also introduces the use of modern computational methods to model energy conversion performance characteristics of devices and systems. Performance features, sources of inefficiencies, and optimal design strategies are explored for a variety of applications.
Advanced Energy Conversion Principles: Read More [+]
Objectives & Outcomes

Course Objectives: This class provides students with an understanding of the thermophysical principles that govern energy conversion processes of different types, and will introduce them to modern computational methods for modeling the performance of energy conversion processes, devices and systems. This course is a capstone experience for ME students, synthesizing thermodynamics, fluid dynamics, heat transfer and computational analysis tools to facilitate engineering design analysis.

Student Learning Outcomes: This course will provide a foundation for design analysis of energy conversion systems encountered in a variety of applications.

Rules & Requirements

Prerequisites: Engineering 7, Mechanical Engineering 40, Mechanical Engineering 106, and Mechanical Engineering 109 or their equivalents

Credit Restrictions: Students will receive no credit for Mechanical Engineering 246 after taking Mechanical Engineering 146.

Hours & Format

Fall and/or spring: 15 weeks - 3-3 hours of lecture and 0-1 hours of discussion per week

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Carey

Advanced Energy Conversion Principles: Read Less [-]

MEC ENG 250A Advanced Conductive and Radiative Transport 3 Units

Terms offered: Fall 2020, Fall 2019, Fall 2018
Fundamentals of conductive heat transfer. Analytical and numerical methods for heat conduction in rigid media. Fundamentals of radiative transfer. Radiative properties of solids, liquids and gas media. Radiative transport modeling in enclosures and participating media.
Advanced Conductive and Radiative Transport: Read More [+]
Objectives & Outcomes

Course Objectives: The course will provide students with knowledge of the physics of conductive transport in solids, the analysis of steady and transient heat conduction by both analytical and numerical methods and the treatment of phase change problems. Furthermore, the course will provide students with knowledge of radiative properties, the mechanisms of radiative transfer and will present theory and methods of solution of radiative transfer problems in participating and nonparticipating media.

Student Learning Outcomes: Students will gain knowledge of the mechanisms of conductive transfer and will develop the ability to quantify steady and transient temperature in important engineering problems often encountered (e.g. manufacturing, materials processing, bio-thermal treatment and electronics cooling) by applying analytical methods and by constructing numerical algorithms. Students will also gain knowledge of the fundamental radiative properties and the mechanisms of radiative transport in enclosures, absorbing, emitting and scattering media as well as the interaction of thermal radiation with other modes of heat transfer.

Rules & Requirements

Prerequisites: Undergraduate courses in engineering thermodynamics, fluid dynamics and heat transfer (Mechanical Engineering 40, Mechanical Engineering 106 and Mechanical Engineering 109 or equivalent). Each student must have access to a PC, Macintosh or workstation machine with scientific programming capabilities for use in homework and projects

Credit Restrictions: Students will not be able to receive credit for this course if they have taken Mechanical Engineering 151, 151A or 251.

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Grigoropoulos

Advanced Conductive and Radiative Transport: Read Less [-]

MEC ENG 250B Advanced Convective Transport and Computational Methods 3 Units

Terms offered: Spring 2020, Spring 2019
The transport of heat and mass in fluids in motion; free and forced convection in laminar and turbulent flow over surfaces and within ducts. Fundamentals of computational methods used for solving the governing transport equations will also be covered.
Advanced Convective Transport and Computational Methods: Read More [+]

Objectives & Outcomes

Course Objectives: This course will provide students with knowledge of the physics of convective transport and an introduction to computational tools that can model convective processes in important applications such as electronics cooling, aerospace thermal management. The course also teaches students to construct computational models of natural and forced convection processes in boundary layers nears surfaces, in enclosures and in ducts or pipes that can be used to design heat exchangers and thermal management equipment for applications.

Student Learning Outcomes: Students will gain a knowledge of the mechanisms of convective heat and mass transfer for flow over surfaces and within ducts, and will develop the ability to construct computer programs that implement computation methods that predict the flow and temperature fields and heat transfer performance for convective flows of interest in engineering applications.

Rules & Requirements

Prerequisites: Undergraduate courses in engineering thermodynamics, fluid dynamics and heat transfer (Mechanical Engineering 40, Mechanical Engineering 106 and Mechanical Engineering 109 or equivalent). Each student must have access to a PC, Macintosh or workstation machine with scientific programming capabilities for use in homework and projects

Credit Restrictions: Students will not be able to receive credit for this course if they have taken Mechanical Engineering 252.

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Carey

Advanced Convective Transport and Computational Methods: Read Less [-]

MEC ENG 251 Heat Conduction 3 Units

Terms offered: Spring 2018, Fall 2016, Fall 2015
Analytical and numerical methods for the determination of the conduction of heat in solids.
Heat Conduction: Read More [+]

Rules & Requirements

Prerequisites: 151; Engineering 230A

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Heat Conduction: Read Less [-]

MEC ENG 252 Heat Convection 3 Units

Terms offered: Spring 2017, Spring 2015, Spring 2014
The transport of heat in fluids in motion; free and forced convection in laminar and turbulent flow over surfaces and within ducts.
Heat Convection: Read More [+]

Rules & Requirements

Prerequisites: 151, 265A; Engineering 230A

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Greif

Heat Convection: Read Less [-]

MEC ENG 253 Graduate Applied Optics and Radiation 3 Units

Terms offered: Spring 2018, Fall 2015, Fall 2013
Fundamentals of electromagnetic theory, principles of optics, waves, diffraction theory, interference, geometrical optics, scattering, theory of molecular spectra, optical and spectroscopic instrumentation. Lasers and laser materials processing, laser spectroscopy. Modern optics, plasmonics.
Graduate Applied Optics and Radiation: Read More [+]
Objectives & Outcomes

Course Objectives: The course will provide students with knowledge of the fundamental principles of optics to analyze optical phenomena and develop the background and skills to design optical instrumentation applied to engineering fields, including additive manufacturing, radiometry and spectroscopy.

Student Learning Outcomes: Students will gain knowledge of the EM theory, optical properties of materials, principles of spectroscopy for gases, liquids and solids, principles and applications of lasers and optical diagnostics. Students will develop the ability to design optical instrumentation systems in the context of key industrial applications, including additive manufacturing, materials processing, bio-optics, semiconductor industry applications, reacting systems, forensics.

Rules & Requirements

Prerequisites: Undergraduate courses in physics (e.g. 7A,B,C). Each student must have access to a PC, Macintosh or workstation machine with scientific programming capabilities for use in homework and projects

Credit Restrictions: Students will not receive credit for this course if they have taken ME 153.

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Grigoropoulos

Graduate Applied Optics and Radiation: Read Less [-]

MEC ENG 254 Advanced Thermophysics for Applications 3 Units

Terms offered: Fall 2020, Fall 2019, Spring 2019
Development of classical thermodynamics from statistical treatment of microscale molecular behavior; Boltzmann distribution; partition functions; statistical-mechanical evaluation of thermodynamic properties; equilibrium; chemical equilibrium; phase transitions; molecular collisions; Maxwell-Boltzmann distribution; collision theory; elementary kinetic theory; molecular dynamics simulation of molecular collisions; kinetic Monte Carlo simulations of gas-phase and gas-surface reactions. Implications are explored for a variety of applications, which may include advanced combustion systems, renewable power systems, microscale transport in high heat flux electronics cooling, aerospace thermal management, and advanced materials processing.
Advanced Thermophysics for Applications: Read More [+]
Objectives & Outcomes

Course Objectives: To introduce students to the statistical foundation of thermodynamics and provide skills to perform advanced calculations for analysis of advanced energy conversion processes and devices.

Student Learning Outcomes: Students ability to calculate partition functions, perform equilibrium calculations, and undertake molecular-dynamics and Monte-Carlo simulations of non-equilibrium systems. This course will provide a foundation for design analysis of energy conversion systems and transport phenomena encountered in a variety of applications.

Rules & Requirements

Prerequisites: Mechanical Engineering 40

Credit Restrictions: Students will not receive credit for this course if they have taken ME 154.

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructors: Carey, Frenklach

Advanced Thermophysics for Applications: Read Less [-]

MEC ENG 255 Advanced Combustion Processes 3 Units

Terms offered: Fall 2020, Fall 2019, Fall 2018
Fundamentals of combustion, flame structure, flame speed, flammability, ignition, stirred reaction, kinetics and nonequilibrium processes, pollutant formation. Application to engines, energy production, and fire safety.
Advanced Combustion Processes: Read More [+]

Objectives & Outcomes

Course Objectives: The course provides an introduction to the subject of combustion, covering a broad range of topics important to the fields of energy conversion, engines, pollution and fires. It consists of classroom lectures and laboratory demonstration. It treats the fundamental processes occurring in combustion systems and emphasizes on technological-problem solving skills. The laboratory demonstrations provide practical experience with real combustion systems. The course also uses computer programs to aid the students in the calculations and analysis, especially in thermodynamics and chemical kinetics.

Student Learning Outcomes: Upon completion of the course, students shall be able to:
Understand and calculate the stoichiometry, adiabatic flame temperature and heat of combustion of a fuel and oxidizer mixture. Understand the role of elementary and global reactions. Calculate reaction rates. Know how to use computer codes (e.g. Cantera) to solve combustion problems. Understand and calculate the ignition characteristics of a fuel and oxidizer mixture: flammability limits, self-ignition. Understand and calculate the structure and properties of a premixed flame: propagation speed, thickness, quenching distance, and minimum ignition energy. Understand and calculate the structure and properties of a diffusion flame: height, lift-off distance and blow-off limit. Understand the formation of pollutants from hydrocarbon combustion. Understand the operation of practical systems, specifically, furnaces and boilers, spark ignition and diesel internal combustion engines, and gas turbines.

Rules & Requirements

Prerequisites: ME 40, ME 106, and ME 109 (or their equivalents)

Credit Restrictions: Students will receive no credit for this course if they have taken ME 140.

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructors: Chen, Fernandez-Pello

Advanced Combustion Processes: Read Less [-]

MEC ENG 256 Combustion 3 Units

Terms offered: Fall 2017, Spring 2015, Spring 2014
Combustion modeling. Multicomponent conservation equations with reactions. Laminar and turbulent deflagrations. Rankine-Hugoniot relations. Diffusion flames. Boundary layer combustion, ignition, and stability.
Combustion: Read More [+]

Objectives & Outcomes

Course Objectives: This course provides students a solid foundation in combustion sciences and technologies relevant to current and future energy conversion devices using combustion.

Student Learning Outcomes: Students will have the ability to perform critical analyses of current and future reacting systems using analytical and numerical methods. For practical combustion systems with complex geometries, students will have gained sufficient background to further their capabilities of using advanced numerical models.

Rules & Requirements

Prerequisites: ME 40, ME 106, and ME 109 (106 and 109 may be taken concurrently) or their equivalents. ME 140/ME255 is recommended

Hours & Format

Fall and/or spring: 15 weeks - 3-3 hours of lecture and 0-1 hours of discussion per week

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Chen

Combustion: Read Less [-]

MEC ENG 257 Advanced Combustion 3 Units

Terms offered: Fall 2016, Fall 2014, Fall 2012
Critical analyses of combustion phenomenon. Conservation relations applied to reacting systems. Reactions are treated by both asymptotic and numerical methods. Real hydrocarbon kinetics are used; where available reduced kinetic mechanics are introduced. Flame propagation theory and experiments are discussed in detail for both laminar and turbulent flows.
Advanced Combustion: Read More [+]

Rules & Requirements

Prerequisites: 256

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Advanced Combustion: Read Less [-]

MEC ENG 258 Heat Transfer with Phase Change 3 Units

Terms offered: Fall 2018, Spring 2016, Spring 2015
Heat transfer associated with phase change processes. Topics include thermodynamics of phase change, evaporation, condensation, nucleation and bubble growth, two phase flow, convective boiling and condensation, melting and solidification.
Heat Transfer with Phase Change: Read More [+]
Rules & Requirements

Prerequisites: 151

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Carey

Heat Transfer with Phase Change: Read Less [-]

MEC ENG 259 Microscale Thermophysics and Heat Transfer 3 Units

Terms offered: Fall 2020, Fall 2017, Spring 2016
This course introduces advanced statistical thermodynamics, nonequilibrium thermodynamics, and kinetic theory concepts used to analyze thermophysics of microscale systems and explores applications in which microscale transport plays an important role.
Microscale Thermophysics and Heat Transfer: Read More [+]
Rules & Requirements

Prerequisites: 151, 254, or consent of instructor

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructors: Carey, Majumdar

Microscale Thermophysics and Heat Transfer: Read Less [-]

MEC ENG 260A Advanced Fluid Mechanics I 3 Units

Terms offered: Fall 2020, Fall 2019, Fall 2018
Introduces the foundations of fluid mechanics. Exact flow solutions are used to develop a physical insight of the fluid flow phenomena. Rigorous derivation of the equations of motion. Incompressible and compressible potential flows. Canonical viscous flows.
Advanced Fluid Mechanics I: Read More [+]
Rules & Requirements

Prerequisites: 106; 185 (strongly recommended) or consent of instructor

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Advanced Fluid Mechanics I: Read Less [-]

MEC ENG 260B Advanced Fluid Mechanics II 3 Units

Terms offered: Spring 2020, Spring 2019, Spring 2018
Develops a working knowledge of fluid mechanics by identifying the essential physical mechanism in complex canonical flow problems which leads to simplified yet accurate formulation. Boundary layers, creeping flows, rotational flows, rotating flows. Stability and transition, introduction to turbulence.
Advanced Fluid Mechanics II: Read More [+]
Rules & Requirements

Prerequisites: 260A 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: Mechanical Engineering/Graduate

Grading: Letter grade.

Advanced Fluid Mechanics II: Read Less [-]

MEC ENG 262 Hydrodynamic Stability and Instability 3 Units

Terms offered: Fall 2018, Fall 2014, Fall 2012
Discussions of linear and nonlinear instabilities in a variety of fluid flows: thermal convection, Rayleigh-Taylor flows, shearing flows, circular and cylindrical Couette flows (i.e., centrifugal instability). Use of the Landau equation, bifurcation diagrams, and energy methods for nonlinear flows.
Hydrodynamic Stability and Instability: Read More [+]
Rules & Requirements

Prerequisites: 185 and 106, or equivalents

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Marcus

Hydrodynamic Stability and Instability: Read Less [-]

MEC ENG 263 Turbulence 3 Units

Terms offered: Spring 2019, Spring 2017, Fall 2012
Physics of turbulence: Summary of stability and transition. Description of turbulence phenomena. Tools for studying turbulence. Homogeneous turbulence, shear turbulence, rotating turbulence. Summary of engineering models. Discussion of recent advances.
Turbulence: Read More [+]
Rules & Requirements

Prerequisites: 260A-260B or equivalent

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Savas

Turbulence: Read Less [-]

MEC ENG 263Z ENGINEERING AERODYNAMICS 3 Units

Terms offered: Not yet offered
Introduction to the lift, drag, and moment of two-dimensional airfoils, three-dimensional wings, and the complete airplane. Calculations of the performance and stability of airplanes in subsonic flight. The course is run on two loosely aligned parallel tracks: a traditional sequence of lectures covering the basic topics in aerodynamics and a set of projects on vortex dynamics and aerodynamics that are loosely aligned with lectures. The distinguishing factor will be the extend of the projects assigned to the graduate level participants, which will be substantially more involved than those expected from the senior level participants.
ENGINEERING AERODYNAMICS: Read More [+]
Rules & Requirements

Prerequisites: ME 40, ME 106

Credit Restrictions: Students will receive no credit for MEC ENG 263Z after completing MEC ENG 163. A deficient grade in MEC ENG 263Z may be removed by taking MEC ENG 163.

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: SAVAS

ENGINEERING AERODYNAMICS: Read Less [-]

MEC ENG 266 Geophysical and Astrophysical Fluid Dynamics 3 Units

Terms offered: Spring 2019, Spring 2015, Spring 2013
This course examines high-Reynolds number flows, including their stability, their waves, and the influence of rotating and stratification as applied to geophysical and astrophysical fluid dynamics as well as to engineering flows. Examples of problems studies include vortex dynamics in planetary atmospheres and protoplanetary disks, jet streams, and waves (Rossby, Poincare, inertial, internal gravity, and Kelvin) in the ocean and atmosphere.
Geophysical and Astrophysical Fluid Dynamics: Read More [+]
Rules & Requirements

Prerequisites: Graduate-level standing or consent of instructor

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Marcus

Formerly known as: 260C

Geophysical and Astrophysical Fluid Dynamics: Read Less [-]

MEC ENG C268 Physicochemical Hydrodynamics 3 Units

Terms offered: Spring 2017, Fall 2013, Fall 2011, Spring 2011
An introduction to the hydrodynamics of capillarity and wetting. Balance laws and short-range forces. Dimensionless numbers, scaling and lubrication approximation. Rayleigh instability. Marangoni effect. The moving contact line. Wetting and short-range forces. The dynamic contact angle. Dewetting. Coating flows. Effect of surfactants and electric fields. Wetting of rough or porous surfaces. Contact angles for evaporating systems.
Physicochemical Hydrodynamics: Read More [+]
Rules & Requirements

Prerequisites: A first graduate course in fluid mechanics sucs as 260A-260B

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Morris

Also listed as: CHM ENG C268

Physicochemical Hydrodynamics: Read Less [-]

MEC ENG 270 Advanced Augmentation of Human Dexterity 4 Units

Terms offered: Spring 2020
This course provides hands-on experience in designing prostheses and assistive technologies using user-centered design. Students will develop a fundamental understanding of the state-of-the-art, design processes and product realization. Teams will prototype a novel solution to a disabilities-related challenge, focusing on upper-limb mobility or dexterity. Lessons will cover biomechanics of human manipulation, tactile sensing and haptics, actuation and mechanism robustness, and control interfaces. Readings will be selected from texts and academic journals available through the UCB online library system and course notes. Guest speakers will be invited to address cutting edge breakthroughs relevant to assistive technology and design.
Advanced Augmentation of Human Dexterity: Read More [+]
Objectives & Outcomes

Course Objectives: The course objectives are to:
- Learn the fundamental principles of biomechanics, dexterous manipulation, and electromechanical systems relevant for non-invasive, cutting-edge assistive device and prosthesis design
- Enhance skill in the areas of human-centered design, teamwork and communication through the practice of conducting labs and a project throughout the semester

Rules & Requirements

Prerequisites: ME 132, or equivalent. Designing for the Human Body (ME C178) or Orthopedic Biomechanics (ME C176), or equivalent. Proficiency with Matlab, or equivalent program

Credit Restrictions: Students will receive no credit for MEC ENG 270 after completing MEC ENG 179.

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Stuart

Advanced Augmentation of Human Dexterity: Read Less [-]

MEC ENG 271 Intermediate Dynamics 3 Units

Terms offered: Fall 2020, Fall 2019
This course introduces and investigates Lagrange's equations of motion for particles and rigid bodies. The subject matter is particularly relevant to applications comprised of interconnected and constrained discrete mechanical components. The material is illustrated with numerous examples. These range from one-dimensional motion of a single particle to three-dimensional motions of rigid bodies and systems of rigid bodies.
Intermediate Dynamics: Read More [+]
Objectives & Outcomes

Course Objectives: Introduce students to the notion of exploiting differential geometry to gain insight into the dynamics of a mechanical system. Familiarize the student with classifications and applications of generalized forces and kinematical constraints. Enable the student to establish Lagrange's equations of motion for a single particle, a system of particles and a single rigid body. Establish equivalence of equations of motion using the Lagrange and Newton-Euler approaches. Discuss the developments of analytical mechanics drawing from applications in navigation, vehicle dynamics, toys, gyroscopes, celestial mechanics, satellite dynamics and computer animation.

Rules & Requirements

Prerequisites: ME 104 or equivalent

Credit Restrictions: Students will receive no credit for MEC ENG 271 after completing MEC ENG 175, or MEC ENG 271. A deficient grade in MEC ENG 271 may be removed by taking MEC ENG 271.

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructors: O'Reilly, Casey

Intermediate Dynamics: Read Less [-]

MEC ENG 273 Oscillations in Linear Systems 3 Units

Terms offered: Fall 2018, Fall 2017, Fall 2016
Response of discrete and continuous dynamical systems, damped and undamped, to harmonic and general time-dependent loading. Convolution integrals and Fourier and Laplace transform methods. Lagrange's equations; eigensolutions; orthogonality; generalized coordinates; nonreciprocal and degenerate systems; Rayleigh's quotient.
Oscillations in Linear Systems: Read More [+]
Objectives & Outcomes

Course Objectives: To give a compact, consistent, and reasonably connected account of the theory of linear vibration at the advanced level. A secondary purpose is to survey some topics of contemporary research. Applications will be mentioned whenever feasible.

Student Learning Outcomes: Acquired necessary knowledge and scientific maturity to begin research in dynamics and vibration.

Rules & Requirements

Prerequisites: ME 104 and ME 133 or their equivalents

Hours & Format

Fall and/or spring: 15 weeks - 3-3 hours of lecture and 0-1 hours of discussion per week

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Ma

Oscillations in Linear Systems: Read Less [-]

MEC ENG 274 Random Oscillations of Mechanical Systems 3 Units

Terms offered: Spring 2018, Spring 2015, Spring 2011
Random variables and random processes. Stationary, nonstationary, and ergodic proceses. Analysis of linear and nonlinear, discrete and continuous, mechanical systems under stationary and nonstationary excitations. Vehicle dynamics. Applications to failure analysis. Stochastic estimation and control and their applications to vibratory systems.
Random Oscillations of Mechanical Systems: Read More [+]
Rules & Requirements

Prerequisites: 104 and 133

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Ma

Random Oscillations of Mechanical Systems: Read Less [-]

MEC ENG 275 Advanced Dynamics 3 Units

Terms offered: Spring 2017, Spring 2015, Spring 2012
Review of Lagrangian dynamics. Legendre transform and Hamilton's equations, Cyclic coordinates, Canonical transformations, Hamilton-Jacobi theory, integrability. Dynamics of asymmetric systems. Approximation theory. Current topics in analytical dynamics.
Advanced Dynamics: Read More [+]
Rules & Requirements

Prerequisites: 175

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Advanced Dynamics: Read Less [-]

MEC ENG 277 Nonlinear and Random Vibrations 3 Units

Terms offered: Spring 2016, Spring 2014, Spring 2012
Oscillations in nonlinear systems having one or two degrees of freedom. Graphical, iteration, perturbation, and asymptotic methods. Self-excited oscillations and limit cycles. Random variables and random processes. Analysis of linear and nonlinear, discrete and continuous, mechanical systems under stationary and non-stationary excitations.
Nonlinear and Random Vibrations: Read More [+]
Objectives & Outcomes

Course Objectives: To give a compact, consistent, and reasonably connected account of the theory of nonlinear vibrations and uncertainty analysis at the advanced level. A secondary purpose is to survey some topics of contemporary research.

Student Learning Outcomes: Acquired necessary knowledge and scientific maturity to begin research in nonlinear vibrations and uncertainty analysis.

Rules & Requirements

Prerequisites: Mechanical Engineering 104 and Mechanical Engineering 133 or their equivalent

Credit Restrictions: Students will not receive credit if they have taken Mechanical Engineering 274.

Hours & Format

Fall and/or spring: 15 weeks - 3-3 hours of lecture and 0-1 hours of discussion per week

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Ma

Nonlinear and Random Vibrations: Read Less [-]

MEC ENG C278 Adv Designing for the Human Body 4 Units

Terms offered: Fall 2019, Fall 2018, Fall 2017
The course provides project-based learning experience in understanding product design, with a focus on the human body as a mechanical machine. Students will learn the design of external devices used to aid or protect the body. Topics will include forces acting on internal materials (e.g., muscles and total replacement devices), forces acting on external materials (e.g., prothetics and crash pads), design/analysis of devices aimed to improve or fix the human body, muscle adaptation, and soft tissue injury. Weekly laboratory projects will incorporate EMG sensing, force plate analysis, and interpretation of data collection (e.g., MATLAB analysis) to integrate course material to better understand contemporary design/analysis/problems.
Adv Designing for the Human Body: Read More [+]
Objectives & Outcomes

Course Objectives: The purpose of this course is twofold:

- to learn the fundamental concepts of designing devices that interact with the human body;
- to enhance skills in mechanical engineering and bioengineering by analyzing the behavior of various complex biomedical problems;
- To explore the transition of a device or discovery as it goes from “benchtop to bedside”.
- Three separate written projects evaluating devices that interact with the body. Projects will focus on 1) biomechanical analysis, 2) FDA regulations and procedures, and 3) design lifecycle.

Student Learning Outcomes: Working knowledge of design considerations for creating a device to protect or aid the human body, force transfer and distribution, data analysis, and FDA approval process for new devices. Understanding of basic concepts in orthopaedic biomechanics and the ability to apply the appropriate engineering concepts to solve realistic biomechanical problems, knowing clearly the assumptions involved. Critical analysis of current literature and technology.

Rules & Requirements

Prerequisites: Proficiency in MatLab or equivalent. Prior knowledge of biology or anatomy is not assumed

Credit Restrictions: There will be no credit given for MEC ENG C178 / BIO ENG C137 after taking MEC ENG 178.

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: O'Connell

Also listed as: BIO ENG C237

Adv Designing for the Human Body: Read Less [-]

MEC ENG C279 Introduction to Statistical Mechanics for Engineers 3 Units

Terms offered: Spring 2020, Spring 2017, Fall 2013
Introduction to statistical mechanics for engineers. Basics of ensembles, phase spaces, partitions functions, and free energies. Analysis of expectation values and fluctuations in system properties. Applications to the study of elementary gases, phonons in solids, polymer chains and networks, harmonic and quasi-harmonic crystalline solids; limitations of classical methods and quantum mechanical influences; molecular dynamics simulations for solids.
Introduction to Statistical Mechanics for Engineers: Read More [+]
Objectives & Outcomes

Course Objectives: To provide a modern introduction to the application of statistical mechanics for engineering with a particular emphasis on mechanical response.

Rules & Requirements

Prerequisites: CE C231 or MSE C211 or ME 185 or consent of instructor

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructors: Govindjee, Papadopoulos

Also listed as: CIV ENG C235

Introduction to Statistical Mechanics for Engineers: Read Less [-]

MEC ENG 280A Introduction to the Finite Element Method 3 Units

Terms offered: Fall 2020, Fall 2019, Fall 2018
Weighted-residual and variational methods of approximation. Canonical construction of finite element spaces. Formulation of element and global state equations. Applications to linear partial differential equations of interest in engineering and applied science.
Introduction to the Finite Element Method: Read More [+]
Rules & Requirements

Prerequisites: Mathematics 50A-50B; some familiarity with elementary field theories of solid/fluid mechanics and/or thermal science

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructors: Papadopoulos, Zohdi

Formerly known as: 280

Introduction to the Finite Element Method: Read Less [-]

MEC ENG 280B Finite Element Methods in Nonlinear Continua 3 Units

Terms offered: Spring 2019, Spring 2016, Spring 2013
A brief review of continuum mechanics. Consistent linearization of kinematical variables and balance laws. Incremental formulations of the equations of motion. Solution of the nonlinear field equations by Newton's method and its variants. General treatment of constraints. Applications to nonlinear material and kinematical modeling on continua.
Finite Element Methods in Nonlinear Continua: Read More [+]
Rules & Requirements

Prerequisites: 280A or equivalent; background in continuum mechanics at the level of 185

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Papadopoulos

Finite Element Methods in Nonlinear Continua: Read Less [-]

MEC ENG 281 Methods of Tensor Calculus and Differential Geometry 3 Units

Terms offered: Fall 2017, Fall 2015, Spring 2012
Methods of tensor calculus and classical differential geometry. The tensor concept and the calculus of tensors, the Riemann-Christoffel tensor and its properties, Riemannian and Euclidean spaces. Geometry of a surface, formulas of Weingarten, and equations of Gauss and Codazzi.
Methods of Tensor Calculus and Differential Geometry: Read More [+]
Rules & Requirements

Prerequisites: Mathematics 53 and 54

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Methods of Tensor Calculus and Differential Geometry: Read Less [-]

MEC ENG 282 Theory of Elasticity 3 Units

Terms offered: Spring 2020, Spring 2018, Spring 2016
Fundamentals and general theorems of the linear theory of elasticity (in three dimensions) and the formulation of static and dynamic boundary value problems. Application to torsion, flexure, and two-dimensional problems of plane strain, generalized plane stress, and bending of plates. Representation of basic field equations in terms of displacement potentials and stress functions. Some basic three-dimensional solutions.
Theory of Elasticity: Read More [+]

Rules & Requirements

Prerequisites: 185

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructors: Bogy, Steigmann

Theory of Elasticity: Read Less [-]

MEC ENG 283 Wave Propagation in Elastic Media 3 Units

Terms offered: Fall 2013, Fall 2012, Fall 2009
Propagation of mechanical disturbances in unbounded and bounded media. Surface waves, wave reflection and transmission at interfaces and boundaries. Stress waves due to periodic and transient sources. Some additional topics may vary with instructor.
Wave Propagation in Elastic Media: Read More [+]

Rules & Requirements

Prerequisites: 185

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Bogy

Wave Propagation in Elastic Media: Read Less [-]

MEC ENG 284 Nonlinear Theory of Elasticity 3 Units

Terms offered: Spring 2019, Spring 2017, Spring 2014
Fundamentals of the nonlinear theory of elasticity. Material symmetry. Exact solutions in elastostatics. Internal constraints. Useful strain-energy functions. Uniqueness. Compatibility conditions. Volterra dislocations. The Eshelby tensor. Small deformations superposed on finite deformations. Waves in pre-stressed solids. Stability. Bifurcations and buckling. Acceleration waves. Entropic elasticity.
Nonlinear Theory of Elasticity: Read More [+]

Objectives & Outcomes

Course Objectives: To provide students with a working knowledge of elasticity.

Student Learning Outcomes: Ability to embark on modern research in the field.

Rules & Requirements

Prerequisites: ME 185 or equivalent

Hours & Format

Fall and/or spring: 15 weeks - 3-3 hours of lecture and 0-1 hours of discussion per week

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Casey

Nonlinear Theory of Elasticity: Read Less [-]

MEC ENG 285A Foundations of the Theory of Continuous Media 3 Units

Terms offered: Spring 2020, Spring 2018, Spring 2016
A general development of thermodynamics of deformable media, entropy production, and related entropy inequalities. Thermomechanical response of dissipative media, including those for viscous fluids and nonlinear elastic solids. A discussion of invariance, internal constraints, material symmetry, and other special topics.
Foundations of the Theory of Continuous Media: Read More [+]

Rules & Requirements

Prerequisites: 185

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Casey

Formerly known as: 285

Foundations of the Theory of Continuous Media: Read Less [-]

MEC ENG 285B Surfaces of Discontinuity and Inhomogeneities in Deformable Continua 3 Units

Terms offered: Fall 2011, Spring 2010, Fall 2008
Finitely deforming thermo-mechanical media. Moving surfaces of discontinuity. Shock waves and acceleration waves in elastic materials. The Eshelby tensor and Eshelbian mechanics. Fracture. Microstructured continua.
Surfaces of Discontinuity and Inhomogeneities in Deformable Continua: Read More [+]
Rules & Requirements

Prerequisites: 185

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Casey

Surfaces of Discontinuity and Inhomogeneities in Deformable Continua: Read Less [-]

MEC ENG 285C Electrodynamics of Continuous Media 3 Units

Terms offered: Spring 2019, Spring 2015, Spring 2013
This course presents the fundamentals of electromagnetic interactions in deformable continuous media. It develops the background necessary to understand various modern technologies involving MEMS devices, sensors and actuators, plasmas, and a wide range of additional phenomena. The emphasis of this course is on fundamentals, beginning with Maxwell's equations in vacuum, the ether relations and their extension to electromagnetic interactions in materials. The treatment is general within the limits of nonrelativistic physics and accommodates coupling with mechanical and thermal effects. The topics discussed are all developed at a general level including the effects of finite deformations. Various linear models, which are especially useful in applications, are developed through specialization of general theory. This course will be of interest to students in engineering, physics, and applied mathematics.
Electrodynamics of Continuous Media: Read More [+]
Rules & Requirements

Prerequisites: A first course in continuum mechanics (such as 185 or Civil Engineering 231.)

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Steigmann

Formerly known as: 284B

Electrodynamics of Continuous Media: Read Less [-]

MEC ENG 285D Engineering Rheology 3 Units

Terms offered: Spring 2016, Spring 2014
Rheology is the study of the interaction between forces and the flow/deformation of materials. It deals with aspects of the mechanics of materials that are not covered in the standard curriculum, such as the response of viscoelastic fluids and solids, together with methods for modeling and simulating their response. Such materials exhibit a host of counterintuitive phenomena that call for nonlinear modeling and a close interaction between theory and experiment. This is a special-topics course for graduate students seeking advanced knowledge of these phenomena and associated modeling.
Engineering Rheology: Read More [+]
Objectives & Outcomes

Course Objectives: To expose students to the theory and methods of modern rheology, including: the mechanics of flow in complex non-Newtonian fluids and the mechanics of viscoelastic solids.

Student Learning Outcomes: Skill in modeling and simulating rheological problems.

Rules & Requirements

Prerequisites: A basic background in continuum mechanics (as covered in ME 185)

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

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Steigmann

Engineering Rheology: Read Less [-]

MEC ENG C285E Mechanics and Physics of Lipid Bilayers 3 Units

Terms offered: Fall 2017
Lipid bilayers constitute the membrane that encloses every animal cell and many of its interior structures, including the nuclear envelope, the organelles and the endoplasmic reticulum. This is a unique course devoted to modern developments in this exceptionally active field of research, ranging from models based on continuum theory to recent developments based on statistical mechanics.
Mechanics and Physics of Lipid Bilayers: Read More [+]
Objectives & Outcomes

Student Learning Outcomes: To expose students to advanced current work on the mechanics and physics of lipid bilayers (a very active field of current research relevant to biomechanics and biophysics)

Rules & Requirements

Prerequisites: Mechanical Engineering 185 or equivalent

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Steigmann

Also listed as: CHM ENG C294A

Mechanics and Physics of Lipid Bilayers: Read Less [-]

MEC ENG 286 Theory of Plasticity 3 Units

Terms offered: Fall 2020, Fall 2018, Spring 2015
Formulation of the theory of plasticity relative to loading surfaces in both strain space and stress space and associated loading criteria. Nonlinear constitutive equations for finitely deformed elastic-plastic materials. Discussion of strain-hardening and special cases. Applications.
Theory of Plasticity: Read More [+]
Rules & Requirements

Prerequisites: 185

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructors: Casey, Papadopoulos

Theory of Plasticity: Read Less [-]

MEC ENG 287 Graduate Introduction to Continuum Mechanics 3 Units

Terms offered: Fall 2020, Fall 2019, Fall 2018
This course is a general introduction to the fundamental concepts of the mechanics of continuous media. Topics covered include the kinematics of deformation, the concept of stress, and the conservation laws for mass, momentum and energy. This is followed by an introduction to constitutive theory with applications to well-established models for viscous fluids and elastic solids. The concepts are illustrated through the solution of tractable initial-boundary-value problems. This course presents foundation-level coverage of theory underlying a number of sub-fields, including Fluid Mechanics, Solid Mechanics and Heat Transfer.
Graduate Introduction to Continuum Mechanics: Read More [+]
Objectives & Outcomes

Course Objectives: This is a gateway course for graduate students entering the fields of Solid Mechanics and Fluid Mechanics. It is designed for students who require a rigorous foundation-level understanding in support of their future work in the theory, modeling and analysis of problems arising in the Engineering Sciences.

Student Learning Outcomes: Students will gain a deep understanding of the concepts and methods underlying modern continuum mechanics. The course is designed to equip students with the background needed to pursue advanced graduate work in allied fields.

Rules & Requirements

Prerequisites: Physics 7A, Math 53 and Math 54, as well as some prior exposure to the elementary mechanics of solids and fluids

Credit Restrictions: Students will receive no credit after taking ME 185.

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructors: Casey, Johnson, Papadopoulos, Steigmann

Graduate Introduction to Continuum Mechanics: Read Less [-]

MEC ENG 288 Theory of Elastic Stability 3 Units

Terms offered: Spring 2009, Fall 2007, Fall 1999
Dynamic stability of elastic bodies. Small motion on finite deformation. Classical treatments of buckling problems. Snapthrough and other global stability problems. Stability theory based upon nonlinear three-dimensional theory of elasticity.
Theory of Elastic Stability: Read More [+]
Rules & Requirements

Prerequisites: 185 and 273

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Steigmann

Theory of Elastic Stability: Read Less [-]

MEC ENG 289 Theory of Shells 3 Units

Terms offered: Spring 2017, Spring 2012, Fall 2007
A direct formulation of a general theory of shells and plates based on the concept of Cosserat (or Directed) surfaces. Nonlinear constitutive equations for finitely deformed elastic shells. Linear theory and a special nonlinear theory with small strain accompanied by large or moderately large rotation. Applications.
Theory of Shells: Read More [+]
Rules & Requirements

Prerequisites: 185 and 281

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructors: Johnson, Steigmann

Theory of Shells: Read Less [-]

MEC ENG 290C Topics in Fluid Mechanics 3 Units

Terms offered: Spring 2020, Spring 2015, Fall 2010
Lectures on special topics which will be announced at the beginning of each semester that the course is offered. Topics may include transport and mixing, geophysical fluid dynamics, biofluid dynamics, oceanography, free surface flows, non-Newtonian fluid mechanics, among other possibilities.
Topics in Fluid Mechanics: Read More [+]
Rules & Requirements

Prerequisites: Consent of instructor

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructors: Savas, Yeung

Topics in Fluid Mechanics: Read Less [-]

MEC ENG 290D Solid Modeling and CAD/CAM Fundamentals 3 Units

Terms offered: Fall 2018, Fall 2016, Fall 2014
Graduate survey of solid modeling research. Representations and algorithms for 3D solid geometry. Applications in design, analysis, planning, and manufacturing of mechanical parts, including CAD/CAM, reverse engineering, robotics, mold-making, and rapid prototyping.
Solid Modeling and CAD/CAM Fundamentals: Read More [+]
Objectives & Outcomes

Course Objectives: Students will gain experience with critical close reading of primary sources, evaluating and synthesizing the content of research papers. They will design, implement, and analyze a sample of geometric algorithms for applications in Solid Modeling and CAD/CAM.

Student Learning Outcomes: Students will be familiar with seminal research and important solid modeling representations and fundamental geometric algorithms, giving them insight into the capabilities and limitations of commercial solid modeling systems. They will have gained programming experience and skills and an understanding of theoretical and practical concerns as they design, implement, and analyze a sample of geometric algorithms for applications in Solid Modeling and CAD/CAM.

Rules & Requirements

Prerequisites: An introductory programming course; graduate standing or consent of instructor

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: McMains

Solid Modeling and CAD/CAM Fundamentals: Read Less [-]

MEC ENG 290G Laser Processing and Diagnostics 3 Units

Terms offered: Spring 2018, Fall 2015, Spring 2013
The course provides a detailed account of laser interactions with materials in the context of advanced materials processing and diagnostics.
Laser Processing and Diagnostics: Read More [+]
Rules & Requirements

Prerequisites: Graduate standing or undergraduate elective upon completion of ME109

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

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Grigoropoulos

Laser Processing and Diagnostics: Read Less [-]

MEC ENG 290H Green Product Development: Design for Sustainability 3 Units

Terms offered: Spring 2019, Spring 2017, Spring 2013
The focus of the course is management of innovation processes for sustainable products, from product definition to sustainable manufacturing and financial models. Using a project in which students will be asked to design and develop a product or service focused on sustainability, we will teach processes for collecting customer and user needs data, prioritizing that data, developing a product specification, sketching and building product prototypes, and interacting with the customer/community during product development. The course is intended as a very hands-on experience in the "green" product development process. The course will be a Management of Technology course offered jointly with the College of Engineering and the Haas School of Business. In addition, it will also receive credit towards the new Certificate on Engineering Sustainability and Environmental Management program. We aim to have half MBA students and half Engineering students (with a few other students, such as from the School of Information) in the class. The instructors will facilitate students to form mixed disciplinary reams for the development of their "green" products.
Green Product Development: Design for Sustainability: Read More [+]
Rules & Requirements

Prerequisites: Graduate standing in Engineering or Information, or consent of instructor

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructors: Agogino, Beckmann

Green Product Development: Design for Sustainability: Read Less [-]

MEC ENG 290I Sustainable Manufacturing 3 Units

Terms offered: Spring 2016, Spring 2015, Spring 2014
Sustainable design, manufacturing, and management as exercised by the enterprise is a poorly understood idea and one that is not intuitively connected to business value or engineering practice. This is especially true for the manufacturing aspects of most enterprises (tools, processes, and systems). This course will provide the basis for understanding (1) what comprises sustainable practices in for-profit enterprises, (2) how to practice and measure continuous improvement using sustainability thinking, techniques, and tools for product and manufacturing process design, and (3) the techniques for and value of effective communication of sustainablilty performance to internal and external audiences. Material in the course will be supplemented by speakers with diverse backgrounds in corporate sustainability, environmental consulting, non-governmental organizations, and academia.
Sustainable Manufacturing: Read More [+]
Rules & Requirements

Prerequisites: Graduate standing, or consent of instructor, especially for students not in engineering, business, or other management of technology programs

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Dornfeld

Sustainable Manufacturing: Read Less [-]

MEC ENG 290J Predictive Control for Linear and Hybrid Systems 3 Units

Terms offered: Spring 2016, Fall 2014, Spring 2013
Advanced optimization, polyhedra manipulation, and multiparametric programming. Invariant set theory. Analysis and design of constrained predictive controllers for linear and nonlinear systems. Computational oriented models of hybrid systems. Analysis and design of constrained predictive controllers for hybrid systems.
Predictive Control for Linear and Hybrid Systems: Read More [+]
Objectives & Outcomes

Course Objectives: The course is designed for graduate students who want to expand their knowledge on optimization-based control design. 50% will be focusing on advanced theory. 50% on applications.

Student Learning Outcomes: At the end of the course, the students will write a theoretical paper on MPC and will design an experiment where the theory is implemented.

Rules & Requirements

Prerequisites: ME C232 and ME C231A

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Borrelli

Predictive Control for Linear and Hybrid Systems: Read Less [-]

MEC ENG 290KA Innovation through Design Thinking 2 Units

Terms offered: Fall 2017, Fall 2016, Fall 2015
Designed for professionally-oriented graduate students, this course explores key concepts in design innovation based on the human-centered design approach called “design thinking.” Topics covered include human-centered design research, analysis of research to develop design principles, creativity techniques, user needs framing and strategic business modeling.
Innovation through Design Thinking: Read More [+]
Objectives & Outcomes

Student Learning Outcomes: The primary goal is to provide students with a set of innovation skills that will allow them to flourish in a climate of complex problem solving and design challenges. Students will develop expertise in innovation skills drawn from the fields of critical thinking, design thinking and systems thinking. Students should be able to apply the skills mastered to real world design problems.

Rules & Requirements

Prerequisites: Graduate level standing; Prior design course

Hours & Format

Fall and/or spring: 8 weeks - 4 hours of lecture per week

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Agogino

Innovation through Design Thinking: Read Less [-]

MEC ENG 290KB Life Cycle Thinking in Engineering Design 1 Unit

Terms offered: Fall 2017, Fall 2016, Fall 2015
How do we design and manufacture greener products, and how do we know if they really are? This class both provides tools for sustainable design innovation and metrics to measure success. Students will use both creative and analytical skills, generating new ideas as well as evaluating designs with screening-level life cycle assessment.
Life Cycle Thinking in Engineering Design: Read More [+]
Objectives & Outcomes

Course Objectives: The objective of this course is to provide students with the tools to frame, analyze, and redesign their projects in terms of life cycle environmental impacts, to improve the sustainability of their projects.

Student Learning Outcomes: Students can expect to depart the course understanding the practice of basic life cycle assessment, including how to set boundaries, choose functional units, and use LCA software. Students will also learn how to integrate this practice into new product development in the context of the “triple bottom line” – economy, environment and society. Students should be able to apply the skills mastered to real world design and engineering problems.

Rules & Requirements

Prerequisites: Graduate level standing; Prior design course

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Agogino

Life Cycle Thinking in Engineering Design: Read Less [-]

MEC ENG 290L Introduction to Nano-Biology 3 Units

Terms offered: Fall 2020, Fall 2018, Spring 2017
This course introduces graduate students in Mechanical Engineering to the nascent field of Nano-Biology. The course is comprised of both formal lectures and projects. Lectures will include an introduction to both molecular biology (components of cells, protein structure and function, DNA, gene regulation, etc.) and nanotechnology ("bottom up" and "top down" nanotechnologies), an overview of current instrumentation in biology, an in-depth description of the recent integration of molecular biology with nanotechnology (for sensing or labeling purposes, elucidating information on cells, etc.), and an introduction to Systems Biology (design principles of biological circuits).
Introduction to Nano-Biology: Read More [+]
Objectives & Outcomes

Course Objectives: The course introduces engineering students to the interplay between Nanotechnology and Biology and serves to 1) broaden the areas of research that students might not have necessarily considered, 2) expose students to cutting-edge research, and 3) develop analytical skills.

Student Learning Outcomes: Students should be able to critique methods and techniques that researchers have used to study and probe biological systems at the nano-scale. They will learn how to write research proposals and how to give an effective presentation. Through the research proposals, students will learn about the scientific-research process: formulating the problem, determining the appropriate experimental methods, interpreting the results, and arriving at a conclusion. Through presentations, students will gain valuable experience in public speaking and learn the process by which they would have to propose a research problem, be it in academia or industry.

Hours & Format

Fall and/or spring: 15 weeks - 3-3 hours of lecture and 0-1 hours of discussion per week

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Sohn

Introduction to Nano-Biology: Read Less [-]

MEC ENG 290M Expert Systems in Mechanical Engineering 3 Units

Terms offered: Fall 2005, Fall 2003, Spring 1999
Introduction to artificial intelligence and decision analysis in mechanical engineering. Fundamentals of analytic design, probability theory, failure analysis, risk assessment, and Bayesian and logical inference. Applications to expert systems in probabilistic mechanical engineering design and failure diagnostics. Use of automated influence diagrams to codify expert knowledge and to evaluate optimal design decisions.
Expert Systems in Mechanical Engineering: Read More [+]
Rules & Requirements

Prerequisites: 102A and 102B or equivalent

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Agogino

Expert Systems in Mechanical Engineering: Read Less [-]

MEC ENG 290N System Identification 3 Units

Terms offered: Spring 2020, Fall 2010, Fall 2008
This course is intended to provide a comprehensive treatment of both classical system identification and recent work in control-oriented system identification. Numerical, practical, and theoretical aspects will be covered. Topics treated include time and frequency domain methods, generalized parameter estimation, identification of structured non-linear systems, modeling uncertainty bounding, and state-space methods.
System Identification: Read More [+]
Rules & Requirements

Prerequisites: 232, Electrical Engineering and Computer Sciences 221A or consent of instructor

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Poolla

System Identification: Read Less [-]

MEC ENG 290P New Product Development: Design Theory and Methods 3 Units

Terms offered: Fall 2015, Fall 2013, Fall 2012
This course is aimed at developing the interdisciplinary skills required for successful product development in today's competitive marketplace. We expect students to be disciplinary experts in their own field (e.g., engineering, business). By bringing together multiple perspectives, we will learn how product development teams can focus their efforts to quickly create cost-effective products that exceed customers' expectations.
New Product Development: Design Theory and Methods: Read More [+]
Objectives & Outcomes

Course Objectives: Students can expect to depart the semester understanding new product development processes as well as useful tools, techniques and organizational structures that support new product development practice.

Student Learning Outcomes: Students can expect to depart the semester understanding new product development processes as well as useful tools, techniques and organizational structures that support new product development practice in the context of the “triple bottom line” – economy, environment and society.

Rules & Requirements

Prerequisites: Graduate standing, consent of instructor

Hours & Format

Fall and/or spring: 15 weeks - 3-3 hours of lecture and 0-1 hours of voluntary per week

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Agogino

New Product Development: Design Theory and Methods: Read Less [-]

MEC ENG 290Q Dynamic Control of Robotic Manipulators 3 Units

Terms offered: Fall 2008, Spring 2007, Fall 2001
Dynamic and kinematic analysis of robotic manipulators. Sensors (position, velocity, force and vision). Actuators and power transmission lines. Direct drive and indirect drive. Point to point control. Straight and curved path following. Industrial practice in servo control. Applications of optimal linear quadratic control, preview control, nonlinear control, and direct/indirect adaptive controls. Force control and compliance control. Collision avoidance. Utilization of dynamic controls
Dynamic Control of Robotic Manipulators: Read More [+]
Rules & Requirements

Prerequisites: 230, 232, or consent of instructor

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructors: Horowitz, Kazerooni

Dynamic Control of Robotic Manipulators: Read Less [-]

MEC ENG 290R Topics in Manufacturing 3 Units

Terms offered: Fall 2017, Spring 2016, Fall 2014
Advanced topics in manufacturing research. Topics vary from year to year.
Topics in Manufacturing: 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 - 3 hours of lecture per week

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructors: Dornfeld, McMains, Wright

Topics in Manufacturing: Read Less [-]

MEC ENG 290T Plasmonic Materials 3 Units

Terms offered: Fall 2017, Fall 2014, Spring 2013
This course deals with fundamental aspects of plasmonic materials. The electromagnetic responses of those artificially constructed materials will be discussed. Physics of surface plasmons and dispersion engineering will be introduced. Resonant phenomena associated with the negative permittivity and permeability and the left-handed propagation will be presented. Methods of design, fabrication, and characterization of plasmonic materials will be discussed.
Plasmonic Materials: Read More [+]

Rules & Requirements

Prerequisites: Physics 110A or consent of instructor

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

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Zhang

Plasmonic Materials: Read Less [-]

MEC ENG 290U Interactive Device Design 4 Units

Terms offered: Fall 2017, Fall 2016, Fall 2015
This course teaches concepts and skills required to design, prototype, and fabricate interactive devices -- that is, physical objects that intelligently respond to user input and enable new types of interactions.
Interactive Device Design: Read More [+]

Objectives & Outcomes

Course Objectives: To educate students in the hybrid design skills needed for today's electronic products. These combine mechanical devices, electronics, software, sensors, wireless communication and connections to the cloud. Students also learn scale up procedures for volume manufacturing.

Student Learning Outcomes: 3D printed prototypes, learned software, programming and design skills

Rules & Requirements

Prerequisites: Instructor consent

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructors: Hartmann, Wright

Interactive Device Design: Read Less [-]

MEC ENG 290V Topics in Energy, Climate, and Sustainability 1 Unit

Terms offered: Prior to 2007
Weekly lecture series featuring guest speakers from academia, industry, government, and civil society. Speakers will address cutting-edge topics involving novel technologies in energy and climate; the production, consumption, and economic exchange of energy resources and commodities; and energy and climate policy. Undergraduate and graduate students welcome.
Topics in Energy, Climate, and Sustainability: Read More [+]

Objectives & Outcomes

Course Objectives: Introduce UC Berkeley students to a variety of perspectives from stakeholders working on the science, technology, economics, and policy of energy and climate issues.

Student Learning Outcomes: Introduce students to interdisciplinary perspectives on energy and climate issues; attract top speakers to campus from academia, industry, government, and civil society; and build community at UC Berkeley around interdisciplinary energy and climate issues.

Rules & Requirements

Repeat rules: 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: Mechanical Engineering/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructors: Wright, Burns, Cullenward

Topics in Energy, Climate, and Sustainability: Read Less [-]

MEC ENG C290S Hybrid Systems and Intelligent Control 3 Units

Terms offered: Spring 2020, Spring 2018, Spring 2016
Analysis of hybrid systems formed by the interaction of continuous time dynamics and discrete-event controllers. Discrete-event systems models and language descriptions. Finite-state machines and automata. Model verification and control of hybrid systems. Signal-to-symbol conversion and logic controllers. Adaptive, neural, and fuzzy-control systems. Applications to robotics and Intelligent Vehicle and Highway Systems (IVHS).
Hybrid Systems and Intelligent Control: Read More [+]
Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Formerly known as: 291E

Also listed as: EL ENG C291E

Hybrid Systems and Intelligent Control: Read Less [-]

MEC ENG C290X Advanced Technical Communication: Proposals, Patents, and Presentations 3 Units

Terms offered: Spring 2018, Spring 2016, Spring 2012, Spring 2011
This course will help the advanced Ph.D. student further develop critically important technical communication traits via a series of lectures, interactive workshops, and student projects that will address the structure and creation of effective research papers, technical reports, patents, proposals, business plans, and oral presentations. One key concept will be the emphasis on focus and clarity--achieved through critical thinking regarding objectives and context. Examples will be drawn primarily from health care and bioengineering multidisciplinary applications.
Advanced Technical Communication: Proposals, Patents, and Presentations: Read More [+]
Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructors: Keaveny, Pruitt

Also listed as: BIO ENG C290D

Advanced Technical Communication: Proposals, Patents, and Presentations: Read Less [-]

MEC ENG 292A Advanced Special Topics in Bioengineering 1 - 4 Units

Terms offered: Fall 2020, Spring 2020, Spring 2018
This 292 series covers current topics of research interest in bioengineering and biomechanics. The course content may vary semester to semester. Check with the department for current term topics.
Advanced Special Topics in Bioengineering: Read More [+]
Rules & Requirements

Prerequisites: Graduate student standing or consent of instructor

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

Hours & Format

Fall and/or spring:
6 weeks - 2.5-10 hours of lecture per week
8 weeks - 2-7.5 hours of lecture per week
10 weeks - 1.5-6 hours of lecture per week
15 weeks - 1-4 hours of lecture per week

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Instructor: Faculty

Advanced Special Topics in Bioengineering: Read Less [-]

MEC ENG 292B Advanced Special Topics in Controls 1 - 4 Units

Terms offered: Fall 2020, Fall 2019, Fall 2018
This series covers current topics of research interest in controls. The course content may vary semester to semester. Check with the department for current term topics.
Advanced Special Topics in Controls: Read More [+]
Objectives & Outcomes

Course Objectives: Varies with course.

Student Learning Outcomes: Varies with course.

Rules & Requirements

Prerequisites: Graduate standing or consent of instructor

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

Hours & Format

Fall and/or spring:
6 weeks - 2.5-10 hours of lecture per week
8 weeks - 2-7.5 hours of lecture per week
10 weeks - 1.5-6 hours of lecture per week
15 weeks - 1-4 hours of lecture per week

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Advanced Special Topics in Controls: Read Less [-]

MEC ENG 292C Advanced Special Topics in Design 1 - 4 Units

Terms offered: Fall 2020, Spring 2020, Fall 2019
This series covers current topics of research interest in design. The course content may vary semester to semester. Check with the department for current term topics.
Advanced Special Topics in Design: Read More [+]

Objectives & Outcomes

Course Objectives: Varies with course.

Student Learning Outcomes: Varies with course.

Rules & Requirements

Prerequisites: Graduate student standing or consent of instructor

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

Hours & Format

Fall and/or spring:
6 weeks - 2.5-10 hours of lecture per week
8 weeks - 2-7.5 hours of lecture per week
10 weeks - 1.5-6 hours of lecture per week
15 weeks - 1-4 hours of lecture per week

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Advanced Special Topics in Design: Read Less [-]

MEC ENG 292D Advanced Special Topics in Dynamics 1 - 4 Units

Terms offered: Prior to 2007
This series covers current topics of research interest in dynamics. The course content may vary semester to semester. Check with the department for current term topics.
Advanced Special Topics in Dynamics: Read More [+]

Objectives & Outcomes

Course Objectives: Varies with course.

Student Learning Outcomes: Varies with course.

Rules & Requirements

Prerequisites: Graduate student standing or consent of instructor

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

Hours & Format

Fall and/or spring:
6 weeks - 2.5-10 hours of lecture per week
8 weeks - 2-7.5 hours of lecture per week
10 weeks - 1.5-6 hours of lecture per week
15 weeks - 1-4 hours of lecture per week

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Advanced Special Topics in Dynamics: Read Less [-]

MEC ENG 292E Advanced Special Topics in Energy Science and Technology 1 - 4 Units

Terms offered: Fall 2019, Spring 2019, Spring 2018
This 292 series covers current topics of research interest in energy science and technology. The course content may vary semester to semester. Check with the department for current term topics.
Advanced Special Topics in Energy Science and Technology: Read More [+]

Objectives & Outcomes

Course Objectives: Varies with course.

Student Learning Outcomes: Varies with course.

Rules & Requirements

Prerequisites: Graduate student standing or consent of instructor

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

Hours & Format

Fall and/or spring:
6 weeks - 2.5-10 hours of lecture per week
8 weeks - 2-7.5 hours of lecture per week
10 weeks - 1.5-6 hours of lecture per week
15 weeks - 1-4 hours of lecture per week

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Advanced Special Topics in Energy Science and Technology: Read Less [-]

MEC ENG 292F Advanced Special Topics in Fluids 1 - 4 Units

Terms offered: Prior to 2007
This 292 series covers current topics of research interest in fluids. The course content may vary semester to semester. Check with the department for current term topics.
Advanced Special Topics in Fluids: Read More [+]

Objectives & Outcomes

Course Objectives: Varies with course.

Student Learning Outcomes: Varies with course.

Rules & Requirements

Prerequisites: Graduate student standing or consent of instructor

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

Hours & Format

Fall and/or spring:
6 weeks - 2.5-10 hours of lecture per week
8 weeks - 2-7.5 hours of lecture per week
10 weeks - 1.5-6 hours of lecture per week
15 weeks - 1-4 hours of lecture per week

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Advanced Special Topics in Fluids: Read Less [-]

MEC ENG 292G Advanced Special Topics in Manufacturing 1 - 4 Units

Terms offered: Prior to 2007
This 292 series covers current topics of research interest in manufacturing. The course content may vary semester to semester. Check with the department for current term topics.
Advanced Special Topics in Manufacturing: Read More [+]

Objectives & Outcomes

Course Objectives: Varies with course.

Student Learning Outcomes: Varies with course.

Rules & Requirements

Prerequisites: Graduate student standing or consent of instructor

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

Hours & Format

Fall and/or spring:
6 weeks - 2.5-10 hours of lecture per week
8 weeks - 2-7.5 hours of lecture per week
10 weeks - 1.5-6 hours of lecture per week
15 weeks - 1-4 hours of lecture per week

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Advanced Special Topics in Manufacturing: Read Less [-]

MEC ENG 292H Advanced Special Topics in Materials 1 - 4 Units

Terms offered: Prior to 2007
This 292 series covers current topics of research interest in materials. The course content may vary semester to semester. Check with the department for current term topics.
Advanced Special Topics in Materials: Read More [+]

Objectives & Outcomes

Course Objectives: Varies with course.

Student Learning Outcomes: Varies with course.

Rules & Requirements

Prerequisites: Graduate student standing or consent of instructor

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

Hours & Format

Fall and/or spring:
6 weeks - 2.5-10 hours of lecture per week
8 weeks - 2-7.5 hours of lecture per week
10 weeks - 1.5-6 hours of lecture per week
15 weeks - 1-4 hours of lecture per week

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Advanced Special Topics in Materials: Read Less [-]

MEC ENG 292I Advanced Special Topics in Mechanics 1 - 4 Units

Terms offered: Prior to 2007
This series covers current topics of research interest in mechanics. The course content may vary semester to semester. Check with the department for current term topics.
Advanced Special Topics in Mechanics: Read More [+]

Objectives & Outcomes

Course Objectives: Varies with course.

Student Learning Outcomes: Varies with course.

Rules & Requirements

Prerequisites: Graduate student standing or consent of instructor

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

Hours & Format

Fall and/or spring:
6 weeks - 2.5-10 hours of lecture per week
8 weeks - 2-7.5 hours of lecture per week
10 weeks - 1.5-6 hours of lecture per week
15 weeks - 1-4 hours of lecture per week

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Advanced Special Topics in Mechanics: Read Less [-]

MEC ENG 292J Advanced Special Topics in MEMS/Nano 1 - 4 Units

Terms offered: Spring 2018
This 292 series covers current topics of research interest in MEMS/nano. The course content may vary semester to semester. Check with the department for current term topics.
Advanced Special Topics in MEMS/Nano: Read More [+]

Objectives & Outcomes

Course Objectives: Varies with course.

Student Learning Outcomes: Varies with course.

Rules & Requirements

Prerequisites: Graduate student standing or consent of instructor

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

Hours & Format

Fall and/or spring:
6 weeks - 2.5-10 hours of lecture per week
8 weeks - 2-7.5 hours of lecture per week
10 weeks - 1.5-6 hours of lecture per week
15 weeks - 1-4 hours of lecture per week

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Advanced Special Topics in MEMS/Nano: Read Less [-]

MEC ENG 292K Advanced Special Topics in Ocean Engineering 1 - 4 Units

Terms offered: Fall 2020, Spring 2019
This series covers current topics of research interest in ocean engineering. The course content may vary semester to semester. Check with the department for current term topics.
Advanced Special Topics in Ocean Engineering: Read More [+]
Objectives & Outcomes

Course Objectives: Varies with course.

Student Learning Outcomes: Varies with course.

Rules & Requirements

Prerequisites: Graduate student standing or consent of instructor

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

Hours & Format

Fall and/or spring:
6 weeks - 2.5-10 hours of lecture per week
8 weeks - 2-7.5 hours of lecture per week
10 weeks - 1.5-6 hours of lecture per week
15 weeks - 1-4 hours of lecture per week

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Letter grade.

Advanced Special Topics in Ocean Engineering: Read Less [-]

MEC ENG 297 Engineering Field Studies 1 - 12 Units

Terms offered: Fall 2020, Summer 2020, Spring 2020
Supervised experience relative to specific aspects of practice in engineering. Under guidance of a faculty member, the student will work in an internship in industry. Emphasis is to attain practical experience in the field.
Engineering Field Studies: Read More [+]
Hours & Format

Fall and/or spring: 15 weeks - 1-12 hours of independent study per week

Summer:
6 weeks - 2.5-20 hours of independent study per week
10 weeks - 1.5-18 hours of independent study per week

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Engineering Field Studies: Read Less [-]

MEC ENG 298 Group Studies, Seminars, or Group Research 1 - 8 Units

Terms offered: Fall 2020, Spring 2020, Fall 2019
Advanced studies in various subjects through special seminars on topics to be selected each year. Informal group studies of special problems, group participation in comprehensive design problems, or group research on complete problems for analysis and experimentation.
Group Studies, Seminars, or Group Research: Read More [+]
Rules & Requirements

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 1-8 hours of independent study per week

Summer: 10 weeks - 1.5-12 hours of independent study per week

Additional Details

Subject/Course Level: Mechanical Engineering/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Group Studies, Seminars, or Group Research: Read Less [-]

MEC ENG 299 Individual Study or Research 1 - 12 Units

Terms offered: Fall 2020, Spring 2020, Fall 2019
Investigations of advanced problems in mechanical engineering.
Individual Study or Research: Read More [+]
Rules & Requirements

Prerequisites: Graduate standing in engineering, physics, or mathematics

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 1-12 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: Mechanical Engineering/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Individual Study or Research: Read Less [-]

MEC ENG 375 Teaching of Mechanical Engineering at the University Level 1 - 6 Units

Terms offered: Fall 2020, Spring 2020, Fall 2019
Weekly seminars and discussions on effective teaching methods. Educational objectives. Theories of learning. The lecture and alternative approaches. Use of media resources. Student evaluation. Laboratory instruction. Curricula in mechanical engineering. Practice teaching. This course is open to Teaching Assistants of Mechanical Engineering.
Teaching of Mechanical Engineering at the University Level: Read More [+]

Rules & Requirements

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

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

Additional Details

Subject/Course Level: Mechanical Engineering/Professional course for teachers or prospective teachers

Grading: Offered for satisfactory/unsatisfactory grade only.

Formerly known as: Mechanical Engineering 301

Teaching of Mechanical Engineering at the University Level: Read Less [-]

Expand all course descriptions [+]Collapse all course descriptions [-]

UGBA C5 Introduction to Entrepreneurship 2 Units

Terms offered: Fall 2020, Fall 2019, Fall 2018, Spring 2017
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

Terms offered: Fall 2020, Spring 2020, Fall 2019
This team-taught course provides an introduction to the study of the modern business enterprise. It consists of four modules, the order of which may vary from semester to semester, and an online business simulation that runs during most of the semester. The four modules cover: Finance & Accounting, Marketing, Operations & Sustainability, and Leadership. In addition to lectures and the simulation, students attend discussion section each week.
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. Alternative to final exam.

Formerly known as: Business Administration 10

Principles of Business: Read Less [-]

UGBA C12 The Berkeley Changemaker: A Discovery Experience 2 Units

Terms offered: Not yet offered
The course is a discovery experience: Students discover their own leadership styles, and they discover how they can create teams – and act upon the world – to effect positive change. Students will learn how to imagine better futures, and then learn how to mobilize others to help create them. Changemakers make their impact through scientific breakthroughs, artistic imagination, social action projects, and entrepreneurial ventures. Online class sessions will cover both theoretical and practical topics, such as critical thinking, persuasive communication, problem framing, hypothesis testing, and leading and working with teams. The ultimate goal of the course is to help incoming students discover their own identity as Berkeley Changemakers.,Terms offered: Summer 2020 3 Week Session
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The Berkeley Changemaker: A Discovery Experience: Read More [+]

Hours & Format

Summer: 3 weeks - 10 hours of web-based lecture per week

Additional Details

Subject/Course Level: Undergrad. Business Administration/ Undergraduate

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

Also listed as: L & S C12

The Berkeley Changemaker: A Discovery Experience: Read Less [-]

UGBA C12 The Berkeley Changemaker: A Discovery Experience 2 Units

Terms offered: Not yet offered
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The Berkeley Changemaker: A Discovery Experience: Read More [+]

Hours & Format

Summer: 3 weeks - 10 hours of web-based lecture per week

Additional Details

Subject/Course Level: Undergrad. Business Administration/ Undergraduate

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

Also listed as: L & S C12

The Berkeley Changemaker: A Discovery Experience: Read Less [-]

UGBA 24 Freshman Seminars 1 Unit

Terms offered: Spring 2020, Fall 2013, Spring 2007
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 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 39AC Philanthropy: A Cross-Cultural Perspective 3 Units

Terms offered: Fall 2019, Fall 2018, Fall 2017
This class will compare and contrast the variety of gift giving and sharing traditions that make up American philanthropy. Both the cultural antecedents and their expression in this country will be explored from five ethnic and racial groups: Native American, European American, African American, Hispanic American, and Asian American. The goal is to gain a greater understanding of the many dimensions of philanthropy as it is practiced in the United States today.
Philanthropy: A Cross-Cultural Perspective: 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.

Formerly known as: Business Administration 39AC

Philanthropy: A Cross-Cultural Perspective: Read Less [-]

UGBA 39E Freshman/Sophomore Seminar 2 - 4 Units

Terms offered: Fall 2020, Fall 2019, Spring 2018
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

Repeat rules: Course may be repeated for credit without restriction.

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.

Formerly known as: Business Administration 39

Freshman/Sophomore Seminar: Read Less [-]

UGBA 88 Data and Decisions 2 Units

Terms offered: Fall 2020, Spring 2020, Fall 2019
The goal of this connector course is to provide an understanding of how data and statistical analysis can improve managerial decision-making. We will explore statistical methods for gleaning insights from economic and social data, with an emphasis on approaches to identifying causal relationships. We will discuss how to design and analyze randomized experiments and introduce econometric methods for estimating causal effects in non-experimental data. The course draws on a variety of business and social science applications, including advertising, management, online marketplaces, labor markets, and education. This course, in combination with the Data 8 Foundations course, satisfies the statistics prerequisite for admission to Haas.
Data and Decisions: Read More [+]
Rules & Requirements

Prerequisites: One semester of Calculus (Math 16A or Math 1A). Also, this is a Data Science connector course and may only be taken concurrently with or after completing Computer Science C8/Statistics C8/ Information C8

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 required.

Instructor: Miller

Data and Decisions: Read Less [-]

UGBA C95B Introduction to the Biotechnology Field and Industry: Impact, History, Therapeutics R&D, Entrepreneurship and Careers 2 Units

Terms offered: Spring 2019
This course offers an introduction to the field of biotechnology and will cover the history of the field, its impact on medicine and society, key methodologies, important therapeutic areas, and the range of career options available in the biopharmaceutical industry. In addition to lectures on innovation and entrepreneurship, students will hear from lecturers with expertise ranging from molecular biology to clinical trial design and interpretation. Several case studies of historically impactful scientists, entrepreneurs, and biotherapeutic companies will be presented. Students will work in teams to create and develop novel biotechnology company ideas to present in class. Intended for students interested in the Biology +Business program.
Introduction to the Biotechnology Field and Industry: Impact, History, Therapeutics R&D, Entrepreneurship and Careers: 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: Offered for pass/not pass grade only. Alternative to final exam.

Instructors: Kirn, Lasky

Also listed as: MCELLBI C95B

Introduction to the Biotechnology Field and Industry: Impact, History, Therapeutics R&D, Entrepreneurship and Careers: Read Less [-]

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

Terms offered: Fall 2020, Fall 2019, Spring 2019
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 [+]
Rules & Requirements

Repeat rules: Course may be repeated for credit without restriction.

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

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 without restriction.

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

Terms offered: Fall 2020, Spring 2020, Fall 2019
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

Terms offered: Fall 2020, Summer 2020 First 6 Week Session, Spring 2020
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 W21, or equivalents

Credit Restrictions: Students will receive no credit for UGBA 101A after completing ECON 100A, ECON 101A, BUS ADM 110, ENVECON 100, BUS ADM S110, IAS 106, or POLECON 106. A deficient grade in UGBA 101A may be removed by taking POLECON 106, ECON 100A, ECON 101A, ENVECON 100, IAS 106, or POLECON 106.

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

Terms offered: Fall 2020, Summer 2020 First 6 Week Session, Summer 2020 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 W21, or equivalents

Credit Restrictions: Students will receive no credit for UGBA 101B after completing ECON 100B, ECON 101B, BUS ADM 111, IAS 107, or POLECON 107. A deficient grade in UGBA 101B may be removed by taking ECON 100B, ECON 101B, IAS 107, or POLECON 107.

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 not required.

Formerly known as: Business Administration 111

Macroeconomic Analysis for Business Decisions: Read Less [-]

UGBA 102A Financial Accounting 3 Units

Terms offered: Fall 2020, Summer 2020 First 6 Week Session, Spring 2020
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.
Financial Accounting: Read More [+]
Rules & Requirements

Credit Restrictions: Course not open for credit for students who are taking or have completed Undergraduate Business Administration W102A.

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.

Financial Accounting: Read Less [-]

UGBA 102B Managerial Accounting 3 Units

Terms offered: Fall 2020, Summer 2020 Second 6 Week Session, Spring 2020
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.
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 - 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.

Managerial Accounting: Read Less [-]

UGBA W102A Financial Accounting 3 Units

Terms offered: Summer 2020 First 6 Week Session, Summer 2019 First 6 Week Session, Summer 2018 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.
Financial Accounting: Read More [+]

Rules & Requirements

Credit Restrictions: Course not open for credit for students who are taking or have completed Undergraduate Business Administration 102A.

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.

Financial Accounting: Read Less [-]

UGBA 103 Introduction to Finance 4 Units

Terms offered: Fall 2020, Summer 2020 First 6 Week Session, Summer 2020 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 - 7.5 hours of lecture and 2.5 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.

Introduction to Finance: Read Less [-]

UGBA 104 Introduction to Business Analytics 3 Units

Terms offered: Fall 2020, Summer 2020 First 6 Week Session, Spring 2020
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.
Introduction to Business Analytics: Read More [+]

Rules & Requirements

Prerequisites: Mathematics 1B or 16B, Statistics W21, or equivalents

Hours & Format

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

Summer: 6 weeks - 2.5 hours of lecture and 2.5 hours of laboratory per week

Additional Details

Subject/Course Level: Undergrad. Business Administration/ Undergraduate

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

Introduction to Business Analytics: Read Less [-]

UGBA 105 Leading People 3 Units

Terms offered: Fall 2020, Summer 2020 First 6 Week Session, Spring 2020

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 - 1.5-3 hours of lecture and 1.5-0 hours of discussion per week

Summer:
6 weeks - 4-8 hours of lecture and 4-0 hours of discussion per week
8 weeks - 3-6 hours of lecture and 3-0 hours of discussion 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

Terms offered: Fall 2020, Summer 2020 First 6 Week Session, Summer 2020 Second 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

Terms offered: Fall 2020, Summer 2020 First 6 Week Session, Spring 2020

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 115 Competitive Strategy 3 Units

Terms offered: Fall 2020, Spring 2020, Fall 2019

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

Terms offered: Fall 2018, Spring 2018, Fall 2017
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 without restriction.

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

Terms offered: Fall 2019, Fall 2018, Summer 2018 Second 6 Week Session
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

Terms offered: Fall 2020, Spring 2019, Spring 2018
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

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

Terms offered: Fall 2020, Fall 2019, Summer 2019 First 6 Week Session
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

Terms offered: Spring 2020, Spring 2019, Spring 2018
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

Terms offered: Fall 2020, Spring 2020, Fall 2019
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

Terms offered: Spring 2020, Fall 2019, Spring 2019
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

Terms offered: Fall 2020, Summer 2020 First 6 Week Session, Spring 2020
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

Terms offered: Fall 2020, Fall 2019, Fall 2018
This course examines how accounting in the financial services industry – banking, insurance, investment industry, and 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: Students are encouraged to complete UGBA 102A or to possess a basic understanding about how financial statements are prepared

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 125 Ethics in Accounting 3 Units

Terms offered: Fall 2020, Spring 2020, Fall 2019
This course focuses on ethics related to the accounting for and reporting of financial statements and related financial information, and touches on the ethics of tax preparers. It is taught within the context of the American Institute of Certified Public Accountants (AICPA), as well as broader ethical concepts. This course fulfills the accounting ethics education requirement of the California Board of Accountancy, needed for a California CPA license. The course covers (i) theories and rules and (ii) the application of these theories and rules to case studies drawn from real life. Students are taught not only to identify the risks of fraud, but also how an organization's culture and structure might be altered to reduce the risks.
Ethics in Accounting: 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.

Ethics in Accounting: Read Less [-]

UGBA 126 Auditing 4 Units

Terms offered: Spring 2020, Fall 2019, Spring 2019
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

Terms offered: Spring 2020, Spring 2019, Fall 2018
A variety of topics in accounting with emphasis on current problems and research.
Special Topics in Accounting: Read More [+]
Rules & Requirements

Prerequisites: At the discretion of the instructor

Repeat rules: Course may be repeated for credit without restriction.

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

Terms offered: Spring 2020, Spring 2019, Fall 2017
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 131 Corporate Finance and Financial Statement Analysis 3 Units

Terms offered: Fall 2020, Summer 2020 Second 6 Week Session, Spring 2020
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 131A Corporate Strategy and Valuation 3 Units

Terms offered: Spring 2020, Spring 2019
The course is designed to cover advanced corporate finance issues. Its purpose is two-fold. First, it will help students develop a tool-box, both conceptual and quantitative, to address real-world corporate financial issues that they will likely use immediately in any finance-related career. Second, the course is designed to give the “the big picture,” i.e., sharpen understanding of how corporate financial strategy helps increase a firm’s value in a dynamic environment. The course examines qualitative factors that help determine financial strategy, including the costs of financial distress and the value of financial flexibility, as well as quantitative techniques, such as option pricing, that will be helpful in various analyses.
Corporate Strategy and Valuation: Read More [+]
Rules & Requirements

Prerequisites: Undergraduate Business Administration 103

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.

Corporate Strategy and Valuation: Read Less [-]

UGBA 132 Financial Institutions and Markets 3 Units

Terms offered: Summer 2020 First 6 Week Session, Summer 2019 First 6 Week Session, Summer 2018 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

Terms offered: Fall 2020, Summer 2020 First 6 Week Session, Summer 2020 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 134 Introduction to Financial Engineering 3 Units

Terms offered: Spring 2019
This course provides students with an introduction to the application of mathematics and statistics in the field of finance. It consists of three integrated modules: 1) an introduction to the quantitative foundations of finance, using calculus, linear algebra, statistics and probability; 2) extension into financial theory as it relates to asset pricing, fixed income, derivatives, structured finance and risk management; and 3) application and implementation of these foundational tools and theory through software like Excel to build basic quantitative financial models (touching on programming). The goal is to use financial models that can guide business and financial decisions.
Introduction to Financial Engineering: Read More [+]

Rules & Requirements

Prerequisites: UGBA 103

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.

Introduction to Financial Engineering: Read Less [-]

UGBA 135 Personal Financial Management 2 Units

Terms offered: Fall 2020, Spring 2020, Fall 2019
Survey of major life financial decisions (e.g., career choice, consumption versus saving, investments, mortgages, insurance) and how decision-making biases (e.g., overconfidence, present bias, limited attention) can lead to suboptimal choice. The course draws on research from economics, psychology, and sociology.
Personal Financial Management: 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 required.

Instructors: Odean, Selinger

Personal Financial Management: Read Less [-]

UGBA 136F Behavioral Finance 3 Units

Terms offered: Summer 2020 Second 6 Week Session, Summer 2019 Second 6 Week Session, Summer 2018 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

Terms offered: Fall 2020, Summer 2020 Second 6 Week Session, Spring 2020
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 without restriction.

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 2 - 3 Units

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 - 2-3 hours of lecture and 0-1 hours of discussion per week

Summer: 6 weeks - 5-7.5 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.

Formerly known as: Business Administration 142

Production and Operations Management: Read Less [-]

UGBA 143 Game Theory and Business Decisions 3 Units

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 146 Project Management 2 Units

Terms offered: Summer 2020 First 6 Week Session, Fall 2005, Spring 2005

The primary objective of this course is to develop the critical skills and knowledge needed to successfully pitch and lead projects, and to deliver those projects on time and within budget. The course delves into formal planning and scheduling techniques including: project definition, project selection, Work Breakdown Structure (WBS), Resource Estimation, Critical Path Method (CPM), Pert, Gantt Charts, Resource Constrained Scheduling, Project Monitoring and Project Closing.

Project Management: Read More [+]

Hours & Format

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.

Project Management: Read Less [-]

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

Terms offered: Summer 2020 First 6 Week Session, Spring 2020, Summer 2019 First 6 Week Session

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 without restriction.

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

Terms offered: Spring 2020, Fall 2018, Fall 2016

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

Terms offered: Fall 2020, Summer 2020 First 6 Week Session, Spring 2020

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 3 Units

Terms offered: Fall 2020, Summer 2020 Second 6 Week Session, Fall 2019

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 - 3 hours of lecture per week

Summer: 6 weeks - 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

Terms offered: Fall 2020, Summer 2020 First 6 Week Session, Spring 2020

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, behavioral and self-assessments, case studies, class discussions, and lectures.

Leadership: Read More [+]

Rules & Requirements

Credit Restrictions: Students will receive no credit for UGBA 155 after completing UGBA W155. A deficient grade in UGBA 155 may be removed by taking UGBA W155.

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 C155 Leadership: Purpose, Authority, and Empowerment 3 Units

Terms offered: Summer 2020 10 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, behavioral and self-assessments, case studies, class discussions, and lectures.

Leadership: Purpose, Authority, and Empowerment: Read More [+]

Rules & Requirements

Credit Restrictions: Students will receive no credit for UGBA C155 after completing UGBA W155. A deficient grade in UGBA C155 may be removed by taking UGBA W155.

Hours & Format

Summer: 10 weeks - 4.5 hours of web-based lecture per week

Additional Details

Subject/Course Level: Undergrad. Business Administration/ Undergraduate

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

Also listed as: UGIS C151

Leadership: Purpose, Authority, and Empowerment: Read Less [-]

UGBA W155 Leadership: Purpose, Authority, and Empowerment 3 Units

Terms offered: Not yet offered

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, behavioral and self-assessments, case studies, class discussions, and lectures.

Leadership: Purpose, Authority, and Empowerment: Read More [+]

Rules & Requirements

Credit Restrictions: Students will receive no credit for UGBA W155 after completing UGBA 155. A deficient grade in UGBA W155 may be removed by taking UGBA 155.

Hours & Format

Summer: 10 weeks - 4.5 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. Alternative to final exam.

Instructor: Mulhern

Leadership: Purpose, Authority, and Empowerment: Read Less [-]

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

Terms offered: Fall 2020, Spring 2020, Fall 2019
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 without restriction.

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 Customer Insights 3 Units

Terms offered: Fall 2020, Summer 2020 First 6 Week Session, Spring 2020
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.
Customer Insights: 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.

Customer Insights: Read Less [-]

UGBA 161 Market Research: Tools and Techniques for Data Collection and Analysis 3 Units

Terms offered: Spring 2020, Spring 2019, Spring 2017
Information technology has allowed firms to gather and process large quantities of information about consumers' choices and reactions to marketing campaigns. However, few firms have the expertise to intelligently act on such information. This course addresses this shortcoming by teaching students how to use customer information to better market to consumers. In addition, the course addresses how information technology affects marketing strategy.
Market Research: Tools and Techniques for Data Collection and Analysis: 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.

Market Research: Tools and Techniques for Data Collection and Analysis: Read Less [-]

UGBA 162 Brand Management and Strategy 3 Units

Terms offered: Fall 2020, Summer 2020 First 6 Week Session, Spring 2020
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

Terms offered: Fall 2020, Fall 2019, Fall 2018
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 164 Marketing Strategy 3 Units

Terms offered: Spring 2020, Fall 2019, Spring 2019
This course specifically addresses how to deal with competition. Additionally, marketing managers usually have to make decisions with incomplete or unreliable information. In “Marketing Strategy” students learn how firms develop plans that can be updated in light of changing circumstances. The course covers the following topics: Market size estimation; Competitor identification and analysis; Internal analysis; Alternative business models; Risk identification, assessment and management using scenario planning; Handling unknown futures using sensitivity analysis; Price setting dynamics; Competitive tactics. The course utilizes a combination of lectures and cases. There are group presentations (self-selected teams) and some group projects.
Marketing 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. Alternative to final exam.

Marketing Strategy: Read Less [-]

UGBA 165 Advertising Strategy 3 Units

Terms offered: Summer 2020 First 6 Week Session, Fall 2019, Summer 2019 First 6 Week Session
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

Terms offered: Spring 2020, Fall 2019, Spring 2018
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 without restriction.

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 169 Pricing 3 Units

Terms offered: Fall 2019, Summer 2019 Second 6 Week Session, Fall 2018

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 C172 History of American Business 3 Units

Terms offered: Spring 2019, Spring 2017, Spring 2016

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

Formerly known as: American Studies C172, Business Administration C172

Also listed as: AMERSTD C172

History of American Business: Read Less [-]

UGBA 175 Legal Aspects of Management 3 Units

Terms offered: Fall 2020, Fall 2019, Fall 2018

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 Innovations in Communications and Public Relations 2 Units

Terms offered: Fall 2020, Fall 2019, Fall 2018

This course introduces students to public relations and how it is used by companies, non-profits and individuals to build and support their brands through innovative communication techniques. Students will hear from and have direct access to entrepreneurs and established executives who share insights on how they've used creative public relations campaigns and communications skills to create attention and value for their brand or avoid it in a crisis. They also learn to work in teams crafting effective media responses for an existing company needing real help now (not a case study). The semester ends with each student applying this technique to create their own personal brand that they can refine as they prepare to move into the workforce.

Innovations in Communications 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.

Innovations in Communications and Public Relations: Read Less [-]

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

Terms offered: Fall 2020, Spring 2016, Fall 2015
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 without restriction.

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

Terms offered: Fall 2020, Summer 2020 Second 6 Week Session, Spring 2020
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

Terms offered: Fall 2020, Spring 2020, Fall 2019
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

Terms offered: Spring 2020, Spring 2019, Spring 2018
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

Terms offered: Spring 2020, Spring 2019, Spring 2018
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

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

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 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 190C Collaborative Innovation 4 Units

Terms offered: Spring 2020
This is a project-based course in collaborative innovation where students experience group creativity and team-based design by using techniques from across the disciplines of business, theater, design, and art practice. Students will leverage problem framing and solving techniques derived from critical thinking, systems thinking, and creative problem solving (popularly known today as design thinking). The course is grounded in a brief weekly lecture that sets out the theoretical, historical, and cultural contexts for particular innovation practices, but the majority of the class involves hands-on studio-based learning guided by an interdisciplinary team of teachers leading small group collaborative projects.
Collaborative Innovation: Read More [+]
Rules & Requirements

Credit Restrictions: Students will receive no credit for UGBA 190C after completing ART 100, or THEATER 100. A deficient grade in UGBA 190C may be removed by taking ART 100, or THEATER 100.

Hours & Format

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

Additional Details

Subject/Course Level: Undergrad. Business Administration/ Undergraduate

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

Instructor: Beckman

Collaborative Innovation: Read Less [-]

UGBA 190D Innovation and Design Thinking in Business 2 Units

Terms offered: Fall 2020, Fall 2019
The goal of this course is to equip students with innovation skills and practices. This is a learn-by-doing lab. Students learn research methods, ethnography, analysis and synthesis, reflective thinking, scenario creation, ideation processes, rapid prototyping cycles and designing experiments, iterative design and how to tell the story of “Never Before Seen” ideas. Class time is spent using hands-on innovation and human-centered design practices. Teams present work for critique and iterative development. The course features short lectures, guest talks, campus-based fieldwork, site visits, research and readings. Projects will be launched in the sessions and each team will be coached and mentored.
Innovation and Design Thinking 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. Alternative to final exam.

Innovation and Design Thinking in Business: Read Less [-]

UGBA 190S Strategy for the Information Technology Firm 2 - 3 Units

Terms offered: Not yet offered
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 - 2-3 hours of lecture per week

Summer: 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.

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

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

Terms offered: Spring 2020, Fall 2019, Summer 2019 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 without restriction.

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 191C Communication for Leaders 2 Units

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

Terms offered: Fall 2020, Fall 2019, Fall 2018
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

Terms offered: Spring 2020, Fall 2019
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

Terms offered: Spring 2020, Spring 2019, Spring 2018
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

Terms offered: Spring 2020, Spring 2019, Spring 2018
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

Terms offered: Spring 2020, Spring 2019, Fall 2017
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

Terms offered: Spring 2020, Spring 2019, Spring 2018
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 192E Social Entrepreneurship 2 Units

Terms offered: Fall 2019
This course is designed to provide broad exposure to the theories and activities of social entrepreneurship. The inquiry is grounded in real-world examples that illustrate the topics and stimulate thinking, discussion, and learning. Working in groups, students develop a business plan or pitch deck for a social enterprise that addresses an issue that is of interest/ concern to the student team. Students with preexisting social enterprise ideas or plans that they would like to further develop and refine are welcomed and encouraged to use this class project as an opportunity to do so.
Social 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. Alternative to final exam.

Social Entrepreneurship: Read Less [-]

UGBA 192G Strategic Approaches for Global Social Impact 2 Units

Terms offered: Prior to 2007
The main objective of this course is to help students become effective practitioners in global development and understand career options in the global social sector. The course aims to (i) analyze the historical, sociological and statistical underpinnings of the major issues in global development (conflict, food security, human rights, poverty, health and education), (ii) understand what various organizations can contribute to each issue (government agencies, multilateral institutions, private foundations, NGOs, and private sector companies and entrepreneurs), and (iii) design and analyze approaches to addressing these issues.
Strategic Approaches for Global Social Impact: 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 required.

Strategic Approaches for Global Social Impact: Read Less [-]

UGBA 192H Managing Human Rights in Business 2 Units

Terms offered: Not yet offered
This course, one of the first of its kind offered at a business school, will prepare students for the growing field of practice at the intersection of business and human rights. Students will gain an overview of the international human rights framework and global business and human rights standards and guidelines; analyze the ways in which companies can impact human rights, and to assess the degree to which companies are and should be responsible for human rights impacts; learn to manage a company's human rights impacts as corporate human rights managers, external consultants, or civil society advocates; and practice the communication skills necessary to successfully address human rights issues within a complex multinational corporation.
Managing Human Rights 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 required.

Managing Human Rights in Business: Read Less [-]

UGBA 192L Applied Impact Evaluation 2 Units

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

Terms offered: Fall 2019, Spring 2019, Fall 2018
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 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

Terms offered: Fall 2020, Fall 2018, Fall 2016
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 192S Business and Sustainability 2 Units

Terms offered: Summer 2020 First 6 Week Session
This course—a mixture of lectures, readings, business cases and corporate speakers—uses theory, frameworks, tools and business cases to teach students how to systematically evaluate and implement sustainability strategies that also maintain or maximize financial returns. Students are taught to identify opportunities to create business value from environmental and social challenges, and to evaluate the competitive implications related to sustainability initiatives. What type of long-term strategies can organizations set to simultaneously foster sustainable development strategy and sound financial practice? How should decision makers make trade-offs between these two organizational objectives? When is “sustainability” also “good business”?
Business and Sustainability: 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.

Business and Sustainability: Read Less [-]

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

Terms offered: Fall 2020, Summer 2020 8 Week Session, Spring 2020
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 without restriction.

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

Terms offered: Fall 2020, Fall 2019, Fall 2018
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

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 4 - 6 Units

Terms offered: Summer 2019 8 Week Session, Summer 2018 Second 6 Week Session, Summer 2017 Second 6 Week Session
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

Fall and/or spring: 15 weeks - 4-6 hours of lecture per week

Summer: 5 weeks - 16-25 hours of lecture per week

Additional Details

Subject/Course Level: Undergrad. Business Administration/ Undergraduate

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

Business Abroad: Read Less [-]

UGBA 194 Undergraduate Colloquium on Business Topics 1 Unit

Terms offered: Spring 2020, Spring 2019, Spring 2018
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

Terms offered: Spring 2020, Fall 2019, Spring 2019
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 - 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: Read Less [-]

UGBA 195B Startup and Small-Business Consulting 2 Units

Terms offered: Not yet offered
This course is designed to provide students with an understanding of the concepts and principles for consulting with startups and small businesses. Students will work in self-created teams of 3-4 and can either bid for projects provided by the instructor, or source their own project so long as it fits the course criteria. Course time will include guest lecturers and consulting skills workshops. Student teams will be expected to meet together and with the client outside of class time.
Startup and Small-Business Consulting: 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.

Startup and Small-Business Consulting: Read Less [-]

UGBA 195P Entrepreneurship: How to Successfully start a New Business 3 Units

Terms offered: Fall 2019, Fall 2018, Fall 2017
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.
Entrepreneurship: How to Successfully start a New Business: 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.

Entrepreneurship: How to Successfully start a New Business: Read Less [-]

UGBA 195S Entrepreneurship To Address Global Poverty 3 Units

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

Terms offered: Spring 2020, Fall 2019, Spring 2019
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 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

Terms offered: Spring 2020, Fall 2019, Spring 2019
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

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 without restriction.

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

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 without restriction.

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 [-]