

Engineering Courses: Summer 2024

ENGR102501

Innovation through Design Thinking

Gaudette, Glenn R

Summer 2024

Would you like to be innovative in whatever you pursue? Innovation is about solving important and complex problems to create value for the greater good. Innovating through design thinking is a structured, human-centered process for creatively solving problems, which can be adopted by anyone. In this foundational course we will introduce the mindset, process and methods at the core of design thinking. Students will see inspiring case studies, hear from cutting edge practitioners, and work on a project to internalize this learning. Students will discover design thinking is a practical toolkit that helps them reliably innovate in the face of changing social needs, business disruptions, and technology shifts.

Credits: 3

Room and Schedule: By Arrangement; See Office of Global Education website for details

Satisfies Core Requirement: None

Prerequisites: None

Corequisites: None

Cross-listed with: ARTS1125, UNAS1025

Frequency: Every Spring

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR310001

Collaborative Service Engineering Project

Gaudette, Glenn R

Summer 2024

In this course, students will conduct an engineering project in service of and in collaboration with local community groups. During this process, students will meet with stakeholders to better understand problems, evaluate problems using engineering methods, propose and prototype recommended solutions, and prepare a final report that they will share with their community partners. In this course, students will conduct an engineering project in service of and in collaboration with local community groups. During this process, students will meet with stakeholders to better understand problems, evaluate problems using engineering methods, propose and prototype recommended solutions, and prepare a final report that they will share with their community partners.

Credits: 3

Room and Schedule: By Arrangement; See Office of Global Education website for details

Satisfies Core Requirement: None

Prerequisites: None

Corequisites: None

Cross-listed with: None

Frequency: Every Fall, Every Summer, Every Spring

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR310002

Collaborative Service Engineering Project

Govindasamy, Siddhartan

Summer 2024

In this course, students will conduct an engineering project in service of and in collaboration with local community groups. During this process, students will meet with stakeholders to better understand problems, evaluate problems using engineering methods, propose and prototype recommended solutions, and prepare a final report that they will share with their community partners. In this course, students will conduct an engineering project in service of and in collaboration with local community groups. During this process, students will meet with stakeholders to better understand problems, evaluate problems using engineering methods, propose and prototype recommended solutions, and prepare a final report that they will share with their community partners.

Credits: 1

Room and Schedule: By Arrangement; See Office of Global Education website for details

Satisfies Core Requirement: None

Prerequisites: None

Corequisites: None

Cross-listed with: None

Frequency: Every Fall,Every Summer,Every Spring

Student Level: Undergraduate

Comments: None

Status: Offered

Engineering Courses: Fall 2024

ENGR102501

Innovation through Design Thinking

O'Brien, Edward F;Rutirasiri, Chokdee R

Fall 2024

Would you like to be innovative in whatever you pursue? Innovation is about solving important and complex problems to create value for the greater good. Innovating through design thinking is a structured, human-centered process for creatively solving problems, which can be adopted by anyone. In this foundational course we will introduce the mindset, process and methods at the core of design thinking. Students will see inspiring case studies, hear from cutting edge practitioners, and work on a project to internalize this learning. Students will discover design thinking is a practical toolkit that helps them reliably innovate in the face of changing social needs, business disruptions, and technology shifts.

Credits: 3

Room and Schedule: Service Bldg Active Learning Classroom;TuTh 06:00PM-07:25PM

Satisfies Core Requirement: None

Prerequisites: None

Corequisites: None

Cross-listed with: ARTS1125,UNAS1025

Frequency: Every Spring

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR102601

Innovation Through Engineering Design

Hira, Avneet

Fall 2024

Would you like to be innovative in whatever you pursue? Innovation is about solving important and complex problems to create value for the greater good. Innovating through design thinking is a structured, human-centered process for creatively solving problems, which can be adopted by anyone. In this foundational course we will introduce the mindset, process and methods at the core of design thinking. Students will see inspiring case studies, hear from cutting edge practitioners, and work on a project to internalize this learning. Students will discover design thinking is a practical toolkit that helps them reliably innovate in the face of changing social needs, business disruptions, and technology shifts.

Credits: 3**Room and Schedule:** Active Learning Classroom 001 TuTh 02:30PM-03:45PM**Satisfies Core Requirement:** None**Prerequisites:** None**Corequisites:** None**Cross-listed with:** None**Frequency:** null**Student Level:** Undergraduate**Comments:** None**Status:** Offered

ENGR102602**Innovation Through Engineering Design****Hira, Avneet****Fall 2024**

Would you like to be innovative in whatever you pursue? Innovation is about solving important and complex problems to create value for the greater good. Innovating through design thinking is a structured, human-centered process for creatively solving problems, which can be adopted by anyone. In this foundational course we will introduce the mindset, process and methods at the core of design thinking. Students will see inspiring case studies, hear from cutting edge practitioners, and work on a project to internalize this learning. Students will discover design thinking is a practical toolkit that helps them reliably innovate in the face of changing social needs, business disruptions, and technology shifts.

Credits: 3**Room and Schedule:** 245 Beacon 312;TuTh 12:00 Noon-01:15PM**Satisfies Core Requirement:** None**Prerequisites:** None

Corequisites: None

Cross-listed with: None

Frequency: null

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR110201

Physical Modeling and Analysis Lab

Conroy, Kristen M

Fall 2024

In this course, students will learn and apply concepts from physics and calculus to model, analyze, and experiment on physical systems through a combination of instructional and laboratory sessions. Example systems to be modeled and analyzed in the class will feature linear and rotational motion, thermal conduction, and simple circuit elements. Students completing this course will be able to abstract a variety of physical systems into forms suitable for analysis and predict the behavior of these systems using analytical tools.

Credits: 2

Room and Schedule: 245 Beacon Street Room 302 M 10:00AM-10:50AM

245 Beacon Street Room 302 W 10:00AM-11:50AM

Satisfies Core Requirement: None

Prerequisites: Human-Centered Engineering Majors Only

Corequisites: PHYS2200 or Permission of the Instructor

Cross-listed with: None

Frequency: Every Fall

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR110202

Physical Modeling and Analysis Lab

Hoar, Catherine

Fall 2024

In this course, students will learn and apply concepts from physics and calculus to model, analyze, and experiment on physical systems through a combination of instructional and laboratory sessions. Example systems to be modeled and analyzed in the class will feature linear and rotational motion, thermal conduction, and simple circuit elements. Students completing this course will be able to abstract a variety of physical systems into forms suitable for analysis and predict the behavior of these systems using analytical tools.

Credits: 2

Room and Schedule: 245 Beacon Street Room 302 M 03:00PM-03:50PM; 245 Beacon Street Room 302 W 03:00PM-04:50PM

Satisfies Core Requirement: None

Prerequisites: Human-Centered Engineering Majors Only

Corequisites: PHYS2200 or Permission of the Instructor

Cross-listed with: None

Frequency: Every Fall

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR170201

First-Year Human-Centered Engineering Reflection 1

Gaudette, Glenn R

Fall 2024

Students will engage in weekly reflection sessions designed to integrate experiences in the HCE classroom with broader questions about the relationship between engineering, design, and society. Drawing on a variety of reflection practices, students will consider the role of engineering knowledge in complex sociotechnical systems, what it means to do human-centered engineering for the common good, the moral and ethical dimensions of engineering practice, and their own formation as students and individuals.

Credits: 0

Room and Schedule: Active Learning Classroom 001 Tu 01:30PM-02:20PM

Satisfies Core Requirement: None

Prerequisites: None

Corequisites: None

Cross-listed with: None

Frequency: Every Fall

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR180101

Making the Modern World: Design, Ethics & Engineering

Conroy, Kristen M

Fall 2024

This is a Complex Problem course and is open to FRESHMEN only. You must take HIST1627 with this course. Together we will consider how engineers and other stakeholders navigate risks related to industrial and environmental disasters, balance financial, technological, and regulatory pressures associated with complex socio-technical problems, and negotiate technical and political liabilities surrounding artificial intelligence, surveillance, and climate adaptation. Engineering systems present pressing technical, ethical, and moral problems that we must grapple with as engaged global citizens. In this course, students will explore the social, cultural, and institutional history of engineering, learn foundational skills in quantitative analysis of real-world engineering designs, and understand the political, environmental, economic, and ethical tradeoffs associated with building the modern world. Students will collaborate on group design projects based on human-centered engineering.

Credits: 3

Room and Schedule: 245 Beacon Street Room 107 TuTh 10:30AM-11:45AM

Satisfies Core Requirement: Natural Science

Prerequisites: None

Corequisites: None

Cross-listed with: None

Frequency: Periodically

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR180102

Making the Modern World: Design, Ethics & Engineering

Rodriguez, Hector E

Fall 2024

This is a Complex Problem course and is open to FRESHMEN only. You must take HIST1627 with this course. Together we will consider how engineers and other stakeholders navigate risks related to industrial and environmental disasters, balance financial, technological, and regulatory pressures associated with complex socio-technical problems, and negotiate technical and political liabilities surrounding artificial intelligence, surveillance, and climate adaptation. Engineering systems present pressing technical, ethical, and moral problems that we must grapple with as engaged global citizens. In this course, students will explore the social, cultural, and institutional history of engineering, learn foundational skills in quantitative analysis of real-world engineering designs, and understand the political, environmental, economic, and ethical tradeoffs associated with building the modern world. Students will collaborate on group design projects based on human-centered engineering.

Credits: 0

Room and Schedule: 245 Beacon Street Room 311 W 10:00AM-11:50AM

Satisfies Core Requirement: Natural Science

Prerequisites: None

Corequisites: None

Cross-listed with: None

Frequency: Periodically

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR180103

Making the Modern World: Design, Ethics & Engineering

Perreault, Luke

Fall 2024

This is a Complex Problem course and is open to FRESHMEN only. You must take HIST1627 with this course. Together we will consider how engineers and other stakeholders navigate risks related to industrial and environmental disasters, balance financial, technological, and regulatory pressures associated with complex socio-technical problems, and negotiate technical and political liabilities surrounding artificial intelligence, surveillance, and climate adaptation. Engineering systems present pressing technical, ethical, and moral problems that we must grapple with as engaged global citizens. In this course, students will explore the social, cultural, and institutional history of engineering, learn foundational skills in quantitative analysis of real-world engineering designs, and understand the political, environmental, economic, and ethical tradeoffs associated with building the modern world. Students will collaborate on group design projects based on human-centered engineering.

Credits: 0

Room and Schedule: Active Learning Classroom 001 W 10:00AM-11:50AM

Satisfies Core Requirement: Natural Science

Prerequisites: None

Corequisites: None

Cross-listed with: None

Frequency: Periodically

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR180104

Making the Modern World: Design, Ethics & Engineering

Rodriguez, Hector E

Fall 2024

This is a Complex Problem course and is open to FRESHMEN only. You must take HIST1627 with this course. Together we will consider how engineers and other stakeholders navigate risks related to industrial and environmental disasters, balance financial, technological, and regulatory pressures associated with complex socio-technical problems, and negotiate technical and political liabilities surrounding artificial intelligence, surveillance, and climate adaptation. Engineering systems present pressing technical, ethical, and moral problems that we must grapple with as engaged global citizens. In this course, students will explore the social, cultural, and institutional history of engineering, learn foundational skills in quantitative analysis of real-world engineering designs, and understand the political, environmental, economic, and ethical tradeoffs associated with building the modern world. Students will collaborate on group design projects based on human-centered engineering.

Credits: 0

Room and Schedule: 245 Beacon Street Room 311 W 01:00PM-02:50PM

Satisfies Core Requirement: Natural Science

Prerequisites: None

Corequisites: None

Cross-listed with: None

Frequency: Periodically

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR180105

Making the Modern World: Design, Ethics & Engineering

Perreault, Luke

Fall 2024

This is a Complex Problem course and is open to FRESHMEN only. You must take HIST1627 with this course. Together we will consider how engineers and other stakeholders navigate risks related to industrial and environmental disasters, balance financial, technological, and regulatory pressures associated with complex socio-technical problems, and negotiate technical and political liabilities surrounding artificial intelligence, surveillance, and climate adaptation. Engineering systems present pressing technical, ethical, and moral problems that we must grapple with as engaged global citizens. In this course, students will explore the social, cultural, and institutional history of engineering, learn foundational skills in quantitative analysis of real-world engineering designs, and understand the political, environmental, economic, and ethical tradeoffs associated with building the modern world. Students will collaborate on group design projects based on human-centered engineering.

Credits: 0

Room and Schedule: 245 Beacon Street Room 302 W 01:00PM-02:50PM

Satisfies Core Requirement: Natural Science

Prerequisites: None

Corequisites: None

Cross-listed with: None

Frequency: Periodically

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR180106

Making the Modern World: Design, Ethics & Engineering

Rodriguez, Hector E

Fall 2024

This is a Complex Problem course and is open to FRESHMEN only. You must take HIST1627 with this course. Together we will consider how engineers and other stakeholders navigate risks related to industrial and environmental disasters, balance financial, technological, and regulatory pressures associated with complex socio-technical problems, and negotiate technical and political liabilities surrounding artificial intelligence, surveillance, and climate adaptation. Engineering systems present pressing technical, ethical, and moral problems that we must grapple with as engaged global citizens. In this course, students will explore the social, cultural, and institutional history of engineering, learn foundational skills in quantitative analysis of real-world engineering designs, and understand the political, environmental, economic, and ethical tradeoffs associated with building the modern world. Students will collaborate on group design projects based on human-centered engineering.

Credits: 0

Room and Schedule: 245 Beacon Street Room 311 F 10:00AM-11:50AM

Satisfies Core Requirement: Natural Science

Prerequisites: None

Corequisites: None

Cross-listed with: None

Frequency: Periodically

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR180107

Making the Modern World: Design, Ethics & Engineering

Perreault, Luke

Fall 2024

This is a Complex Problem course and is open to FRESHMEN only. You must take HIST1627 with this course. Together we will consider how engineers and other stakeholders navigate risks related to industrial and environmental disasters, balance financial, technological, and regulatory pressures associated with complex socio-technical problems, and negotiate technical and political liabilities surrounding artificial intelligence, surveillance, and climate adaptation. Engineering systems present pressing technical, ethical, and moral problems that we must grapple with as engaged global citizens. In this course, students will explore the social, cultural, and institutional history of engineering, learn foundational skills in quantitative analysis of real-world engineering designs, and understand the political, environmental, economic, and ethical tradeoffs associated with building the modern world. Students will collaborate on group design projects based on human-centered engineering.

Credits: 0

Room and Schedule: 245 Beacon Street Room 302 F 10:00AM-11:50AM

Satisfies Core Requirement: Natural Science

Prerequisites: None

Corequisites: None

Cross-listed with: None

Frequency: Periodically

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR180108

Making the Modern World: Design, Ethics & Engineering

Rodriguez, Hector E

Fall 2024

This is a Complex Problem course and is open to FRESHMEN only. You must take HIST1627 with this course. Together we will consider how engineers and other stakeholders navigate risks related to industrial and environmental disasters, balance financial, technological, and regulatory pressures associated with complex socio-technical problems, and negotiate technical and political liabilities surrounding artificial intelligence, surveillance, and climate adaptation. Engineering systems present pressing technical, ethical, and moral problems that we must grapple with as engaged global citizens. In this course, students will explore the social, cultural, and institutional history of engineering, learn foundational skills in quantitative analysis of real-world engineering designs, and understand the political, environmental, economic, and ethical tradeoffs associated with building the modern world. Students will collaborate on group design projects based on human-centered engineering.

Credits: 0

Room and Schedule: 245 Beacon Street Room 311 F 02:00PM-03:50PM

Satisfies Core Requirement: Natural Science

Prerequisites: None

Corequisites: None

Cross-listed with: None

Frequency: Periodically

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR180109

Making the Modern World: Design, Ethics & Engineering

Perreault, Luke

Fall 2024

This is a Complex Problem course and is open to FRESHMEN only. You must take HIST1627 with this course. Together we will consider how engineers and other stakeholders navigate risks related to industrial and environmental disasters, balance financial, technological, and regulatory pressures associated with complex socio-technical problems, and negotiate technical and political liabilities surrounding artificial intelligence, surveillance, and climate adaptation. Engineering systems present pressing technical, ethical, and moral problems that we must grapple with as engaged global citizens. In this course, students will explore the social, cultural, and institutional history of engineering, learn foundational skills in quantitative analysis of real-world engineering designs, and understand the political, environmental, economic, and ethical tradeoffs associated with building the modern world. Students will collaborate on group design projects based on human-centered engineering.

Credits: 0

Room and Schedule: 245 Beacon Street Room 302 F 02:00PM-03:50PM

Satisfies Core Requirement: Natural Science

Prerequisites: None

Corequisites: None

Cross-listed with: None

Frequency: Periodically

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR180110

Making the Modern World: Design, Ethics & Engineering

Conroy, Kristen M

Fall 2024

This is a Complex Problem course and is open to FRESHMEN only. You must take HIST1627 with this course. Together we will consider how engineers and other stakeholders navigate risks related to industrial and environmental disasters, balance financial, technological, and regulatory pressures associated with complex socio-technical problems, and negotiate technical and political liabilities surrounding artificial intelligence, surveillance, and climate adaptation. Engineering systems present pressing technical, ethical, and moral problems that we must grapple with as engaged global citizens. In this course, students will explore the social, cultural, and institutional history of engineering, learn foundational skills in quantitative analysis of real-world engineering designs, and understand the political, environmental, economic, and ethical tradeoffs associated with building the modern world. Students will collaborate on group design projects based on human-centered engineering.

Credits: 0

Room and Schedule: 245 Beacon Street Room 107 Th 06:00PM-07:15PM

Satisfies Core Requirement: Natural Science

Prerequisites: None

Corequisites: None

Cross-listed with: None

Frequency: Periodically

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR180111

Making the Modern World: Design, Ethics & Engineering

Conroy, Kristen M

Fall 2024

This is a Complex Problem course and is open to FRESHMEN only. You must take HIST1627 with this course. Together we will consider how engineers and other stakeholders navigate risks related to industrial and environmental disasters, balance financial, technological, and regulatory pressures associated with complex socio-technical problems, and negotiate technical and political liabilities surrounding artificial intelligence, surveillance, and climate adaptation. Engineering systems present pressing technical, ethical, and moral problems that we must grapple with as engaged global citizens. In this course, students will explore the social, cultural, and institutional history of engineering, learn foundational skills in quantitative analysis of real-world engineering designs, and understand the political, environmental, economic, and ethical tradeoffs associated with building the modern world. Students will collaborate on group design projects based on human-centered engineering.

Credits: 0

Room and Schedule: 245 Beacon Street Room 125 Th 06:00PM-07:15PM

Satisfies Core Requirement: Natural Science

Prerequisites: None

Corequisites: None

Cross-listed with: None

Frequency: Periodically

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR180112

Making the Modern World: Design, Ethics & Engineering

Conroy, Kristen M

Fall 2024

This is a Complex Problem course and is open to FRESHMEN only. You must take HIST1627 with this course. Together we will consider how engineers and other stakeholders navigate risks related to industrial and environmental disasters, balance financial, technological, and regulatory pressures associated with complex socio-technical problems, and negotiate technical and political liabilities surrounding artificial intelligence, surveillance, and climate adaptation. Engineering systems present pressing technical, ethical, and moral problems that we must grapple with as engaged global citizens. In this course, students will explore the social, cultural, and institutional history of engineering, learn foundational skills in quantitative analysis of real-world engineering designs, and understand the political, environmental, economic, and ethical tradeoffs associated with building the modern world. Students will collaborate on group design projects based on human-centered engineering.

Credits: 0

Room and Schedule: 245 Beacon Street Room 125A Th 06:00PM-07:15PM

Satisfies Core Requirement: Natural Science

Prerequisites: None

Corequisites: None

Cross-listed with: None

Frequency: Periodically

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR180113

Making the Modern World: Design, Ethics & Engineering

Conroy, Kristen M

Fall 2024

This is a Complex Problem course and is open to FRESHMEN only. You must take HIST1627 with this course. Together we will consider how engineers and other stakeholders navigate risks related to industrial and environmental disasters, balance financial, technological, and regulatory pressures associated with complex socio-technical problems, and negotiate technical and political liabilities surrounding artificial intelligence, surveillance, and climate adaptation. Engineering systems present pressing technical, ethical, and moral problems that we must grapple with as engaged global citizens. In this course, students will explore the social, cultural, and institutional history of engineering, learn foundational skills in quantitative analysis of real-world engineering designs, and understand the political, environmental, economic, and ethical tradeoffs associated with building the modern world. Students will collaborate on group design projects based on human-centered engineering.

Credits: 0

Room and Schedule: 245 Beacon Street Room 204 Th 06:00PM-07:15PM

Satisfies Core Requirement: Natural Science

Prerequisites: None

Corequisites: None

Cross-listed with: None

Frequency: Periodically

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR180114

Making the Modern World: Design, Ethics & Engineering

Conroy, Kristen M

Fall 2024

This is a Complex Problem course and is open to FRESHMEN only. You must take HIST1627 with this course. Together we will consider how engineers and other stakeholders navigate risks related to industrial and environmental disasters, balance financial, technological, and regulatory pressures associated with complex socio-technical problems, and negotiate technical and political liabilities surrounding artificial intelligence, surveillance, and climate adaptation. Engineering systems present pressing technical, ethical, and moral problems that we must grapple with as engaged global citizens. In this course, students will explore the social, cultural, and institutional history of engineering, learn foundational skills in quantitative analysis of real-world engineering designs, and understand the political, environmental, economic, and ethical tradeoffs associated with building the modern world. Students will collaborate on group design projects based on human-centered engineering.

Credits: 0

Room and Schedule: 245 Beacon Street Room 205 Th 06:00PM-07:15PM

Satisfies Core Requirement: Natural Science

Prerequisites: None

Corequisites: None

Cross-listed with: None

Frequency: Periodically

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR180115

Making the Modern World: Design, Ethics & Engineering

Conroy, Kristen M

Fall 2024

This is a Complex Problem course and is open to FRESHMEN only. You must take HIST1627 with this course. Together we will consider how engineers and other stakeholders navigate risks related to industrial and environmental disasters, balance financial, technological, and regulatory pressures associated with complex socio-technical problems, and negotiate technical and political liabilities surrounding artificial intelligence, surveillance, and climate adaptation. Engineering systems present pressing technical, ethical, and moral problems that we must grapple with as engaged global citizens. In this course, students will explore the social, cultural, and institutional history of engineering, learn foundational skills in quantitative analysis of real-world engineering designs, and understand the political, environmental, economic, and ethical tradeoffs associated with building the modern world. Students will collaborate on group design projects based on human-centered engineering.

Credits: 0

Room and Schedule: 245 Beacon Street Room 214 Th 06:00PM-07:15PM

Satisfies Core Requirement: Natural Science

Prerequisites: None

Corequisites: None

Cross-listed with: None

Frequency: Periodically

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR180116

Making the Modern World: Design, Ethics & Engineering

Conroy, Kristen M

Fall 2024

This is a Complex Problem course and is open to FRESHMEN only. You must take HIST1627 with this course. Together we will consider how engineers and other stakeholders navigate risks related to industrial and environmental disasters, balance financial, technological, and regulatory pressures associated with complex socio-technical problems, and negotiate technical and political liabilities surrounding artificial intelligence, surveillance, and climate adaptation. Engineering systems present pressing technical, ethical, and moral problems that we must grapple with as engaged global citizens. In this course, students will explore the social, cultural, and institutional history of engineering, learn foundational skills in quantitative analysis of real-world engineering designs, and understand the political, environmental, economic, and ethical tradeoffs associated with building the modern world. Students will collaborate on group design projects based on human-centered engineering.

Credits: 0

Room and Schedule: 245 Beacon Street Room 215 Th 06:00PM-07:15PM

Satisfies Core Requirement: Natural Science

Prerequisites: None

Corequisites: None

Cross-listed with: None

Frequency: Periodically

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR180117

Making the Modern World: Design, Ethics & Engineering

Conroy, Kristen M

Fall 2024

This is a Complex Problem course and is open to FRESHMEN only. You must take HIST1627 with this course. Together we will consider how engineers and other stakeholders navigate risks related to industrial and environmental disasters, balance financial, technological, and regulatory pressures associated with complex socio-technical problems, and negotiate technical and political liabilities surrounding artificial intelligence, surveillance, and climate adaptation. Engineering systems present pressing technical, ethical, and moral problems that we must grapple with as engaged global citizens. In this course, students will explore the social, cultural, and institutional history of engineering, learn foundational skills in quantitative analysis of real-world engineering designs, and understand the political, environmental, economic, and ethical tradeoffs associated with building the modern world. Students will collaborate on group design projects based on human-centered engineering.

Credits: 0

Room and Schedule: 245 Beacon Street Room 230 Th 06:00PM-07:15PM

Satisfies Core Requirement: Natural Science

Prerequisites: None

Corequisites: None

Cross-listed with: None

Frequency: Periodically

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR210101

Engineering Foundations Studio I

Mohebbi, Amin

Fall 2024

This course is designed to help students begin to mechanically analyze the physical objects in the world around them. Students will learn how to look at systems and determine how to model the forces and reactions for statically determinate systems. The course will also cover math topics including integrals and their applications, vectors, vector functions, vector calculus (introductory level). Fundamental themes of materials science-- structure-property-processing relationships in materials, specifically metals, ceramics, and plastics will also be investigated.

Credits: 3

Room and Schedule: Scientific Exploration Lab 013 MWF 10:00AM-10:50AM

Satisfies Core Requirement: None

Prerequisites: MATH1102 and MATH1103 and PHYS2200

Corequisites: None

Cross-listed with: None

Frequency: Every Fall

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR210102

Engineering Foundations Studio I

Herkins, Ashley

Fall 2024

This course is designed to help students begin to mechanically analyze the physical objects in the world around them. Students will learn how to look at systems and determine how to model the forces and reactions for statically determinate systems. The course will also cover math topics including integrals and their applications, vectors, vector functions, vector calculus (introductory level). Fundamental themes of materials science-- structure-property-processing relationships in materials, specifically metals, ceramics, and plastics will also be investigated.

Credits: 3

Room and Schedule: Scientific Exploration Lab 013 MWF 02:00PM-02:50PM

Satisfies Core Requirement: None

Prerequisites: MATH1102 and MATH1103 and PHYS2200

Corequisites: None

Cross-listed with: None

Frequency: Every Fall

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR210201

Engineering Foundations Studio II

Govindasamy, Siddhartan

Fall 2024

Students in this course will further their knowledge and understanding of circuit elements such as resistors, capacitors, inductors, diodes and transistors. Students will learn to apply tools such as the Kirchhoff current and voltage laws to analyze circuits, differential equations to analyze and design filters and analyze the frequency responses of circuits. Mathematical techniques such as solving first and second order differential equations, and the Fourier transform will be introduced in context of circuit applications.

Credits: 3

Room and Schedule: 245 Beacon Street Room 311 TuTh 01:30PM-02:45PM

Satisfies Core Requirement: None

Prerequisites: ENGR1103 and MATH1102 and MATH1103 and ENGR1102

Corequisites: None

Cross-listed with: None

Frequency: Every Fall

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR210202

Engineering Foundations Studio II

Govindasamy, Siddhartan

Fall 2024

Students in this course will further their knowledge and understanding of circuit elements such as resistors, capacitors, inductors, diodes and transistors. Students will learn to apply tools such as the Kirchhoff current and voltage laws to analyze circuits, differential equations to analyze and design filters and analyze the frequency responses of circuits. Mathematical techniques such as solving first and second order differential equations, and the Fourier transform will be introduced in context of circuit applications.

Credits: 3

Room and Schedule: 245 Beacon Street Room 311 TuTh 10:30AM-11:45AM

Satisfies Core Requirement: None

Prerequisites: ENGR1103 and MATH1102 and MATH1103 and ENGR1102

Corequisites: None

Cross-listed with: None

Frequency: Every Fall

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR270201

Second-Year Human-Centered Engineering Reflection 1

Henriques, Justin Joseph

Fall 2024

Students will participate in weekly reflections designed to integrate experiences in the HCE classroom with broader questions about the relationships among engineering, design, and society. In the second year, students will explore ideas of engineering identity, connections between engineering and philosophy and theology, and the needs of HCE as a new field of study.

Credits: 0

Room and Schedule: 245 Beacon Street Room 302 Tu 12:00 Noon-12:50PM

Satisfies Core Requirement: None

Prerequisites: Open to Human-Centered Engineering majors only.

Corequisites: None

Cross-listed with: None

Frequency: Every Fall

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR270202

Second-Year Human-Centered Engineering Reflection 1

Henriques, Justin Joseph

Fall 2024

Students will participate in weekly reflections designed to integrate experiences in the HCE classroom with broader questions about the relationships among engineering, design, and society. In the second year, students will explore ideas of engineering identity, connections between engineering and philosophy and theology, and the needs of HCE as a new field of study.

Credits: 0

Room and Schedule: 245 Beacon Street Room 311 W 03:00PM-03:50PM

Satisfies Core Requirement: None

Prerequisites: Open to Human-Centered Engineering majors only.

Corequisites: None

Cross-listed with: None

Frequency: Every Fall

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR310002

Collaborative Service Engineering Project

Henriques, Justin Joseph

Fall 2024

In this course, students will conduct an engineering project in service of and in collaboration with local community groups. During this process, students will meet with stakeholders to better understand problems, evaluate problems using engineering methods, propose and prototype recommended solutions, and prepare a final report that they will share with their community partners. In this course, students will conduct an engineering project in service of and in collaboration with local community groups. During this process, students will meet with stakeholders to better understand problems, evaluate problems using engineering methods, propose and prototype recommended solutions, and prepare a final report that they will share with their community partners.

Credits: 3

Room and Schedule: 245 Beacon Street Room 302 MWF 12:00 Noon-12:50PM

Satisfies Core Requirement: None

Prerequisites: None

Corequisites: None

Cross-listed with: None

Frequency: Every Fall, Every Summer, Every Spring

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR310101

Engineering for Society

Herkins, Ashley

Fall 2024

In this course, we will learn and practice engineering tools and techniques to work on engineering problems while focusing on societal benefit and the human experience. The tools and techniques will comprise those from, but not be limited to, mechanical, electrical, and industrial engineering. A majority of the course sessions will be facilitated in a project-based modality where we will learn the tools and techniques in the context of the problems we work on.

Credits: 3

Room and Schedule: 245 Beacon Street Room 302 TuTh 09:00AM-10:15AM

Satisfies Core Requirement: None

Prerequisites: ENGR1101

Corequisites: None

Cross-listed with: None

Frequency: Every Fall,Every Summer,Every Spring

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR310102

Engineering for Society

Salifu, Ali A

Fall 2024

In this course, we will learn and practice engineering tools and techniques to work on engineering problems while focusing on societal benefit and the human experience. The tools and techniques will comprise those from, but not be limited to, mechanical, electrical, and industrial engineering. A majority of the course sessions will be facilitated in a project-based modality where we will learn the tools and techniques in the context of the problems we work on.

Credits: 3

Room and Schedule: Scientific Exploration Lab 013 TuTh 01:30PM-02:45PM

Satisfies Core Requirement: None

Prerequisites: ENGR1101

Corequisites: None

Cross-listed with: None

Frequency: Every Fall,Every Summer,Every Spring

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR310501

Introduction to Statistical Data Analysis and Machine Learning

Mohebbi, Amin

Fall 2024

This course offers a comprehensive exploration of MATLAB's applications in the field of data science and machine learning. Throughout the program, students will engage in practical scripting and problem-solving, master data visualization techniques, and analyze data distributions and statistics. The course covers essential topics such as hypothesis testing, regression analysis, and the fundamentals of neural networks, equipping students with the skills to construct neural networks and integrate MATLAB into machine learning workflows. With a focus on supervised and unsupervised learning, students will learn to classify, regress, and cluster data while evaluating model performance and applying machine learning to real-world problems. Additionally, students will gain hands-on experience implementing clustering algorithms like K-Means and hierarchical clustering in MATLAB, concluding with insightful case studies and practical examples showcasing the versatility and power of data analysis with novel tools in engineering, mathematics, and scientific disciplines.

Credits: 4

Room and Schedule: Digital Experience Classroom 100 MWF 09:00AM-09:50AM

Satisfies Core Requirement: None

Prerequisites: None

Corequisites: None

Cross-listed with: None

Frequency: Every Spring

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR310502

Introduction to Statistical Data Analysis and Machine Learning

Mohebbi, Amin

Fall 2024

This course offers a comprehensive exploration of MATLAB's applications in the field of data science and machine learning. Throughout the program, students will engage in practical scripting and problem-solving, master data visualization techniques, and analyze data distributions and statistics. The course covers essential topics such as hypothesis testing, regression analysis, and the fundamentals of neural networks, equipping students with the skills to construct neural networks and integrate MATLAB into machine learning workflows. With a focus on supervised and unsupervised learning, students will learn to classify, regress, and cluster data while evaluating model performance and applying machine learning to real-world problems. Additionally, students will gain hands-on experience implementing clustering algorithms like K-Means and hierarchical clustering in MATLAB, concluding with insightful case studies and practical examples showcasing the versatility and power of data analysis with novel tools in engineering, mathematics, and scientific disciplines.

Credits: 0

Room and Schedule: Digital Experience Classroom 100 W 03:00PM-03:50PM

Satisfies Core Requirement: None

Prerequisites: None

Corequisites: None

Cross-listed with: None

Frequency: Every Spring

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR311201

Advanced Engineering Foundations: Thermodynamics

Brace, Emma

Fall 2024

This course will cover the first and second laws of thermodynamics and apply them to closed and open systems. Topics include energy conservation, heat cycles, entropy, enthalpy, material property estimation for pure components and mixtures, and phase equilibria. Course will include engineering applications of thermodynamics in energy, the environment, and health.

Credits: 3

Room and Schedule: Active Learning Classroom 001 TuTh 12:00 Noon-01:15PM

Satisfies Core Requirement: None

Prerequisites: MATH1101 and MATH1103 and PHYS2200

Corequisites: None

Cross-listed with: None

Frequency: Biannually

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR311401

Advanced Engineering Foundations: Bioprocess Engineering

Hoar, Catherine

Fall 2024

Principles and applications of biotechnology and biological process engineering. This course will introduce students to the microbiological, biochemical, and physical processes applied in engineered biological systems. Topics include fundamentals of microbiology and molecular biology, reactor design, and transport processes in biological systems. Case studies will highlight biotechnology and bioprocess engineering applications in energy, health, and the environment including resource recovery, biofuel and chemical production, waste treatment, bioremediation, and production of pharmaceuticals.

Credits: 3

Room and Schedule: Service Bldg Fluids Lab 013; TuTh 03:00PM-04:15PM

Satisfies Core Requirement: None

Prerequisites: CHEM1111 and CHEM1109 and (MATH1102 or MATH1100)

Corequisites: None

Cross-listed with: None

Frequency: Annually

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR370201

Third-Year Human-Centered Engineering Reflection 1

Brace, Emma

Fall 2024

Students will participate in weekly reflections designed to integrate experiences in the HCE classroom with broader questions about the relationships among engineering, design, and society. In the third year, students will explore ideas of engineering identity, service-based engineering, and the what it means to engage with communities during engineering project work.

Credits: 0

Room and Schedule: Active Learning Classroom 001 F 11:00AM-11:50AM

Satisfies Core Requirement: None

Prerequisites: None

Corequisites: None

Cross-listed with: None

Frequency: Every Fall

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR370202

Third-Year Human-Centered Engineering Reflection 1

Brace, Emma

Fall 2024

Students will participate in weekly reflections designed to integrate experiences in the HCE classroom with broader questions about the relationships among engineering, design, and society. In the third year, students will explore ideas of engineering identity, service-based engineering, and the what it means to engage with communities during engineering project work.

Credits: 0

Room and Schedule: Gasson Hall 201 W 02:00PM-02:50PM

Satisfies Core Requirement: None

Prerequisites: None

Corequisites: None

Cross-listed with: None

Frequency: Every Fall

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR410201**Senior Impact Project****Gaudette, Glenn R;Govindasamy, Siddhartan;Pan, Shufen****Fall 2024**

This course is the first of a two-course sequence which fulfils the engineering capstone design requirement for the human-centered engineering major. Students will work in teams with internal or external partners on a real-world project. Students will consult with faculty instructors and other faculty members with relevant expertise as needed in completing this course.

Credits: 3**Room and Schedule:** Active Learning Classroom 001 MWF 02:00PM-02:50PM**Satisfies Core Requirement:** None**Prerequisites:** ENGR3100**Corequisites:** None**Cross-listed with:** None**Frequency:** Annually**Student Level:** Undergraduate**Comments:** None**Status:** Offered**ENGR410202****Senior Impact Project****Gaudette, Glenn R;Govindasamy, Siddhartan;Pan, Shufen****Fall 2024**

This course is the first of a two-course sequence which fulfils the engineering capstone design requirement for the human-centered engineering major. Students will work in teams with internal or external partners on a real-world project. Students will consult with faculty instructors and other faculty members with relevant expertise as needed in completing this course.

Credits: 3**Room and Schedule:** Active Learning Classroom 001 MWF 08:00AM-08:50AM**Satisfies Core Requirement:** None**Prerequisites:** ENGR3100**Corequisites:** None**Cross-listed with:** None**Frequency:** Annually

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR423001

Biomechanics

Gaudette, Glenn R

Fall 2024

This course emphasizes the applications of mechanics to describe the material properties of living tissues. It is concerned with the description and measurements of these properties as related to their physiological functions. Emphasis on the interrelationship between biomechanics and physiology in medicine, surgery, body injury and prostheses. Topics covered include: Review of basic mechanics, stress, strain, constitutive equations and the field equations, viscoelastic behavior, and models of material behavior. The measurement and characterization of properties of soft and hard tissues will be covered, along with biomechanics as related to body injury and the design of prosthetic devices.

Credits: 4

Room and Schedule: Scientific Exploration Lab 013 MWF 01:00PM-01:50PM

Satisfies Core Requirement: None

Prerequisites: ENGR2101 and ENGR2103

Corequisites: None

Cross-listed with: None

Frequency: Annually

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR423002

Biomechanics

Gaudette, Glenn R

Fall 2024

This course emphasizes the applications of mechanics to describe the material properties of living tissues. It is concerned with the description and measurements of these properties as related to their physiological functions. Emphasis on the interrelationship between biomechanics and physiology in medicine, surgery, body injury and prostheses. Topics covered include: Review of basic mechanics, stress, strain, constitutive equations and the field equations, viscoelastic behavior, and models of material behavior. The measurement and characterization of properties of soft and hard tissues will be covered, along with biomechanics as related to body injury and the design of prosthetic devices.

Credits: 0

Room and Schedule: Material Analysis Lab 008 M 04:00PM-05:50PM

Satisfies Core Requirement: None

Prerequisites: ENGR2101 and ENGR2103

Corequisites: None

Cross-listed with: None

Frequency: Annually

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR470201

Independent Reflection in Human-Centered Engineering

Gaudette, Glenn R

Fall 2024

Independent reflection in Human-Centered Engineering under the direction of a faculty member.

Credits: 0

Room and Schedule: By Arrangement

Satisfies Core Requirement: None

Prerequisites: Permission of Department

Corequisites: None

Cross-listed with: None

Frequency: Every Fall

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR470202**Independent Reflection in Human-Centered Engineering****Tonn, Jenna A****Fall 2024**

Independent reflection in Human-Centered Engineering under the direction of a faculty member.

Credits: 0**Room and Schedule:** By Arrangement**Satisfies Core Requirement:** None**Prerequisites:** Permission of Department**Corequisites:** None**Cross-listed with:** None**Frequency:** Every Fall**Student Level:** Undergraduate**Comments:** None**Status:** Offered

ENGR470203**Independent Reflection in Human-Centered Engineering****Hira, Avneet****Fall 2024**

Independent reflection in Human-Centered Engineering under the direction of a faculty member.

Credits: 0**Room and Schedule:** By Arrangement**Satisfies Core Requirement:** None**Prerequisites:** Permission of Department**Corequisites:** None**Cross-listed with:** None**Frequency:** Every Fall**Student Level:** Undergraduate**Comments:** None**Status:** Offered

ENGR470401

Senior Year Human-Centered Engineering Reflection 1

Hira, Avneet

Fall 2024

Students will participate in weekly reflections designed to integrate experiences in the HCE classroom with broader questions about the relationships among engineering, design, and society. In the fourth year, students will reflect on questions related to the responsibility of engineers in society, the practice engineering as seen through their engineering senior impact projects, and their own formation as fourth year students.

Credits: 0

Room and Schedule: 245 Beacon Street Room 302 Th 01:30PM-02:20PM

Satisfies Core Requirement: None

Prerequisites: None

Corequisites: None

Cross-listed with: None

Frequency: Annually

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR490101

Undergraduate Research in Human-Centered Engineering

Gaudette, Glenn R

Fall 2024

Undergraduate research in Human-Centered Engineering under the direction of a faculty member.

Credits: 3

Room and Schedule: By Arrangement

Satisfies Core Requirement: None

Prerequisites: Permission of Department

Corequisites: None

Cross-listed with: None

Frequency: Every Fall, Every Spring

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR490102**Undergraduate Research in Human-Centered Engineering****Govindasamy, Siddhartan****Fall 2024**

Undergraduate research in Human-Centered Engineering under the direction of a faculty member.

Credits: 3**Room and Schedule:** By Arrangement**Satisfies Core Requirement:** None**Prerequisites:** Permission of Department**Corequisites:** None**Cross-listed with:** None**Frequency:** Every Fall, Every Spring**Student Level:** Undergraduate**Comments:** None**Status:** Offered

ENGR490103**Undergraduate Research in Human-Centered Engineering****Ranger, Bryan J****Fall 2024**

Undergraduate research in Human-Centered Engineering under the direction of a faculty member.

Credits: 3**Room and Schedule:** By Arrangement**Satisfies Core Requirement:** None**Prerequisites:** Permission of Department**Corequisites:** None**Cross-listed with:** None**Frequency:** Every Fall, Every Spring**Student Level:** Undergraduate**Comments:** None**Status:** Offered

ENGR490104

Undergraduate Research in Human-Centered Engineering

Salifu, Ali A

Fall 2024

Undergraduate research in Human-Centered Engineering under the direction of a faculty member.

Credits: 3

Room and Schedule: By Arrangement

Satisfies Core Requirement: None

Prerequisites: Permission of Department

Corequisites: None

Cross-listed with: None

Frequency: Every Fall, Every Spring

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR491101

Independent Study in Human-Centered Engineering

Dept, Tbd

Fall 2024

Independent study in Human-Centered Engineering under the direction of a faculty member.

Credits: 3

Room and Schedule: By Arrangement

Satisfies Core Requirement: None

Prerequisites: Permission of Department

Corequisites: None

Cross-listed with: None

Frequency: Every Fall, Every Spring

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR491201

Independent Study in Human-Centered Engineering

Dept, Tbd

Fall 2024

Independent study in Human-Centered Engineering under the direction of a faculty member.

Credits: 2

Room and Schedule: By Arrangement

Satisfies Core Requirement: None

Prerequisites: Permission of Department

Corequisites: None

Cross-listed with: None

Frequency: Every Fall, Every Spring

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR492101

Topics in Human-Centered Engineering

Dept, Tbd

Fall 2024

Topics for this course vary from semester to semester and are determined by the interests of faculty and students.

Credits: 3

Room and Schedule: By Arrangement

Satisfies Core Requirement: None

Prerequisites: Human Centered Engineering Majors Only

Corequisites: None

Cross-listed with: None

Frequency: Periodically

Student Level: Undergraduate

Comments: None

Status: Offered

Engineering Courses: Spring 2025

ENGR102501

Innovation through Design Thinking

Bhattacharya, Sunanda; O'Brien, Edward F; Rutirasiri, Chokdee R

Spring 2025

Would you like to be innovative in whatever you pursue? Innovation is about solving important and complex problems to create value for the greater good. Innovating through design thinking is a structured, human-centered process for creatively solving problems, which can be adopted by anyone. In this foundational course we will introduce the mindset, process and methods at the core of design thinking. Students will see inspiring case studies, hear from cutting edge practitioners, and work on a project to internalize this learning. Students will discover design thinking is a practical toolkit that helps them reliably innovate in the face of changing social needs, business disruptions, and technology shifts.

Credits: 3

Room and Schedule: Active Learning Classroom 001 TuTh 06:00PM-07:30PM

Satisfies Core Requirement: None

Prerequisites: None

Corequisites: None

Cross-listed with: ARTS1125, UNAS1025

Frequency: Every Spring

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR102502

Innovation through Design Thinking

Bhattacharya, Sunanda; O'Brien, Edward F; Rutirasiri, Chokdee R

Spring 2025

Would you like to be innovative in whatever you pursue? Innovation is about solving important and complex problems to create value for the greater good. Innovating through design thinking is a structured, human-centered process for creatively solving problems, which can be adopted by anyone. In this foundational course we will introduce the mindset, process and methods at the core of design thinking. Students will see inspiring case studies, hear from cutting edge practitioners, and work on a project to internalize this learning. Students will discover design thinking is a practical toolkit that helps them reliably innovate in the face of changing social needs, business disruptions, and technology shifts.

Credits: 3

Room and Schedule: 245 Beacon Street Room 204 TuTh 06:00PM-07:30PM

Satisfies Core Requirement: None

Prerequisites: None

Corequisites: None

Cross-listed with: ARTS1125, UNAS1025

Frequency: Every Spring

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR110101

Introduction to Human-Centered Engineering

Conroy, Kristen M

Spring 2025

In this course, we will learn about and practice engineering methods to tackle design problems through a human-centered lens. These methods include introductory work with: mathematical models, statistics, physical prototyping, computer-aided design, decision-making approaches, and observation and interview techniques. We will learn how these methods can be employed while working on a design problem, including problem formulation, data analysis, design trade-offs, concept selection, and design deployment. At the end of this course, we will have a working understanding of how human-centered engineers think and work.

Credits: 4

Room and Schedule: 245 Beacon Street Room 311 MWF 10:00AM-11:50AM

Satisfies Core Requirement: None

Prerequisites: Open to Human-Centered Engineering Majors Only.

Corequisites: None

Cross-listed with: None

Frequency: Every Spring

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR110102

Introduction to Human-Centered Engineering

Herkins, Ashley

Spring 2025

In this course, we will learn about and practice engineering methods to tackle design problems through a human-centered lens. These methods include introductory work with: mathematical models, statistics, physical prototyping, computer-aided design, decision-making approaches, and observation and interview techniques. We will learn how these methods can be employed while working on a design problem, including problem formulation, data analysis, design trade-offs, concept selection, and design deployment. At the end of this course, we will have a working understanding of how human-centered engineers think and work.

Credits: 4

Room and Schedule: 245 Beacon Street Room 311 MWF 01:00PM-02:50PM

Satisfies Core Requirement: None

Prerequisites: Open to Human-Centered Engineering Majors Only.

Corequisites: None

Cross-listed with: None

Frequency: Every Spring

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR110301

Engineering Analysis Lab

Perreault, Luke

Spring 2025

In this course, students will apply integral calculus and scientific principles to develop analytical solutions for engineering problems. Students will learn how to devise experiments, collect and analyze data, and conduct basic error analysis. The course will be structured as individual experimental modules to get hands-on experience with fundamental instruments including power supplies, sensors, electromechanical components, and computer-based data acquisition systems. Following this course, students will be equipped to apply quantitative analytical techniques to a variety of practical engineering problems.

Credits: 2

Room and Schedule: 245 Beacon Street Room 302 Tu 10:30AM-11:20AM

245 Beacon Street Room 302 Th 10:30AM-12:20PM

Satisfies Core Requirement: None

Prerequisites: Open to Human-Centered Engineering majors only.

Corequisites: None

Cross-listed with: None

Frequency: Every Spring

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR110302

Engineering Analysis Lab

Ranger, Bryan J

Spring 2025

In this course, students will apply integral calculus and scientific principles to develop analytical solutions for engineering problems. Students will learn how to devise experiments, collect and analyze data, and conduct basic error analysis. The course will be structured as individual experimental modules to get hands-on experience with fundamental instruments including power supplies, sensors, electromechanical components, and computer-based data acquisition systems. Following this course, students will be equipped to apply quantitative analytical techniques to a variety of practical engineering problems.

Credits: 2

Room and Schedule: 245 Beacon Street Room 302 Tu 04:30PM-05:20PM

245 Beacon Street Room 302 Th 04:30PM-06:20PM

Satisfies Core Requirement: None

Prerequisites: Open to Human-Centered Engineering majors only.

Corequisites: None

Cross-listed with: None

Frequency: Every Spring

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR110501

Engineering Computation and Programming

Rodriguez, Hector E

Spring 2025

In this course, students will be introduced to computational tools used in engineering through the MATLAB computing and programming environment. Students will also learn and apply fundamental concepts from linear algebra to solve engineering problems computationally. Topics to be introduced include loops, functions, arrays, matrices, and vectors. Students will be expected to complete weekly assignments and a final project in which students will use the MATLAB computing environment to solve an appropriately scoped computing/engineering problem.

Credits: 3

Room and Schedule: Digital Experience Lab Room 100;TuTh 09:00AM-10:15AM

Satisfies Core Requirement: None

Prerequisites: None

Corequisites: None

Cross-listed with: None

Frequency: Every Spring

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR110502

Engineering Computation and Programming

Rodriguez, Hector E

Spring 2025

In this course, students will be introduced to computational tools used in engineering through the MATLAB computing and programming environment. Students will also learn and apply fundamental concepts from linear algebra to solve engineering problems computationally. Topics to be introduced include loops, functions, arrays, matrices, and vectors. Students will be expected to complete weekly assignments and a final project in which students will use the MATLAB computing environment to solve an appropriately scoped computing/engineering problem.

Credits: 3

Room and Schedule: Digital Experience Lab 100;TuTh 03:00PM-04:15PM

Satisfies Core Requirement: None

Prerequisites: None

Corequisites: None

Cross-listed with: None

Frequency: Every Spring

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR170301

First-year Human-Centered Engineering Reflection 2

Gaudette, Glenn R

Spring 2025

Students will continue to engage in weekly reflection sessions designed to integrate experiences in the HCE classroom with broader questions about the relationship between engineering, design, and society. Drawing on a variety of reflection practices, students will consider the role of engineering knowledge in complex sociotechnical systems, what it means to do human-centered engineering for the common good, the moral and ethical dimensions of engineering practice, and their own formation as students and individuals.

Credits: 0

Room and Schedule: Active Learning Classroom Room 001;Th 01:30PM-02:20PM

Satisfies Core Requirement: None

Prerequisites: Open to Human-Centered Engineering majors only.

Corequisites: None

Cross-listed with: None

Frequency: Every Spring

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR170302

First-year Human-Centered Engineering Reflection 2

Gaudette, Glenn R

Spring 2025

Students will continue to engage in weekly reflection sessions designed to integrate experiences in the HCE classroom with broader questions about the relationship between engineering, design, and society. Drawing on a variety of reflection practices, students will consider the role of engineering knowledge in complex sociotechnical systems, what it means to do human-centered engineering for the common good, the moral and ethical dimensions of engineering practice, and their own formation as students and individuals.

Credits: 0

Room and Schedule: Active Learning Classroom Room 001;F 12:00 Noon-12:50PM

Satisfies Core Requirement: None

Prerequisites: Open to Human-Centered Engineering majors only.

Corequisites: None

Cross-listed with: None

Frequency: Every Spring

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR210301

Engineering Foundations Studio III

Salifu, Ali A

Spring 2025

In this course, students will be introduced to thermodynamics and transport phenomena (fluid mechanics, heat transfer, and mass transfer). Students will first learn about thermodynamics (from the engineering perspective) to understand how systems interact with their surroundings. This will be done from the context of the laws of thermodynamics (zeroth, first, and second) and the concepts of work, heat, internal energy, enthalpy, entropy, and the Carnot cycles. This knowledge will then feed into discussions of the three transport processes (fluid mechanics, heat transfer, and mass transfer) from the context of the laws of conservation of momentum, energy, and mass.

Credits: 4

Room and Schedule: Scientific Exploration Room 013;TuTh 01:30PM-02:45PM

Satisfies Core Requirement: None

Prerequisites: PHYS2200 or Calc 2 (MATH1101 or MATH1103)

Corequisites: None

Cross-listed with: None

Frequency: Every Spring

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR210302

Engineering Foundations Studio III

Salifu, Ali A

Spring 2025

In this course, students will be introduced to thermodynamics and transport phenomena (fluid mechanics, heat transfer, and mass transfer). Students will first learn about thermodynamics (from the engineering perspective) to understand how systems interact with their surroundings. This will be done from the context of the laws of thermodynamics (zeroth, first, and second) and the concepts of work, heat, internal energy, enthalpy, entropy, and the Carnot cycles. This knowledge will then feed into discussions of the three transport processes (fluid mechanics, heat transfer, and mass transfer) from the context of the laws of conservation of momentum, energy, and mass.

Credits: 0

Room and Schedule: Scientific Exploration Room 013;Th 04:30PM-06:20PM

Satisfies Core Requirement: None

Prerequisites: PHYS2200 or Calc 2 (MATH1101 or MATH1103)

Corequisites: None

Cross-listed with: None

Frequency: Every Spring

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR210303

Engineering Foundations Studio III

Conroy, Kristen M

Spring 2025

In this course, students will be introduced to thermodynamics and transport phenomena (fluid mechanics, heat transfer, and mass transfer). Students will first learn about thermodynamics (from the engineering perspective) to understand how systems interact with their surroundings. This will be done from the context of the laws of thermodynamics (zeroth, first, and second) and the concepts of work, heat, internal energy, enthalpy, entropy, and the Carnot cycles. This knowledge will then feed into discussions of the three transport processes (fluid mechanics, heat transfer, and mass transfer) from the context of the laws of conservation of momentum, energy, and mass.

Credits: 4

Room and Schedule: Scientific Exploration Room 013;TuTh 09:00AM-10:15AM

Satisfies Core Requirement: None

Prerequisites: PHYS2200 or Calc 2 (MATH1101 or MATH1103)

Corequisites: None

Cross-listed with: None

Frequency: Every Spring

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR210304

Engineering Foundations Studio III

Conroy, Kristen M

Spring 2025

In this course, students will be introduced to thermodynamics and transport phenomena (fluid mechanics, heat transfer, and mass transfer). Students will first learn about thermodynamics (from the engineering perspective) to understand how systems interact with their surroundings. This will be done from the context of the laws of thermodynamics (zeroth, first, and second) and the concepts of work, heat, internal energy, enthalpy, entropy, and the Carnot cycles. This knowledge will then feed into discussions of the three transport processes (fluid mechanics, heat transfer, and mass transfer) from the context of the laws of conservation of momentum, energy, and mass.

Credits: 0

Room and Schedule: Scientific Exploration Room 013;Th 10:30AM-12:20PM

Satisfies Core Requirement: None

Prerequisites: PHYS2200 or Calc 2 (MATH1101 or MATH1103)

Corequisites: None

Cross-listed with: None

Frequency: Every Spring

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR210401

Engineering Foundations Studio IV

Henriques, Justin Joseph

Spring 2025

In this course students will be introduced to the analysis of complex engineering systems in the real world. Students will learn several quantitative methods for modeling engineering systems including simple and complex networks and material flow analysis. Mathematical concepts of probability and statistics such as Poisson processes, return periods, and error propagation will be applied to various engineering domains. Students will also be introduced to engineering economics and life cycle assessment for situating engineering decisions within their economic, social, and environmental contexts.

Credits: 4

Room and Schedule: MWF 10:00AM-10:50AM;Service Building, Scientific Exploration Room 013

Satisfies Core Requirement: None

Prerequisites: ENGR2101 and ENGR2102

Corequisites: None

Cross-listed with: None

Frequency: Annually

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR210402

Engineering Foundations Studio IV

Henriques, Justin Joseph

Spring 2025

In this course students will be introduced to the analysis of complex engineering systems in the real world. Students will learn several quantitative methods for modeling engineering systems including simple and complex networks and material flow analysis. Mathematical concepts of probability and statistics such as Poisson processes, return periods, and error propagation will be applied to various engineering domains. Students will also be introduced to engineering economics and life cycle assessment for situating engineering decisions within their economic, social, and environmental contexts.

Credits: 0

Room and Schedule: Service Building, Digital Experience Classroom 100;Tu 10:30AM-12:20PM

Satisfies Core Requirement: None

Prerequisites: ENGR2101 and ENGR2102

Corequisites: None

Cross-listed with: None

Frequency: Annually

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR210403

Engineering Foundations Studio IV

Mohebbi, Amin

Spring 2025

In this course students will be introduced to the analysis of complex engineering systems in the real world. Students will learn several quantitative methods for modeling engineering systems including simple and complex networks and material flow analysis. Mathematical concepts of probability and statistics such as Poisson processes, return periods, and error propagation will be applied to various engineering domains. Students will also be introduced to engineering economics and life cycle assessment for situating engineering decisions within their economic, social, and environmental contexts.

Credits: 4

Room and Schedule: MWF 02:00PM-02:50PM;Service Building, Scientific Exploration Room 013

Satisfies Core Requirement: None

Prerequisites: ENGR2101 and ENGR2102

Corequisites: None

Cross-listed with: None

Frequency: Annually

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR210404

Engineering Foundations Studio IV

Mohebbi, Amin

Spring 2025

In this course students will be introduced to the analysis of complex engineering systems in the real world. Students will learn several quantitative methods for modeling engineering systems including simple and complex networks and material flow analysis. Mathematical concepts of probability and statistics such as Poisson processes, return periods, and error propagation will be applied to various engineering domains. Students will also be introduced to engineering economics and life cycle assessment for situating engineering decisions within their economic, social, and environmental contexts.

Credits: 0

Room and Schedule: F 11:00AM-12:50PM;Service Building, Digital Experience Classroom 100

Satisfies Core Requirement: None

Prerequisites: ENGR2101 and ENGR2102

Corequisites: None

Cross-listed with: None

Frequency: Annually

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR210501

Engineering Foundations Studio V

Herkins, Ashley

Spring 2025

In this course students will conduct semester-long projects in human-centered engineering analysis. In small groups and with a faculty advisor, students will identify a topic of interest in the domains of health, energy, or the environment; conduct background research using literature sources; define a problem and an appropriate engineering methodology; execute their analysis; and prepare a report of their conclusions. Students will be expected to identify and apply mathematical, scientific, and engineering concepts relevant to their project. Students will gain experience with project management, teamwork, and professional communication.

Credits: 2

Room and Schedule: 245 Beacon Street Room 311 Tu 04:30PM-06:20PM

Satisfies Core Requirement: None

Prerequisites: None

Corequisites: None

Cross-listed with: None

Frequency: Annually

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR210502

Engineering Foundations Studio V

Salifu, Ali A

Spring 2025

In this course students will conduct semester-long projects in human-centered engineering analysis. In small groups and with a faculty advisor, students will identify a topic of interest in the domains of health, energy, or the environment; conduct background research using literature sources; define a problem and an appropriate engineering methodology; execute their analysis; and prepare a report of their conclusions. Students will be expected to identify and apply mathematical, scientific, and engineering concepts relevant to their project. Students will gain experience with project management, teamwork, and professional communication.

Credits: 2

Room and Schedule: 245 Beacon Street Room 302 W 11:00AM-12:50PM

Satisfies Core Requirement: None

Prerequisites: None

Corequisites: None

Cross-listed with: None

Frequency: Annually

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR270301

Second-Year Human-Centered Engineering Reflection 2

Henriques, Justin Joseph

Spring 2025

Students will participate in weekly reflections designed to integrate experiences in the HCE classroom with broader questions about the relationships among engineering, design, and society. In the second year, students will explore ideas of engineering identity, connections between engineering and philosophy and theology, and the needs of HCE as a new field of study.

Credits: 0

Room and Schedule: 245 Beacon Street Room 302 W 09:00AM-09:50AM

Satisfies Core Requirement: None

Prerequisites: None

Corequisites: None

Cross-listed with: None

Frequency: Every Spring

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR270302

Second-Year Human-Centered Engineering Reflection 2

Henriques, Justin Joseph

Spring 2025

Students will participate in weekly reflections designed to integrate experiences in the HCE classroom with broader questions about the relationships among engineering, design, and society. In the second year, students will explore ideas of engineering identity, connections between engineering and philosophy and theology, and the needs of HCE as a new field of study.

Credits: 0

Room and Schedule: 245 Beacon Street Room 302 W 03:00PM-03:50PM

Satisfies Core Requirement: None

Prerequisites: None

Corequisites: None

Cross-listed with: None

Frequency: Every Spring

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR310001

Collaborative Service Engineering Project

Henriques, Justin Joseph

Spring 2025

In this course, students will conduct an engineering project in service of and in collaboration with local community groups. During this process, students will meet with stakeholders to better understand problems, evaluate problems using engineering methods, propose and prototype recommended solutions, and prepare a final report that they will share with their community partners. In this course, students will conduct an engineering project in service of and in collaboration with local community groups. During this process, students will meet with stakeholders to better understand problems, evaluate problems using engineering methods, propose and prototype recommended solutions, and prepare a final report that they will share with their community partners.

Credits: 3

Room and Schedule: 245 Beacon Street Room 311 MWF 12:00 Noon-12:50PM

Satisfies Core Requirement: None

Prerequisites: None

Corequisites: None

Cross-listed with: None

Frequency: Every Fall, Every Summer, Every Spring

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR310002

Collaborative Service Engineering Project

Govindasamy, Siddhartan

Spring 2025

In this course, students will conduct an engineering project in service of and in collaboration with local community groups. During this process, students will meet with stakeholders to better understand problems, evaluate problems using engineering methods, propose and prototype recommended solutions, and prepare a final report that they will share with their community partners. In this course, students will conduct an engineering project in service of and in collaboration with local community groups. During this process, students will meet with stakeholders to better understand problems, evaluate problems using engineering methods, propose and prototype recommended solutions, and prepare a final report that they will share with their community partners.

Credits: 2

Room and Schedule: TBD

Satisfies Core Requirement: None

Prerequisites: None

Corequisites: None

Cross-listed with: None

Frequency: Every Fall, Every Summer, Every Spring

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR310301

Advanced Math for Engineers

Govindasamy, Siddhartan

Spring 2025

This course will introduce students to mathematical tools and techniques which would be relevant to engineers across a wide range of disciplines. Topics such as partial differential equations, introductory complex analysis, and Laplace, and Fourier transforms will be covered.

Credits: 3

Room and Schedule: 245 Beacon Street Room 302 TuTh 01:30PM-02:45PM

Satisfies Core Requirement: None

Prerequisites: CALC 2 (MATH1101 or MATH1103); ENGR2102 or MATH4410; ENGR1105 or MATH2210. Open to Human-Centered Engineering majors; open to other majors by permission of instructor.

Corequisites: None

Cross-listed with: None

Frequency: Annually

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR310501

Introduction to Statistical Data Analysis and Machine Learning

Mohebbi, Amin

Spring 2025

This course offers a comprehensive exploration of MATLAB's applications in the field of data science and machine learning. Throughout the program, students will engage in practical scripting and problem-solving, master data visualization techniques, and analyze data distributions and statistics. The course covers essential topics such as hypothesis testing, regression analysis, and the fundamentals of neural networks, equipping students with the skills to construct neural networks and integrate MATLAB into machine learning workflows. With a focus on supervised and unsupervised learning, students will learn to classify, regress, and cluster data while evaluating model performance and applying machine learning to real-world problems. Additionally, students will gain hands-on experience implementing clustering algorithms like K-Means and hierarchical clustering in MATLAB, concluding with insightful case studies and practical examples showcasing the versatility and power of data analysis with novel tools in engineering, mathematics, and scientific disciplines.

Credits: 4

Room and Schedule: Digital Experience Classroom 100;MWF 03:00PM-03:50PM

Satisfies Core Requirement: None

Prerequisites: None

Corequisites: None

Cross-listed with: None

Frequency: Every Spring

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR310502

Introduction to Statistical Data Analysis and Machine Learning

Mohebbi, Amin

Spring 2025

This course offers a comprehensive exploration of MATLAB's applications in the field of data science and machine learning. Throughout the program, students will engage in practical scripting and problem-solving, master data visualization techniques, and analyze data distributions and statistics. The course covers essential topics such as hypothesis testing, regression analysis, and the fundamentals of neural networks, equipping students with the skills to construct neural networks and integrate MATLAB into machine learning workflows. With a focus on supervised and unsupervised learning, students will learn to classify, regress, and cluster data while evaluating model performance and applying machine learning to real-world problems. Additionally, students will gain hands-on experience implementing clustering algorithms like K-Means and hierarchical clustering in MATLAB, concluding with insightful case studies and practical examples showcasing the versatility and power of data analysis with novel tools in engineering, mathematics, and scientific disciplines.

Credits: 0

Room and Schedule: Digital Experience Classroom 100;W 04:00PM-05:50PM

Satisfies Core Requirement: None

Prerequisites: None

Corequisites: None

Cross-listed with: None

Frequency: Every Spring

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR370301

Third-Year Human-Centered Engineering Reflection 2

Brace, Emma

Spring 2025

Students will continue to engage in weekly reflections designed to integrate experiences in the HCE classroom with broader questions about the relationships among engineering, design, and society. In the third year, students will explore potential career paths in addition to ideas of engineering identity, service-based engineering, and what it means to engage with communities during engineering project work.

Credits: 0

Room and Schedule: 245 Beacon Street Room 302 W 02:00PM-02:50PM

Satisfies Core Requirement: None

Prerequisites: Open to Human-Centered Engineering Majors only.

Corequisites: None

Cross-listed with: None

Frequency: Every Spring

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR370302

Third-Year Human-Centered Engineering Reflection 2

Brace, Emma

Spring 2025

Students will continue to engage in weekly reflections designed to integrate experiences in the HCE classroom with broader questions about the relationships among engineering, design, and society. In the third year, students will explore potential career paths in addition to ideas of engineering identity, service-based engineering, and what it means to engage with communities during engineering project work.

Credits: 0

Room and Schedule: Active Learning Classroom 001 F 11:00AM-11:50AM

Satisfies Core Requirement: None

Prerequisites: Open to Human-Centered Engineering Majors only.

Corequisites: None

Cross-listed with: None

Frequency: Every Spring

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR410301

Senior Impact Project

Gaudette, Glenn R;Govindasamy, Siddhartan;Pan, Shufen

Spring 2025

This course is the second of a two-course sequence which fulfils the engineering capstone design requirement for the human-centered engineering major. Students will work in teams with internal or external partners on a real-world project. Students will consult with faculty instructors and other faculty members with relevant expertise as needed in completing this course.

Credits: 3

Room and Schedule: MWF 02:00PM-02:50PM;Service Building, Active Learning Classroom 001

Satisfies Core Requirement: None

Prerequisites: ENGR4102

Corequisites: None

Cross-listed with: None

Frequency: Annually

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR411001

Polymer Engineering for Health and the Environment

Herkins, Ashley

Spring 2025

In this course, students will explore polymer engineering with a strong focus on environmental and health impacts. We will examine both natural and synthetic polymers, emphasizing their roles in ecological sustainability and healthcare advancements. Key topics include distinguishing plastics from inorganic materials, fundamental concepts in polymer engineering (such as building blocks, structure, elementary reactions, and polymerization mechanisms), and the importance of recycling, including the Big 6 polymers. A significant component of the course will be dedicated to understanding the environmental implications of polymer use and disposal, as well as the potential for polymers to contribute to sustainable practices. We will also explore the chemistry of natural polymers derived from plants, animals, and humans, and their applications in improving health outcomes through medical technologies. Students will engage with these concepts through practical assignments and exams, tackling open-ended questions that address both environmental challenges and health-related innovations.

Credits: 3

Room and Schedule: 245 Beacon Street Room 311 MWF 09:00AM-09:50AM

Satisfies Core Requirement: None

Prerequisites: CHEM1109 and CHEM1111

Corequisites: None

Cross-listed with: None

Frequency: Annually

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR422201

Engineering Principles in Physiology

Perreault, Luke

Spring 2025

Engineering Principles in Physiology is a laboratory-based course exploring physiological concepts foundational to biomedical engineering. Systems covered include the musculoskeletal, nervous, cardiovascular, and respiratory. How the function of these systems can be evaluated and quantified in the context of engineering principles is emphasized through a combination of in-class review and laboratory projects: for example, computational modeling of enzyme kinetics within cells, methods to quantify and evaluate cardiac and respiratory function, understanding fluid mechanics within the cardiovascular system, and action potential propagation in musculoskeletal tissue. The ethical & human-centered responsibilities of engineers working at the medical-technological interface are considered for each topic through case studies and in-class discussion.

Credits: 4

Room and Schedule: MWF 01:00PM-01:50PM;Service Building, Material Analysis Lab Room 008

Satisfies Core Requirement: None

Prerequisites: ENGR2103 and ENGR2104 and ENGR2105

Corequisites: None

Cross-listed with: None

Frequency: Annually

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR422202

Engineering Principles in Physiology

Perreault, Luke

Spring 2025

Engineering Principles in Physiology is a laboratory-based course exploring physiological concepts foundational to biomedical engineering. Systems covered include the musculoskeletal, nervous, cardiovascular, and respiratory. How the function of these systems can be evaluated and quantified in the context of engineering principles is emphasized through a combination of in-class review and laboratory projects: for example, computational modeling of enzyme kinetics within cells, methods to quantify and evaluate cardiac and respiratory function, understanding fluid mechanics within the cardiovascular system, and action potential propagation in musculoskeletal tissue. The ethical & human-centered responsibilities of engineers working at the medical-technological interface are considered for each topic through case studies and in-class discussion.

Credits: 0

Room and Schedule: M 04:00PM-05:50PM;Service Building, Material Analysis Lab Room 008

Satisfies Core Requirement: None

Prerequisites: ENGR2103 and ENGR2104 and ENGR2105

Corequisites: None

Cross-listed with: None

Frequency: Annually

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR432001

Quantitative Sustainable Design

Brace, Emma

Spring 2025

This is a project-based course that focuses on the application of quantitative sustainable design (QSD) to energy technologies. QSD is a framework linking design and operational decisions to sustainability indicators to inform decision-making. This allows for navigation of trade-offs across environmental, economic, and social dimensions of sustainability. In this course students will learn methods for economic analyses (TEA - techno-economic analysis, LCC - life cycle costing) and environmental sustainability assessment (LCA - life cycle assessment) as well as uncertainty and sensitivity analyses. Students will apply this process to a semester-long design project of an energy technology of interest.

Credits: 4

Room and Schedule: 245 Beacon Street Room 311 TuTh 12:00 Noon-01:15PM

Satisfies Core Requirement: None

Prerequisites: ENGR2103 and ENGR2104 and ENGR2105 and CHEM1109 and CHEM1111

Corequisites: None

Cross-listed with: None

Frequency: Annually

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR432002

Quantitative Sustainable Design

Brace, Emma

Spring 2025

This is a project-based course that focuses on the application of quantitative sustainable design (QSD) to energy technologies. QSD is a framework linking design and operational decisions to sustainability indicators to inform decision-making. This allows for navigation of trade-offs across environmental, economic, and social dimensions of sustainability. In this course students will learn methods for economic analyses (TEA - techno-economic analysis, LCC - life cycle costing) and environmental sustainability assessment (LCA - life cycle assessment) as well as uncertainty and sensitivity analyses. Students will apply this process to a semester-long design project of an energy technology of interest.

Credits: 0

Room and Schedule: Digital Experience Classroom 100 Tu 04:30PM-06:20PM

Satisfies Core Requirement: None

Prerequisites: ENGR2103 and ENGR2104 and ENGR2105 and CHEM1109 and CHEM1111

Corequisites: None

Cross-listed with: None

Frequency: Annually

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR433001

Green Building Design

Mohebbi, Amin

Spring 2025

The intent of this course is to provide an overview of concepts in green building and sustainability practices, as related to site and building construction. We will discuss technical aspects of building energy usage and how past, current, and potential future processes are used in providing comfort and energy management for the occupants. We will also be looking at a popular internationally recognized rating system (LEED), focusing on the Building Design and Construction (LEED BD+C) specialization. Topics to be covered include: review on architectural and site plan reading, site selection and development, energy and water efficiency, appropriate applications of emerging technology, indoor air and environment quality, lighting choices (interior and site), and sustainability. .

Credits: 3

Room and Schedule: 245 Beacon Street Room 302 MWF 10:00AM-10:50AM

Satisfies Core Requirement: None

Prerequisites: Open to Human-Centered Engineering majors; open to other majors by permission of instructor.

Corequisites: None

Cross-listed with: None

Frequency: Annually

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR441001

Engineering for Sustainable Development

Conroy, Kristen M

Spring 2025

This course will focus on engineering for sustainable development. We will consider technical, social and ecological aspects of built water, sanitation and hygiene (WaSH) systems. We will engage with current design solutions and consider their acceptance and efficacy. We will explore frameworks, ways of knowing, and constraints that influence sustainable development engineering practice and areas of research.

Credits: 3

Room and Schedule: 245 Beacon Street Room 311 TuTh 03:00PM-04:15PM

Satisfies Core Requirement: None

Prerequisites: ENGR2103 or ENGR1801/HIST1627 or ENGR1025 or ENGR1026

Corequisites: None

Cross-listed with: None

Frequency: Annually

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR442001

Water Quality Engineering

Hoar, Catherine

Spring 2025

This course will introduce students to water quality engineering, the branch of environmental engineering concerned with the treatment of water and wastewater. We will examine sources of water contaminants, including pathogens and chemical pollutants, and discuss the risks these contaminants pose to human health and the environment. Students will learn about the physical, chemical, and biological processes that govern contaminant fate in natural and engineered water systems. Through inquiry-based laboratories, students will apply analytical techniques for measuring water quality to assess water treatment processes. A collaborative course project will address emerging challenges in water quality and resource recovery.

Credits: 4

Room and Schedule: 245 Beacon Street Room 311 TuTh 10:30AM-11:45AM

Satisfies Core Requirement: None

Prerequisites: Calculus I: (MATH1100) or (MATH1102) or (MATH1002 and MATH1003) or equivalent; General Chemistry I w/ Lab: (CHEM1109 and CHEM1111) or equivalent

Corequisites: None

Cross-listed with: None

Frequency: Annually

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR442002

Water Quality Engineering

Hoar, Catherine

Spring 2025

This course will introduce students to water quality engineering, the branch of environmental engineering concerned with the treatment of water and wastewater. We will examine sources of water contaminants, including pathogens and chemical pollutants, and discuss the risks these contaminants pose to human health and the environment. Students will learn about the physical, chemical, and biological processes that govern contaminant fate in natural and engineered water systems. Through inquiry-based laboratories, students will apply analytical techniques for measuring water quality to assess water treatment processes. A collaborative course project will address emerging challenges in water quality and resource recovery.

Credits: 0

Room and Schedule: Material Analysis Lab 008 Th 04:30PM-06:20PM

Satisfies Core Requirement: None

Prerequisites: Calculus I: (MATH1100) or (MATH1102) or (MATH1002 and MATH1003) or equivalent; General Chemistry I w/ Lab: (CHEM1109 and CHEM1111) or equivalent

Corequisites: None

Cross-listed with: None

Frequency: Annually

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR470501

Senior Year Human-Centered Engineering Reflection 2

Ranger, Bryan J

Spring 2025

Students will participate in weekly reflections designed to integrate experiences in the HCE classroom with broader questions about the relationships among engineering, design, and society. In the fourth year, students will reflect on questions related to the responsibility of engineers in society, the practice engineering as seen through their engineering senior impact projects, and their own formation as fourth year students.

Credits: 0

Room and Schedule: 245 Beacon Street Room 302 F 12:00 Noon-12:50PM

Satisfies Core Requirement: None

Prerequisites: Open to Human-Centered Engineering majors only.

Corequisites: None

Cross-listed with: None

Frequency: null

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR490101

Undergraduate Research in Human-Centered Engineering

Gaudette, Glenn R

Spring 2025

Undergraduate research in Human-Centered Engineering under the direction of a faculty member.

Credits: 3

Room and Schedule: By Arrangement

Satisfies Core Requirement: None

Prerequisites: Permission of Department

Corequisites: None

Cross-listed with: None

Frequency: Every Fall,Every Spring

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR490102

Undergraduate Research in Human-Centered Engineering

Ranger, Bryan J

Spring 2025

Undergraduate research in Human-Centered Engineering under the direction of a faculty member.

Credits: 3

Room and Schedule: By Arrangement

Satisfies Core Requirement: None

Prerequisites: Permission of Department

Corequisites: None

Cross-listed with: None

Frequency: Every Fall,Every Spring

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR491101

Independent Study in Human-Centered Engineering

Gaudette, Glenn R

Spring 2025

Independent study in Human-Centered Engineering under the direction of a faculty member.

Credits: 3

Room and Schedule: By Arrangement

Satisfies Core Requirement: None

Prerequisites: Permission of Department

Corequisites: None

Cross-listed with: None

Frequency: Every Fall, Every Spring

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR491102

Independent Study in Human-Centered Engineering

Henriques, Justin Joseph

Spring 2025

Independent study in Human-Centered Engineering under the direction of a faculty member.

Credits: 3

Room and Schedule: By Arrangement

Satisfies Core Requirement: None

Prerequisites: Permission of Department

Corequisites: None

Cross-listed with: None

Frequency: Every Fall, Every Spring

Student Level: Undergraduate

Comments: None

Status: Offered

ENGR491103**Independent Study in Human-Centered Engineering****Govindasamy, Siddhartan****Spring 2025**

Independent study in Human-Centered Engineering under the direction of a faculty member.

Credits: 3**Room and Schedule:** By Arrangement**Satisfies Core Requirement:** None**Prerequisites:** Permission of Department**Corequisites:** None**Cross-listed with:** None**Frequency:** Every Fall, Every Spring**Student Level:** Undergraduate**Comments:** None**Status:** Offered

ENGR491201**Independent Study in Human-Centered Engineering****Govindasamy, Siddhartan****Spring 2025**

Independent study in Human-Centered Engineering under the direction of a faculty member.

Credits: 2**Room and Schedule:** By Arrangement**Satisfies Core Requirement:** None**Prerequisites:** Permission of Department**Corequisites:** None**Cross-listed with:** None**Frequency:** Every Fall, Every Spring**Student Level:** Undergraduate**Comments:** None**Status:** Offered

ENGR492101**Topics in Human-Centered Engineering****Gaudette, Glenn R**

Spring 2025

Topics for this course vary from semester to semester and are determined by the interests of faculty and students.

Credits: 3

Room and Schedule: By Arrangement

Satisfies Core Requirement: None

Prerequisites: Human Centered Engineering Majors Only

Corequisites: None

Cross-listed with: None

Frequency: Periodically

Student Level: Undergraduate

Comments: None

Status: Offered
