Design -- EPICS
(Engineering Practices Introductory Course Sequence)

Design EPICS is designed to prepare students for their upper-division courses and to develop some of the key skills of the professional engineer: the ability to solve complex, open-ended problems, the ability to work in teams, the ability to select a solution from competing alternatives, and the ability to communicate effectively. The first semester course, EPIC151, is required by all undergraduate options. The second semester course, EPIC251, is required by all undergraduate engineering options according to ABET requirements. EPIC251 is not required for majors in Chemistry, Applied Mathematics and Statistics, Electrical Engineering and Computer Science, Mechanical Engineering, and Economics and Business.

An award-winning program, Design EPICS replaces the traditional core courses in introductory computing skills, graphics, and technical communication. Whenever possible, instruction in these subjects is "hands-on" and experimental, with the instructor serving as both mentor and lecturer.

Problem-solving skills are developed through open-ended design problems organized as semester-long "projects," which the students solve in teams. Projects grow in content and complexity as the program applies a guided methodology to projects submitted by an external client. The projects require extensive library research and self-education in appropriate technical areas; they also require students to consider non-technical constraints (economic, ethical, political, societal, etc.) and incorporate them into their solutions.

Written and oral communications skills are studied and practiced as an integral part of the project work. Specific graphics and computing skills are integrated within projects wherever applicable.

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Courses

EPIC151. DESIGN (EPICS) I. 3.0 Semester Hrs.
(I,I,S). Design EPICS I introduces students to a design process that includes open-ended problem solving and teamwork integrated with the use of computer software as tools to solve engineering problems. Computer applications emphasize graphical visualization and production of clear and coherent graphical images, charts, and drawings. Teams assess engineering ethics, group dynamics and time management with respect to decisionmaking. The course emphasizes written technical communications and introduces oral presentations. 3 semester hours.

EPIC155. EPICS I GRAPHICS. 1.0 Semester Hr.
(I,I). Instruction and practice in mechanical sketching and computer-aided drafting methods. Specific lessons include perspective sketching, geometric construction, isometric and orthographic views, dimensions, and sections. Homework is assigned weekly. Each unit culminates in one in-class proficiency examination or extended written assignment, plus one capstone design portfolio. Prerequisites: None. 1 hour lecture, 1 hour laboratory, 1 semester hour.

EPIC198. SPECIAL TOPICS. 1-6 Semester Hr.
(I, II) Pilot course or special topics course. Topics chosen from special interests of instructor(s) and student(s). Usually the course is offered only once. Prerequisite: none. Variable credit; 1 to 6 credit hours. Repeatable for credit under different titles.

EPIC199. INDEPENDENT STUDY. 1-6 Semester Hr.
(I, II) Individual research or special problem projects supervised by a faculty member, also, when a student and instructor agree on a subject matter, content, and credit hours. Prerequisite: ?Independent Study? form must be completed and submitted to the Registrar. Variable credit; 1 to 6 credit hours. Repeatable for credit.

EPIC251. DESIGN (EPICS) II. 3.0 Semester Hrs.
(I,I,S). Design EPICS II builds on the design process introduced in Design EPICS I, which focuses on open-ended problem solving in which students integrate teamwork and communications with the use of computer software as tools to solve engineering problems. Computer applications emphasize information acquisition and processing based on knowing what new information is necessary to solve a problem and where to find the information efficiently. Teams analyze team dynamics through weekly team meetings and progress reports. The course emphasizes oral presentations and builds on written communications techniques introduced in Design EPICS I. Prerequisite: EPIC151 or EPIC155. 3 semester hours.

EPIC252. LEADERSHIP DESIGN II. 4.0 Semester Hrs.
(I,II) EPIC252 can be taken in place of EPIC251. Students integrate teamwork, communications, computer software applications and project management skills to solve engineering problems, and the deliverables are equivalent to those for EPICS 251. In addition, students examine the global nature of modern engineering design by combining a project of global interest with an emphasis on leadership and communications skills across a variety of cultures. To support these objectives, students conduct research in the effect of international influences and cultural diversity on the acceptance and implementation of their design solutions. Prerequisite: EPIC151. 4 semester hours.
EPIC261. EPICS II: GIS. 3.0 Semester Hrs.
(I,II,S): Design EPICS II builds on the design process introduced in Design EPICS I, which focuses on open-ended problem solving in which students integrate teamwork and communication with the use of computer software as tools to solve engineering problems. Computer applications emphasize information acquisition and processing based on knowing what new information is necessary to solve a problem and where to find the information efficiently. EPICS 261 GIS incorporates instruction and practice in ArcView, a geographic information system software package, to enable students to capture, manage, analyze and display geographic information in maps, charts or tables, with projects that depend on GIS for their design solutions. Recent projects involving the use of GIS include campus emergency management and room usage maps, groundwater testing well analysis and reporting for the Colorado Department of Agriculture and trail maps for the Foothills Recreation District. Prerequisite: EPIC151 or EPIC155. 3 semester hours.

EPIC262. EPICS II: AUTO CAD. 3.0 Semester Hrs.
(I,II): Design EPICS II builds on the design process introduced in Design EPICS I, which focuses on open-ended problem solving in which students integrate teamwork and communication with the use of computer software as tools to solve engineering problems. Computer applications emphasize information acquisition and processing based on knowing what new information is necessary to solve a problem and where to find the information efficiently. EPICS 262-AutoCAD incorporates semester-long instruction and practice in AutoCAD computer-aided drawing, with projects involving the use of AutoCAD in design solutions. Recent projects include remodeling plans for the Ford Building, a solar tree house education center, an environmentally sustainable house, and new structural designs for use in Haiti following the January 2010 earthquake in Haiti. Students in the Civil Engineering and Environmental Engineering or in Mining Engineering, should consider registering for this course. Prerequisite: EPIC151 or EPIC155. 3 semester hours.

EPIC263. EPICS II: DRILLING ENGINEERING. 3.0 Semester Hrs.
(S): Design EPICS II builds on the design process introduced in Design EPICS I, which focuses on open-ended problem solving in which students integrate teamwork and communication with the use of computer software as tools to solve engineering problems. Computer applications emphasize information acquisition and processing based on knowing what new information is necessary to solve a problem and where to find the information efficiently. This course implements the design process with drilling technology and automated drilling processes to solve multidisciplinary drilling project issues. Based on the project conditions set by the client, various alternatives and configurations are possible to meet the project objectives. Teams select and build a body of evidence to market their most desirable alternatives. Prerequisite: EPIC151. 3 semester hours.

EPIC264. EPICS II: GEOLOGY GIS. 3.0 Semester Hrs.
(II): Design EPICS II builds on the design process introduced in Design EPICS I, which focuses on open-ended problem solving in which students integrate teamwork and communication with the use of computer software as tools to solve engineering problems. Computer applications emphasize information acquisition and processing based on knowing what new information is necessary to solve a problem and where to find the information efficiently. There are typically eight geology-based projects in the course, based on the needs of multiple outside clients. Many of the course deliverables are maps with associated data sets. Prerequisite: EPIC151 or EPIC155. 3 semester hours.

EPIC265. EPIC II: BIOCHEMICAL PROCESSES. 3.0 Semester Hrs.
(I,II): Design EPICS II builds on the design process introduced in Design EPICS I, which focuses on open-ended problem solving in which students integrate teamwork and communication with the use of computer software as tools to solve engineering problems. Computer applications emphasize information acquisition and processing based on knowing what new information is necessary to solve a problem and where to find the information efficiently. This course emphasizes steady-state design in biochemical production processes and provides exposure to information about various manufacturing and research segments. Projects are selected to represent real-world biochemical engineering problems in biofuels, food sciences and pharmaceuticals, wherein creative and critical thinking skills are necessary. These projects may often involve computer-based optimization to obtain a solution. Students are exposed to the range of core engineering computation skills that are utilized in both the chemical and biochemical engineering disciplines, and subsequently employ these skills to their design projects. This approach also integrates the content of future courses with the application of engineering design. Prerequisite: EPIC151. 3 semester hours.

EPIC266. EPICS II: CHEMICAL PROCESSES. 3.0 Semester Hrs.
(II): Design EPICS II builds on the design process introduced in Design EPICS I, which focuses on open-ended problem solving in which students integrate teamwork and communication with the use of computer software as tools to solve engineering problems. Computer applications emphasize information acquisition and processing based on knowing what new information is necessary to solve a problem and where to find the information efficiently. This course emphasizes steady-state design in chemical production processes and provides exposure to information about various manufacturing and research segments. Projects are selected to represent real-world chemical engineering problems in the energy sectors, chemicals and environmental stewardship, wherein creative and critical thinking skills are necessary. These projects may often involve computer-based optimization to obtain a solution. Students are exposed to the range of core engineering computation skills that are utilized in both the chemical and biochemical engineering disciplines, and subsequently employ these skills to their design projects. This approach also integrates the content of future courses with the application of engineering design. Prerequisite: EPIC151. 3 semester hours.

EPIC267. EPICS II: CIVIL ENGINEERING. 3.0 Semester Hrs.
(II): Design EPICS II builds on the design process introduced in Design EPICS I, which focuses on open-ended problem solving in which students integrate teamwork and communication with the use of computer software as tools to solve engineering problems. Computer applications emphasize information acquisition and processing based on knowing what new information is necessary to solve a problem and where to find the information efficiently. Prerequisite: EPIC151 or EPIC155. 3 semester hours.
EPIC269. EPICS II: ENGINEERING PHYSICS. 3.0 Semester Hrs.
(I) Design EPICS II builds on the design process introduced in Design EPICS I, and focuses on open-ended problem solving in which students use teamwork to develop computer software as a tool to solve problems related to engineering physics. Students will learn basic programming skills and apply them to projects that relate to current research and applications of physics. Projects are selected to represent real world physics problems wherein creative and critical thinking skills are necessary. These projects often involve computer-based optimization to obtain a solution. Students will learn how to analyze errors in data, and their effects on data interpretation and decision-making. Engineering Physics majors are encouraged to take this course in the sophomore year. It is open to other students on a space-available basis. Prerequisites: EPIC151. 2 lecture hours, 3 lab hours, 3 semester hours.

EPIC271. EPICS II MATERIALS. 3.0 Semester Hrs.
(II) Design Epics II Materials builds on the design process introduced in Design Epics I, which focuses on open-ended problem solving in student integrate teamwork and communication with the use of computer software as tools to solve materials engineering problems. Computer applications emphasize information acquisition and processing based on knowing what new information is necessary to solve a materials problem and where to find the information efficiently. Teams analyze team dynamics through weekly team meetings and progress reports. The course emphasizes oral presentations and builds on written communications techniques introduced in Design EPICS I. Prerequisite: EPIC151 or EPIC155. 2 hours lecture; 3 hours lab; 3 semester hours.

EPIC298. SPECIAL TOPICS. 1-6 Semester Hr.
(I, II) Pilot course or special topics course. Topics chosen from special interests of instructor(s) and student(s). Usually the course is offered only once. Prerequisite: none. Variable credit; 1 to 6 credit hours. Repeatable for credit under different titles.

EPIC299. INDEPENDENT STUDY. 1-6 Semester Hr.
(I, II) Individual research or special problem projects supervised by a faculty member, also, when a student and instructor agree on a subject matter, content, and credit hours. Prerequisite: ?Independent Study? form must be completed and submitted to the Registrar. Variable credit; 1 to 6 credit hours. Repeatable for credit.

EPIC398. SPECIAL TOPICS. 1-6 Semester Hr.
(I, II) Pilot course or special topics course. Topics chosen from special interests of instructor(s) and student(s). Usually the course is offered only once. Prerequisite: none. Variable credit; 1 to 6 credit hours. Repeatable for credit under different titles.

EPIC399. INDEPENDENT STUDY. 1-6 Semester Hr.
(I, II) Individual research or special problem projects supervised by a faculty member, also, when a student and instructor agree on a subject matter, content, and credit hours. Prerequisite: ?Independent Study? form must be completed and submitted to the Registrar. Variable credit; 1 to 6 credit hours. Repeatable for credit.

EPIC497. SPECIAL SUMMER COURSE. 6.0 Semester Hrs.

EPIC498. SPECIAL TOPICS. 1-6 Semester Hr.
(I, II) Pilot course or special topics course. Topics chosen from special interests of instructor(s) and student(s). Usually the course is offered only once. Prerequisite: none. Variable credit; 1 to 6 credit hours. Repeatable for credit under different titles.

EPIC499. INDEPENDENT STUDY. 1-6 Semester Hr.
(I, II) Individual research or special problem projects supervised by a faculty member, also, when a student and instructor agree on a subject matter, content, and credit hours. Prerequisite: ?Independent Study? form must be completed and submitted to the Registrar. Variable credit; 1 to 6 credit hours. Repeatable for credit.