Design - EPICS
(Engineering Practices Introductory Course Sequence)

2017/2018

Design EPICS teaches students how to solve complex, open-ended problems using critical thinking and workplace skills. Students work in multidisciplinary teams to learn through doing, with an emphasis on re-defining the problem through a holistic lens of technology, people, and environment. Students follow a user-centered design methodology throughout the semester, seeking to understand a problem from multiple perspectives before attempting to solve it. Instruction in these subjects is "hands-on" and experimental, with the instructor serving as both mentor and lecturer.

EPIC151 is a required 3-credit, one-semester course, in which students work in teams on a semester-long project. Students in EPIC151 learn to communicate technical ideas and solutions graphically, orally, written, and through prototype demonstrations.

EPICS offers a variety of 3-credit EPICS II courses (p. 1), which build on the 151 foundation while also requiring student teams to manage a client relationship and use commercial software to model, predict, and analyze. Students must check with their major department to determine which EPICS II course is required or permissible.

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Courses

EPIC151. INTRODUCTION TO DESIGN. 3.0 Semester Hrs.
(I, II, S) Introduction to Design teaches students how to solve complex, open-ended problems in a hands-on manner using critical thinking and workplace skills. Students work in multidisciplinary teams to learn through doing, with emphasis on defining and diagnosing the problem through a holistic lens of technology, people and culture. Students follow a user-centered design methodology throughout the process, seeking to understand a problem from multiple perspectives before attempting to solve it. Students learn and apply specific skills throughout the semester, including: communication (written, oral, graphical), project management, concept visualization, critical thinking, effective teamwork, as well as building and iterating solutions. 2 hours lecture; 3 hours lab; 3 semester hours.

EPIC155. INTRODUCTION TO DESIGN, GRAPHICS. 1.0 Semester Hr.
(I,II) Introduction to Design, Graphics teaches students conceptualization and visualization skills, and how to represent ideas graphically, both by hand and using computer aided design (CAD). 1 hour lecture; 1 hour lab; 1 semester hour.

EPIC198. SPECIAL TOPCS. 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. THE PRACTICE OF DESIGN. 3.0 Semester Hrs.
(I, II, S) The Practice of Design builds on the design process introduced in Introduction to Design, 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 Introduction to Design. Prerequisites: EPIC151 or EPIC155. 2 hours lecture; 3 hours lab; 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.

EPIC251. THE PRACTICE OF DESIGN: GIS. 3.0 Semester Hrs.
(I, II) The Practice of Design: GIS builds on the design process learned in Introduction to Design (EPIC151), which focuses on open-ended problem solving where students integrate teamwork and communication with the use of computer software as tools to solve engineering problems. Practice of Design: GIS incorporates instruction and hands-on exercises in ArcGIS, a geographic information system software package, to enable students to capture, manage, analyze and display spatial data in maps and charts, to solve problems that depend on spatial analysis and orientation GIS for their design solutions. Prerequisites: EPIC151 or EPIC155. 2 hours lecture; 3 hours lab; 3 semester hours.
EPIC262. THE PRACTICE OF DESIGN: AUTOCAD. 3.0 Semester Hrs.
(I) The Practice of Design: AutoCAD builds on the design process from Introduction to Design, which focuses on open-ended problem solving where students integrate teamwork and communication with the use of computer software as tools to solve engineering problems. The Practice of Design: AutoCAD incorporates instruction in 3-D AutoCAD computer-aided drawing of elemental designs (structure and mechanical) and geospatial designs and analyses to solve problems and publish outcomes. Students are introduced to digital terrain modeling and geo-referencing concepts using AutoCAD Civil 3D and raster satellite imagery. Students studying Civil Engineering, Environmental Engineering, and Mining Engineering might consider registering for this course. Prerequisites: EPIC151 or EPIC155. 3 hours lecture; 2 hours lab; 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 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.

EPIC266. EPICS II: CHEMICAL 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 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 or EPIC155. 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 builds on the design process introduced in Design EPICS I, which focuses on open-ended problem solving where students integrate teamwork and communication with the use of computer software as tools to solve materials engineering problems. The EPICS 271 MME curriculum matches the standard EPICS 251 deliverables but with a focus on Metallurgical and Materials Engineering (MME) based projects. Previous projects have utilized areas such as mechanical testing, bio-materials, semiconductors, ceramics, and non destructive examination to address industrial, environmental, research and geopolitical open-ended problems. Prerequisites: 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.