Engineering (ENGIN)

Courses

ENGIN 7 Introduction to Computer Programming for Scientists and Engineers 4 Units
Elements of procedural and object-oriented programming. Induction, iteration, and recursion. Real functions and floating-point computations for engineering analysis. Introduction to data structures. Representative examples are drawn from mathematics, science, and engineering. The course uses the MATLAB programming language. Sponsoring departments: Civil and Environmental Engineering and Mechanical Engineering.
Rules & Requirements

Prerequisites: Mathematics 1B (maybe taken concurrently)

Credit Restrictions: Students will receive no credit for Engineering 7 after completing Engineering W7. A deficient grade in Engineering W7 may be repeated by taking Engineering 7.

Hours & Format

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

Summer: 10 weeks - 3 hours of lecture, 1.5 hours of discussion, and 6 hours of laboratory per week

Additional Details

Subject/Course Level: Engineering/Undergraduate

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

Formerly known as: 77

ENGIN W7 Introduction to Computer Programming for Scientists and Engineers 4 Units
Elements of procedural and object-oriented programming. Induction, iteration, and recursion. Real functions and floating-point computations for engineering analysis. Introduction to data structures. Representative examples are drawn from mathematics, science, and engineering. The course uses the MATLAB programming language.
Rules & Requirements

Prerequisites: Mathematics 1B (may be taken concurrently)

Credit Restrictions: Students will receive no credit for Engineering W7 after completing Engineering 7 or 77. A deficient grade in Engineering 7 or 77 may be removed by taking Engineering W7.

Hours & Format

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

Summer: 10 weeks - 6 hours of web-based lecture and 7.5 hours of web-based discussion per week

Online: This is an online course.

Additional Details

Subject/Course Level: Engineering/Undergraduate

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

Instructor: Papadopoulos

ENGIN 10 Engineering Design and Analysis 3 Units
This is a is an introduction to the profession of engineering and its different disciplines through a variety of individual design and analysis projects. Hands on creativity,teamwork, and effective communication are emphasized. Common lecture sessions address the essence of engineering design, the practice of engineering analysis, the societal context for engineering projects and the ethics of the engineering profession. Students develop design and analysis skills, and practice applying these skills to illustrative problems drawn from various mechanical engineering topics such as material testing,aerodynamics, controls and design.
Objectives Outcomes

Course Objectives: Develop teamwork skills.
Emphasize communication skills, both written and oral.
Enhance students critical thinking and design skills.
Introduce students to a broad view of engineering analysis and design.
Introduce students to professional ethics and the societal context of engineering practice.
Offer experience in hands on,creative engineering projects.
Provide an introduction to different fields of engineering.
Reinforce the importance of mathematics and science in engineering design and analysis.

Student Learning Outcomes: Appreciate the importance of professional and ethical responsibility in engineering.
Begin to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
Begin to use the techniques, skills, and engineering tools necessary for contemporary and future engineering practice.

Develop early abilities identifying, formulating, and solving engineering problems.
Gain experience in working in multidisciplinary teams.
Obtain experience in effective communication.
Recognize the role of mathematics and science in engineering.
Understand the design of systems, components, and processes to meet desired needs within realistic constraints.

Hours & Format

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

Additional Details

Subject/Course Level: Engineering/Undergraduate

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

ENGIN 15 Design Methodology 2 Units
Introduction to design methodology, problem definition, and the search for creative solutions. Social, political, legal, and ethical aspects of design solutions. Topics and discussions include the structure of engineering organizations, the product development cycle, mechanical dissection, reverse engineering, patents, failure case studies, product liability, and engineering ethics.
Objectives Outcomes

Course Objectives: To introduce the engineering design process, its scope, and its limitations. To have students understand the responsibilities of an engineer for designs that are created.

Student Learning Outcomes: The ability to use methodical techniques to identify engineering problems and develop practical solutions.
The ability to work effectively in a team environment.

Hours & Format

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

Additional Details

Subject/Course Level: Engineering/Undergraduate

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

Instructor: Lieu

ENGIN 24 Freshman Seminar 1 Unit
The Berkeley Seminar Program is designed to provide students with the opportunity to explore an intellectual topic with a faculty member in a small seminar setting. Berkeley Seminars are offered in all college departments, and topics vary from department to department and semester to semester.
Rules & Requirements

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

Hours & Format

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

Additional Details

Subject/Course Level: Engineering/Undergraduate

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

ENGIN 25 Visualization for Design 2 Units
Development of 3-dimensional visualization skills for engineering design. Sketching as a tool for design communication. Presentation of 3-dimensional geometry with 2-dimensional engineering drawings. This course will introduce the use of 2-dimensional CAD on computer workstations as a major graphical analysis and design tool. A group design project is required. Teamwork and effective communication are emphasized.

Objectives Outcomes

Course Objectives: Improve 3-dimensional visualization skills; enable a student to create and understand engineering drawings; introduce 2-dimensional computer-aided geometry modeling as a visualization, design, and analysis tool; enhance critical thinking and design skills; emphasize communication skills, both written and oral; develop teamwork skills; offer experience in hands-on engineering projects; develop early abilities in identifying, formulating, and solving engineering problems; introduce students to the societal context of engineering practice.

Student Learning Outcomes: Upon completion of the course, students shall be able to communicate 3-dimensional geometry effectively using sketches; operate 2-dimensional CAD software with a high degree of skill and confidence; understand and create engineering drawings; visualize 3-dimensional geometry from a series of 2-dimensional drawings.

Rules & Requirements

Credit Restrictions: Students will receive no credit for Engineering 25 after completing both Engineering 10 and 28.

Hours & Format

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

Additional Details

Subject/Course Level: Engineering/Undergraduate

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

Instructors: Lieu, McMains

ENGIN 26 Three-Dimensional Modeling for Design 2 Units
Three-dimensional modeling for engineering design. This course will emphasize the use of CAD on computer workstations as a major graphical analysis and design tool. Students develop design skills, and practice applying these skills. A group design project is required. Hands-on creativity, teamwork, and effective communication are emphasized.

Objectives Outcomes

Course Objectives: Introduce computer-based solid, parametric, and assembly modeling as a tool for engineering design; enhance critical thinking and design skills; emphasize communication skills, both written and oral; develop teamwork skills; offer experience in hands-on, creative engineering projects; reinforce the societal context of engineering practice; develop early abilities in identifying, formulating, and solving engineering problems.

Student Learning Outcomes: Upon completion of the course, students shall be able to operate 3-dimensional solid modeling software tools with a high degree of skill and confidence; specify dimensions for parts and assemblies such that they can be fabricated, and fit such that they function with the desired result; produce rapid-prototype models of parts and assemblies to demonstrate their desired functionality; understand the design of systems, components, and processes to meet desired needs within realistic constraints.

Rules & Requirements

Prerequisites: None

Credit Restrictions: Students will receive no credit for Engineering 26 after completing Engineering 10 and 28.

Hours & Format

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

Additional Details

Subject/Course Level: Engineering/Undergraduate

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

Instructors: Lieu, McMains, Youssefi

ENGIN 27 Introduction to Manufacturing and Tolerancing 2 Units
Geometric dimensioning and tolerancing (GD&T), tolerance analysis for fabrication, fundamentals of manufacturing processes (metal cutting, welding, joining, casting, molding, and layered manufacturing).
Objectives Outcomes

Course Objectives: Enable a student to create and understand tolerances in engineering drawings; enhance critical thinking and design skills; emphasize communication skills, both written and oral; offer hands-on experience in manufacturing; develop abilities in identifying, formulating, and solving engineering problems; introduce students to the context of engineering practice.

Student Learning Outcomes: Upon completion of the course, students shall be able to fabricate basic parts in the machine shop; understand and communicate tolerance requirements in engineering drawings using industry standard GD&T; use metrology tools to evaluate if physical parts are within specified tolerances; demonstrate familiarity with manufacturing processes; and design parts that can be fabricated realistically and economically using these processes.

Rules & Requirements

Prerequisites: Engineering 25 (can be taken concurrently)

Hours & Format

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

Additional Details

Subject/Course Level: Engineering/Undergraduate

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

Instructors: McMains, Lieu, Dornfeld, Taylor

ENGIN 28 Basic Engineering Design Graphics 3 Units
Introduction to the engineering design process and graphical communications tools used by engineers. Conceptual design of products. Tolerance analysis for fabrication. Documentation of design through engineering drawing. Development of spatial reasoning skills. Basic descriptive geometry. Parametric solid modeling and feature based design. Use of Computer-Assisted Design as a design tool.
Hours & Format

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

Additional Details

Subject/Course Level: Engineering/Undergraduate

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

Instructor: Lieu

ENGIN 39B Freshman/Sophomore Seminar 1.5 - 4 Units
Freshman and sophomore seminars offer lower division students the opportunity to explore an intellectual topic with a faculty member and a group of peers in a small-seminar setting. These seminars are offered in all campus departments; topics vary from department to department and from semester to semester. Enrollment limits are set by the faculty, but the suggested limit is 25.
Rules & Requirements

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

Hours & Format

Fall and/or spring: 15 weeks - 1.5-4 hours of seminar per week

Additional Details

Subject/Course Level: Engineering/Undergraduate

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

ENGIN 39E Freshman/Sophomore Seminar 1.5 - 4 Units
Freshman and sophomore seminars offer lower division students the opportunity to explore an intellectual topic with a faculty member and a group of peers in a small-seminar setting. These seminars are offered in all campus departments; topics vary from department to department and from semester to semester. Enrollment limits are set by the faculty, but the suggested limit is 25.
Rules & Requirements

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

Hours & Format

Fall and/or spring: 15 weeks - 1.5-4 hours of seminar per week

Additional Details

Subject/Course Level: Engineering/Undergraduate

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

ENGIN 39F Freshman/Sophomore Seminar 1.5 - 4 Units
Freshman and sophomore seminars offer lower division students the opportunity to explore an intellectual topic with a faculty member and a group of peers in a small-seminar setting. These seminars are offered in all campus departments; topics vary from department to department and from semester to semester. Enrollment limits are set by the faculty, but the suggested limit is 25.
Rules & Requirements

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

Hours & Format

Fall and/or spring: 15 weeks - 1.5-4 hours of seminar per week

Additional Details

Subject/Course Level: Engineering/Undergraduate

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

ENGIN 45 Properties of Materials 3 Units
Application of basic principles of physics and chemistry to the engineering properties of materials. Special emphasis devoted to relation between microstructure and the mechanical properties of metals, concrete, polymers, and ceramics, and the electrical properties of semiconducting materials. Sponsoring Department: Materials Science and Engineering
Rules & Requirements

Prerequisites: PHYSICS 7A (http://guide.berkeley.edu/search/?P=PHYSICS%207A)

Hours & Format

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

Additional Details

Subject/Course Level: Engineering/Undergraduate

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

ENGIN 47 Supplementary Work in Lower Division Engineering 1 - 3 Units
May be taken only with permission of the Dean of the College of Engineering. Students with partial credit in a lower division engineering course may complete the work under this heading.
Rules & Requirements

Prerequisites: Limited to students who must make up a fraction of a required lower division course

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

Hours & Format

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

Summer: 8 weeks - 1.5-5.5 hours of independent study per week

Additional Details

Subject/Course Level: Engineering/Undergraduate

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

ENGIN 92 Perspectives in Engineering 1 Unit
This series of lectures provides students, especially undeclared Engineering students, with information on the various engineering disciplines to guide them toward choice of major. Lecturers describe research activities, how they made their own career choices, and indicate future opportunities. Recommended for all Engineering Science students and required for Engineering undeclared students.
Rules & Requirements

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

Hours & Format

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

Additional Details

Subject/Course Level: Engineering/Undergraduate

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

ENGIN 93 Energy Engineering Seminar 1 Unit
Weekly seminar with different speakers on energy-related topics. The goal is to expose students to a broad range of energy issues.
Hours & Format

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

Additional Details

Subject/Course Level: Engineering/Undergraduate

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

Instructor: Zohdi

ENGIN 98 Directed Group Studies for Lower Division Undergraduates 1 - 4 Units
Seminars for group study of selected topics, which will vary from year to year. Intended for students in the lower division.
Rules & Requirements

Prerequisites: Consent of instructor

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

Hours & Format

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

Summer:
6 weeks - 2.5-10 hours of directed group study per week
8 weeks - 1.5-7.5 hours of directed group study per week
10 weeks - 1.5-6 hours of directed group study per week

Additional Details

Subject/Course Level: Engineering/Undergraduate

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

ENGIN 115 Engineering Thermodynamics 4 Units
Fundamental laws of thermodynamics for simple substances; application to flow processes and to nonreacting mixtures; statistical thermodynamics of ideal gases and crystalline solids; chemical and materials thermodynamics; multiphase and multicomponent equilibria in reacting systems; electrochemistry. Sponsoring Departments: Materials Science and Engineering and Nuclear Engineering.
Rules & Requirements

Prerequisites: PHYSICS 7B (http://guide.berkeley.edu/search/?P=PHYSICS%207B), MATH 54 (http://guide.berkeley.edu/search/?P=MATH%2054); Chemistry 1B recommended

Credit Restrictions: Students will receive no credit for Engineering 115 after taking Mechanical Engineering 105 or Chemical Engineering 141.

Hours & Format

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

Additional Details

Subject/Course Level: Engineering/Undergraduate

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

Instructors: Glaeser, Olander

ENGIN 117 Methods of Engineering Analysis 3 Units
Methods of theoretical engineering analysis; techniques for analyzing partial differential equations and the use of special functions related to engineering systems. Sponsoring Department: Mechanical Engineering.
Rules & Requirements

Prerequisites: Mathematics 53, 54

Hours & Format

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

Additional Details

Subject/Course Level: Engineering/Undergraduate

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

ENGIN 120 Principles of Engineering Economics 3 Units
Economic analysis for engineering decision making: Capital flows, effect of time and interest rate. Different methods of evaluation of alternatives. Minimum-cost life and replacement analysis. Depreciation and taxes. Uncertainty; preference under risk; decision analysis. Capital sources and their effects. Economic studies.
Rules & Requirements

Prerequisites: Completion of 60 units of an approved engineering curriculum

Credit Restrictions: Students will receive 2 units for 120 after taking Civil Engineering 167.

Hours & Format

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

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

Additional Details

Subject/Course Level: Engineering/Undergraduate

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

Instructor: Adler

ENGIN 125 Ethics, Engineering, and Society 3 Units
How should engineers analyze and resolve the ethical issues inherent in engineering? This seminar-style course provides an introduction to how theories, concepts, and methods from the humanities and social science can be applied to ethical problems in engineering. Assignments incorporate group and independent research designed to provide students an opportunity to contribute novel findings to the emerging field of engineering ethics while building their analytical and communication skills. This course cannot be used to fulfill any engineering technical requirements (units or courses).
Hours & Format

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

Summer:
6 weeks - 5 hours of lecture and 3 hours of discussion per week
8 weeks - 4 hours of lecture and 2 hours of discussion per week

Additional Details

Subject/Course Level: Engineering/Undergraduate

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

ENGIN 128 Advanced Engineering Design Graphics 3 Units
Advanced graphics tools for engineering design. Parametric solid modeling. Assembly modeling. Presentation using computer animation and multimedia techniques.
Rules & Requirements

Prerequisites: 28

Hours & Format

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

Additional Details

Subject/Course Level: Engineering/Undergraduate

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

Instructor: Lieu

ENGIN 147 Supplementary Work in Upper Division Engineering 1 - 3 Units
May be taken only with permission of the Dean of the College of Engineering. Students with partial credit in an upper division engineering course may complete the work under this heading.
Rules & Requirements

Prerequisites: Limited to students who must make up a fraction of a required upper division course

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

Hours & Format

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

Additional Details

Subject/Course Level: Engineering/Undergraduate

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

ENGIN 157AC Engineering, The Environment, and Society 4 Units
This course engages students at the intersection of environmental justice, social justice, and engineering to explore how problems that are commonly defined in technical terms are at their roots deeply socially embedded. Through partnerships with community-based organizations, students are trained to recognize the socio-political nature of technical problems so that they may approach solutions in ways that prioritize social justice. Topics covered include environmental engineering as it relates to air, water, and soil contamination; race, class, and privilege; expertise; ethics; and engaged citizenship. This course cannot be used to complete any engineering technical or unit requirements.
Hours & Format

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

Additional Details

Subject/Course Level: Engineering/Undergraduate

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

Also listed as: IAS 157AC

ENGIN 177 Advanced Programming with MATLAB 3 Units
The course builds an understanding, demonstrates engineering uses, and provides hand-on experience for object-oriented programming as well as exposes a practical knowledge of advanced features available in MATLAB. The course will begin with a brief review of basic MATLAB features and quickly move to class organization and functionality. The introduced concepts are reinforced by examining the advanced graphical features of MATLAB. The material will also include the effective use of programs written in C and FORTRAN, and will cover SIMULINK, a MATLAB toolbox providing for an effective ways of model simulations. Throughout the course, the emphasis will be placed on examples and homework assignments from engineering disciplines.
Rules & Requirements

Prerequisites: 7 or 77; Mathematics 53 and 54 (one of these may be taken concurrently)

Hours & Format

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

Additional Details

Subject/Course Level: Engineering/Undergraduate

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

Instructors: Frenklach, Packard

ENGIN 194 Undergraduate Research 3 Units
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. Final report and presentation required.
Rules & Requirements

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

Repeat rules: Course may be repeated for credit, but only three units may be used toCourse may be repeated for credit, but only three units may be used to satisfy a technical elective. satisfy a technical elective. Course may be repeated for credit when topic changes.

Hours & Format

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

Additional Details

Subject/Course Level: Engineering/Undergraduate

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

ENGIN 198 Directed Group Studies for Advanced Undergraduates 1 - 4 Units
Group study of selected topics.
Rules & Requirements

Prerequisites: Upper division standing, plus particular courses to be specified by instructor

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

Hours & Format

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

Summer: 8 weeks - 1.5-7.5 hours of directed group study per week

Additional Details

Subject/Course Level: Engineering/Undergraduate

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

ENGIN 201 Ocean Engineering Seminar 2 or 3 Units
Lectures on new developments in ocean, arctic engineering. The optional third unit covers the analysis and design of arctic structures for ice structure interaction. The additional unit will require that students meet with the instructor one extra hour per week to work on an individual project. Topics covered: ice mechanics, determination of global and local forces, and other ice actions on structures. Term paper required. Sponsoring department: Engineering Interdisciplinary Studies.
Rules & Requirements

Prerequisites: Enrollment in Ocean Engineering Master of Engineering Program or consent of instructor

Hours & Format

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

Additional Details

Subject/Course Level: Engineering/Graduate

Grading: Letter grade.

ENGIN 230 Methods of Applied Mathematics 3 Units
Topics include complex variable methods, contour integration, solution of Laplace's equation via analytic function theory; asymptotic methods for evaluating integrals and solving differential equations; introduction to calculus of variations with applications; introductory integral equations. The course is intended to expose students in engineering and physical sciences to a range of methods for solving equations associated with mathematical models of physical processes.
Rules & Requirements

Prerequisites: Mathematics 54 or equivalent. Engineering 117 or equivalent is desirable but not mandatory

Hours & Format

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

Additional Details

Subject/Course Level: Engineering/Graduate

Grading: Letter grade.

Instructor: Steigmann

ENGIN 231 Mathematical Methods in Engineering 3 Units
This course offers an integrated treatment of three topics essential to modern engineering: linear algebra, random processes, and optimization. These topics will be covered more rapidly than in separate undergraduate courses covering the same material, and will draw on engineering examples for motivation. The stress will be on proofs and computational aspects will also be highlighted. It is intended for engineering students whose research focus has a significant mathematical component, but who have not previously had a thorough exposure to these topics.
Rules & Requirements

Prerequisites: MATH 1A (http://guide.berkeley.edu/search/?P=MATH%201A)-1B, 53 and 54 or equivalent

Hours & Format

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

Additional Details

Subject/Course Level: Engineering/Graduate

Grading: Letter grade.

Instructors: Packard, Poolla

ENGIN C233 Applications of Parallel Computers 3 Units
Models for parallel programming. Fundamental algorithms for linear algebra, sorting, FFT, etc. Survey of parallel machines and machine structures. Exiting parallel programming languages, vectorizing compilers, environments, libraries and toolboxes. Data partitioning techniques. Techniques for synchronization and load balancing. Detailed study and algorithm/program development of medium sized applications.
Rules & Requirements

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

Hours & Format

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

Additional Details

Subject/Course Level: Engineering/Graduate

Grading: Letter grade.

Instructors: Demmel, Yelick

Also listed as: COMPSCI C267

ENGIN 266A Finite Difference Methods for Fluid Dynamics 4 Units
Application of finite difference methods to current problems of fluid dynamics, including compressible and incompressible flow. Sponsoring department: Mechanical Engineering.
Rules & Requirements

Prerequisites: A graduate-level course in fluid dynamics or numerical methods for differential equations, or consent of instructor

Hours & Format

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

Additional Details

Subject/Course Level: Engineering/Graduate

Grading: Letter grade.

Instructor: Marcus

Formerly known as: 266

ENGIN 266B Spectral Methods for Fluid Dynamics 4 Units
Application of spectral methods to current problems of fluid dynamics, including compressible and incompressible flow. Sponsoring department: Mechanical Engineering.
Rules & Requirements

Prerequisites: A graduate-level course in fluid dynamics or numerical methods for differential equations, or consent of instructor

Hours & Format

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

Additional Details

Subject/Course Level: Engineering/Graduate

Grading: Letter grade.

Instructor: Marcus

Formerly known as: 266

ENGIN 271 Engineering Leadership I 3 Units
Designed for professionally-oriented engineering graduate students, this course explores key management and leadership concepts relevant to technology-dependent enterprises. Topics include opportunity recognition, strategies for effective R and D, marketing innovation, disruption, cognitive inertia, product management, market selection, standards wars, two-sided markets, attracting stakeholders, business models, pricing strategies.
Rules & Requirements

Prerequisites: Admission to the MEng Program

Hours & Format

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

Additional Details

Subject/Course Level: Engineering/Graduate

Grading: Letter grade.

Instructors: Flemming, Lee

ENGIN 272 Engineering Leadership II 3 Units
Designed for professionally-oriented engineering graduate level students, this course explores key operational, leadership, and financial concepts relevant to technology-dependent enterprises. Topics include methods to go to market, direct and indirect sales, logistics, talent management, managing creativity, project management, leadership styles, CFO-style interpretation of financial statements, funding sources, budgeting, and valuation methods.
Rules & Requirements

Prerequisites: Admission to MEng Program and 271

Hours & Format

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

Additional Details

Subject/Course Level: Engineering/Graduate

Grading: Letter grade.

ENGIN C282 Charged Particle Sources and Beam Technology 3 Units
Topics in this course will include the latest technology of various types of ion and electron sources, extraction and formation of charge particle beams, computer simulation of beam propagation, diagnostics of ion sources and beams, and the applications of beams in fusion, synchrotron light source, neutron generation, microelectronics, lithography, and medical therapy. This is a general accelerator technology and engineering course that will be of interest to graduate students in physics, electrical engineering, and nuclear engineering.
Hours & Format

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

Additional Details

Subject/Course Level: Engineering/Graduate

Grading: Letter grade.

Instructors: Leung, Steier

Also listed as: NUC ENG C282

ENGIN 290 Special Topics in Management of Technology 2 or 3 Units
Specific topics, hours and units of credit will vary from section to section, year to year. Courses are related classes in the Management of Technology certificate program.
Rules & Requirements

Prerequisites: Graduate standing

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

Hours & Format

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

Additional Details

Subject/Course Level: Engineering/Graduate

Grading: Letter grade.

ENGIN 290A Introduction to Management of Technology 3 Units
This course is designed to give students a broad overview of the main topics encompassed by management of technology. It includes the full chain of innovative activities beginning with research and development and extending through production and marketing. Why do many existing firms fail to incorporate new technology in a timely manner? At each stage of innovation, we examine key factors determining successful management of technology. What constitutes a successful technology strategy? The integrating course focus will be on the emergence of the knowledge economy and technology as a key knowledge asset and will involve both general readings and cases. The course also introduces students to Haas and COE faculty working in the relevant areas.
Hours & Format

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

Additional Details

Subject/Course Level: Engineering/Graduate

Grading: Letter grade.

Instructor: Proctor

ENGIN 290B Biotechnology: Industry Perspectives and Business Development 2 Units
This course is designed to examine the strategic issues that confront the management of the development stage biotech company, i.e., after its start-up via an initial capital infusion, but before it might be deemed successful (e.g., by virtue of a product launch), or otherwise has achieved "first-tier" status. Thus, the intention is to study the biotech organization during the process of it growth and maturation from an early stage existence through "adolescence" into an "adult" company. The focus of the class will be on business development, i.e., the deal making that must occur to accomplish the corporate objectives of bringing in new technologies and getting the initial products to market. We will explore the critical deal issues from both the perspective of the development stage company and the viewpoint of the larger, more mature biotech or big pharma company with which it seeks to partner.
Rules & Requirements

Credit Restrictions: Students will receive no credit for 290E after taking Master of Business Administration 290B or Evening Weekend Master of Business Administration 290B.

Hours & Format

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

Additional Details

Subject/Course Level: Engineering/Graduate

Grading: Letter grade.

Instructors: Hoover, Sanders

ENGIN 290E Marketing Emerging Technologies 3 Units
The primary goal of this course is to develop in the student the marketing skills needed to compete aggressively as an entrepreneur in technology fields. Upon completion of the course, the student should have developed the following skills: the ability to assess and predict customer needs in markets that may not yet exist; the ability to create and execute marketing plans that necessarily integrate sophisticated technological development with rapidly evolving customer requirements; the ability to create and grow a focused marketing organization rapidly and efficiently; and the ability to create and use marketing communications to reach prospects, customers, OEMs, and sales channels efficiently and inexpensively.
Rules & Requirements

Credit Restrictions: Students will receive no credit for 290E after taking Master of Business Administration 290E.

Hours & Format

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

Additional Details

Subject/Course Level: Engineering/Graduate

Grading: Letter grade.

Instructor: Isaacs

ENGIN 290G International Trade and Competition in High Technology 3 Units
This course seeks to make sense of, inter alia, the decline and prospective recovery of U.S. high-technology industries, the evolution of innovation and technology strategies and policies in Western Europe and Asia, the historic and current roles of governments in shaping markets for high-technology goods, and the impact on business strategies of recent developments in early-stage capital markets. Our general approach views technological innovation and competition as dynamic processes that reflect previous choices made by firms and governments. Modern technologies develop in markets that are international scope, often imperfectly competitive, and subject to influence by a variety of economic and political stakeholders. We will use an eclectic mix of theoretical, historical, and practical perspectives throughout the course in examining these issues, although no special familarity with any of these is assumed. From time to time, we will be joined by venture capitalists, corporate executives, and technologists engaged in global high-technology markets for discussion of these issues.
Rules & Requirements

Credit Restrictions: Students will receive no credit for 290G after taking Master of Business Administration 290G.

Hours & Format

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

Additional Details

Subject/Course Level: Engineering/Graduate

Grading: Letter grade.

Instructor: Wu

ENGIN 290H Management of Technology - Doing Business in China 2 Units
This course prepares students to found a startup business in China or to work with an MNC in China, develops their critical analysis and strategic decision tools and skills needed to compete in the world's most dynamic emerging market, and provides access and useful introductions/Guanxi to aid future business development in China.
Rules & Requirements

Credit Restrictions: Students will receive no credit for 290H after taking Master of Business Administration 290H.

Hours & Format

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

Additional Details

Subject/Course Level: Engineering/Graduate

Grading: Letter grade.

Instructor: Sanderson

ENGIN 290J Entrepreneurship in Biotechnology 2 Units
This course will provide students an introduction to the complexities and unique problems of starting a life sciences company. It is designed for both entrepreneurs and students who may someday work in a biotechnology or medical device startup. Students will be exposed to the topics most critical for successfully founding, financing, and operating a life science company, and will be expected to perform many of the same tasks that founders would normally undertake. Discussions with life-science entrepreneurs, case studies of recent companies, and hands-on work developing entrepreneurial endeavors will all be utilized.
Hours & Format

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

Additional Details

Subject/Course Level: Engineering/Graduate

Grading: Letter grade.

Instructor: Lasky

ENGIN 290O Opportunity Recognition: Technology and Entrepreneurship in Silicon Valley 3 Units
This course is intended to provide the core skills needed for the identification of opportunities that can lead to successful, entrepreneurial high technology ventures, regardless of the individual's "home" skill set, whether technical or managerial. We examine in depth the approaches most likely to succeed for entrepreneurial companies as a function of markets and technologies. Emphasis is placed on the special requirements for creating and executing strategy in a setting of rapid technological change and limited resources. This course is open to both MBA and Engineering students (who enroll through the College of Engineering), and is particularly suited for those who anticipate founding or operating technology companies.
Hours & Format

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

Additional Details

Subject/Course Level: Engineering/Graduate

Grading: Letter grade.

ENGIN 290P Project Management 2 Units
This course will provide you with a comprehensive view of the elements of modern project management, guidelines for success, and related tools. In organizations today, successful operations keep the organization alive and successful projects move it towards strategic objectives. A project is a one-time or infrequently occurring operation with a unique goal, limited lifespan, and limited resources. The fundamental concepts come from the field of operations management, but projects present special types of operations because of their intended focus, limited lives, constraints, and uncertainties. In organizations today, projects are many, diverse, and frequently overlapping.
Hours & Format

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

Additional Details

Subject/Course Level: Engineering/Graduate

Grading: Letter grade.

ENGIN 290S Supply Chain Management 3 Units
This course involves the flows of materials and information among all of the firms that contribute value to a product, from the source of raw materials to end customers. Elements of supply chain management have been studied and practiced for some time in marketing, logtistics, and operations management. We will attempt to integrate these different perspectives to develop a broad understanding of how to manage a supply change. This course will focus on effective supply chain strategies for companies that operate globally with emphasis on how to plan and integrate supply chain components into a coordinated system. You will be exposed to concepts and models important in supply chain planning with emphasis on key trade offs and phenomena. The course will introduce and utilize key tactics such as risk pooling and inventory placement, integrated planning and collaboration, and information sharing. Lectures, Internet simulations, computer exercises, and case discussions introduce various models and methods for supply chain analysis and optimization.
Rules & Requirements

Credit Restrictions: Students will receive no credit for 290S after taking Master of Business Administration 248A or Evening Weekend Master of Business Administration 248A.

Hours & Format

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

Additional Details

Subject/Course Level: Engineering/Graduate

Grading: Letter grade.

Instructor: Angelus

ENGIN 295 Master of Engineering Capstone Integration 1 Unit
Engineering leadership principles integrated with concurrent technical capstone projects for Master of Engineering students. Students enroll in this supplementary course while they are enrolled in Engineering 296M, Capstone project, with their technical department capstone advisor. This project-based course will apply communication skills, management principles, and leadership concepts to the capstone project.
Rules & Requirements

Repeat rules: Course may be repeated a maximum of 2 times.

Hours & Format

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

Summer:
6 weeks - 2.5 hours of lecture and 1 hour of discussion per week
8 weeks - 1.5 hours of lecture and 1 hour of discussion per week

Additional Details

Subject/Course Level: Engineering/Graduate

Grading: Letter grade.

Instructors: Fleming, Keaveny

ENGIN 296MA Master of Engineering Capstone Project 2 Units
This course is the first of a sequence of two capstone project courses for candidates of the Masters of Engineering degree. Students engage in professionally oriented independent or group research or study under the supervision of a research advisor. The research and study synthesizes the technical, environmental, economic, and social issues involved in the design and operation of complex engineering devices, systems, and organization.
Rules & Requirements

Prerequisites: Acceptance into the Master of Engineering program

Hours & Format

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

Additional Details

Subject/Course Level: Engineering/Graduate

Grading: Letter grade. This is part one of a year long series course. A provisional grade of IP (in progress) will be applied and later replaced with the final grade after completing part two of the series.

ENGIN 296MB Master of Engineering Capstone Project 3 Units
This course is the second of a sequence of two capstone project courses for candidates of the Masters of Engineering degree. Students engage in professionally oriented independent or group research or study under the supervision of a research advisor. The research and study synthesizes the technical, environmental, economic, and social issues involved in the design and operation of complex engineering devices, systems, and organizations.
Rules & Requirements

Prerequisites: 296MA

Hours & Format

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

Additional Details

Subject/Course Level: Engineering/Graduate

Grading: Letter grade. This is part two of a year long series course. Upon completion, the final grade will be applied to both parts of the series.

ENGIN 298A Group Studies or Seminars 1 - 6 Units
Advanced group studies or seminars in subjects which are interdisciplinary in the various fields of engineering or other sciences associated with engineering problems. Topics which form the basis of seminars will be announced at the beginning of each semester.
Rules & Requirements

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

Hours & Format

Fall and/or spring: 15 weeks - 1-6 hours of seminar per week

Additional Details

Subject/Course Level: Engineering/Graduate

Grading: Letter grade.

ENGIN 298B Group Studies or Seminars 1 - 6 Units
Advanced group studies or seminars in subjects which are interdisciplinary in the various fields or engineering or other sciences associated with engineering problems. Topics which form the basis of seminars will be announced at the beginning of each semester.
Rules & Requirements

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

Hours & Format

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

Additional Details

Subject/Course Level: Engineering/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.