JumpStart 3rd Year- Presentation

Undergraduate Academic Advisor Team

Topics

- Introduction
- JS3 Overview
  - Requirements
- MyDegreePath
- Things you should know
- Career Planning
- Webform

Degree Requirements

Requirements are based on catalog year you entered

2024-2025

Catalog.ucmerced.edu

Remember your catalog year doesn't change.

Important Links

Engr-advising.ucmerced.edu

- Appointments and Walk-in Hours
- Policies
- Major info, flow charts, etc.
- Engineering specific forms

Registrar.ucmerced.edu

- All university policies,
- procedures, deadlines
- All university forms

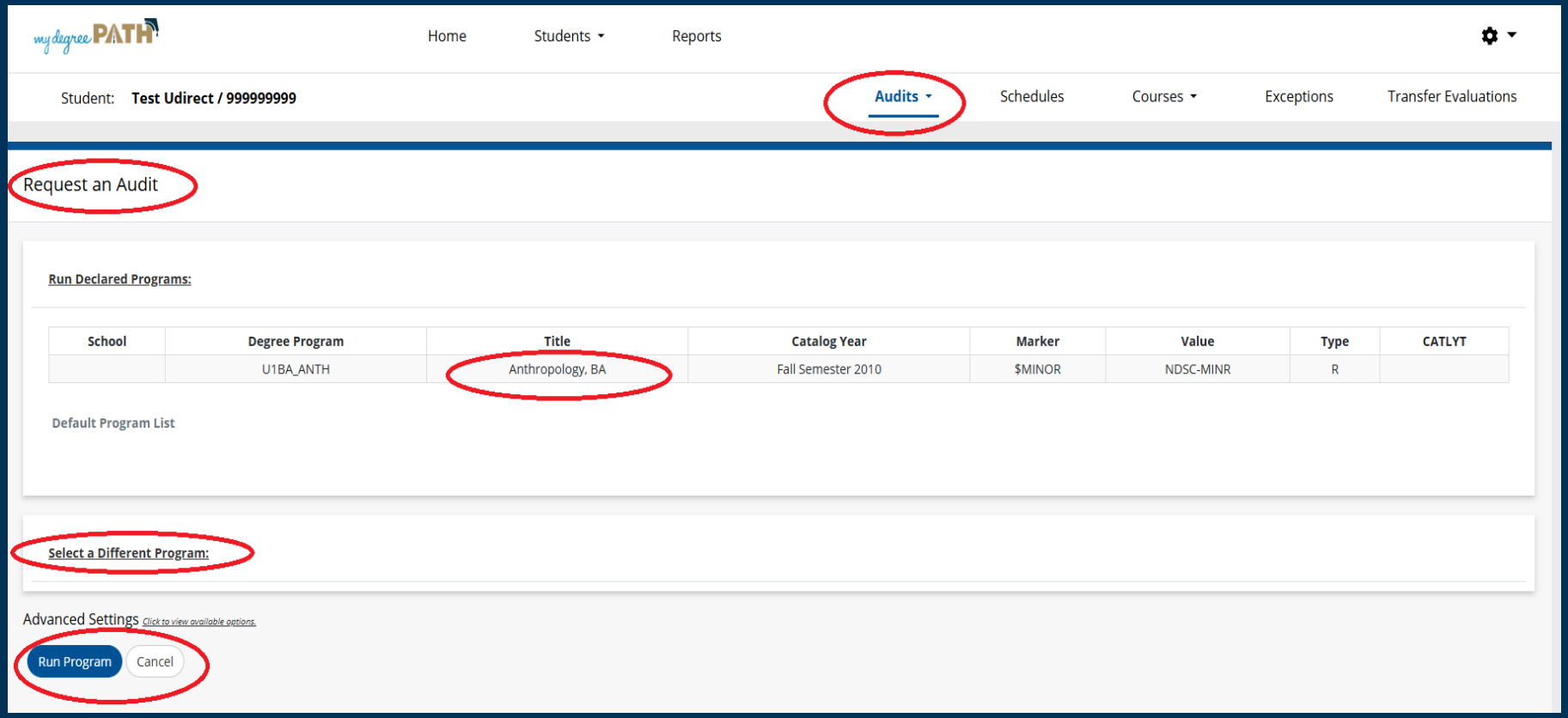
Advising.ucmerced.edu

- For general campus advising information

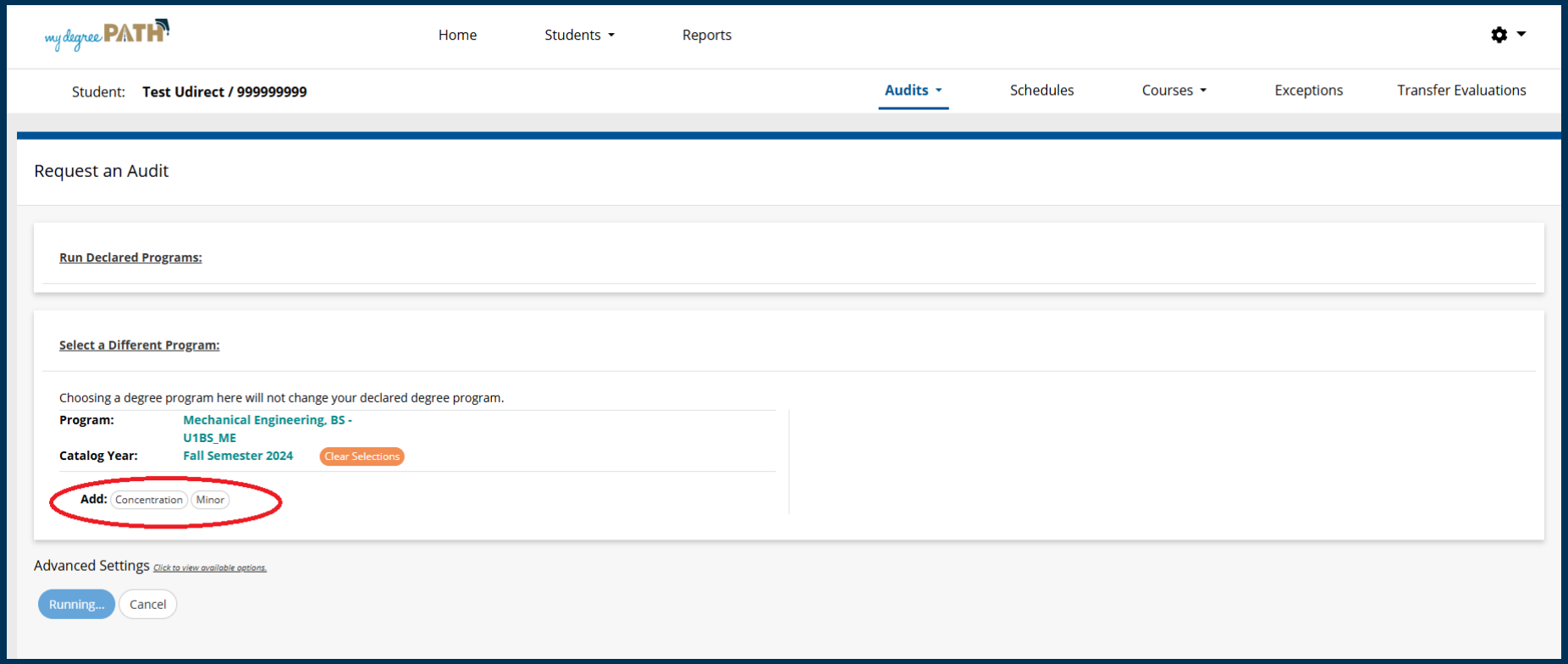
Don't "Google" it – look within the site or catalog

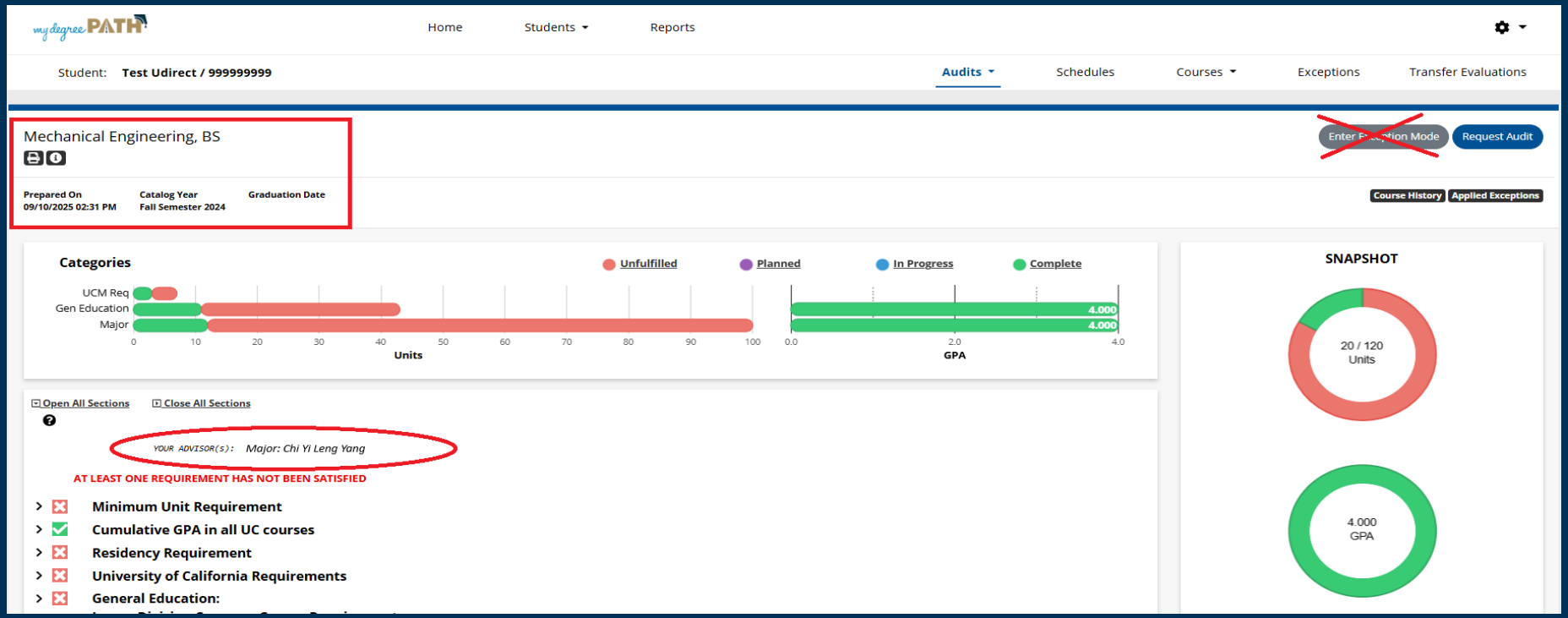
Overview of MyDegreePath

Running a Degree Audit using MyDegreePath



Explore Requirements for Minors/Majors

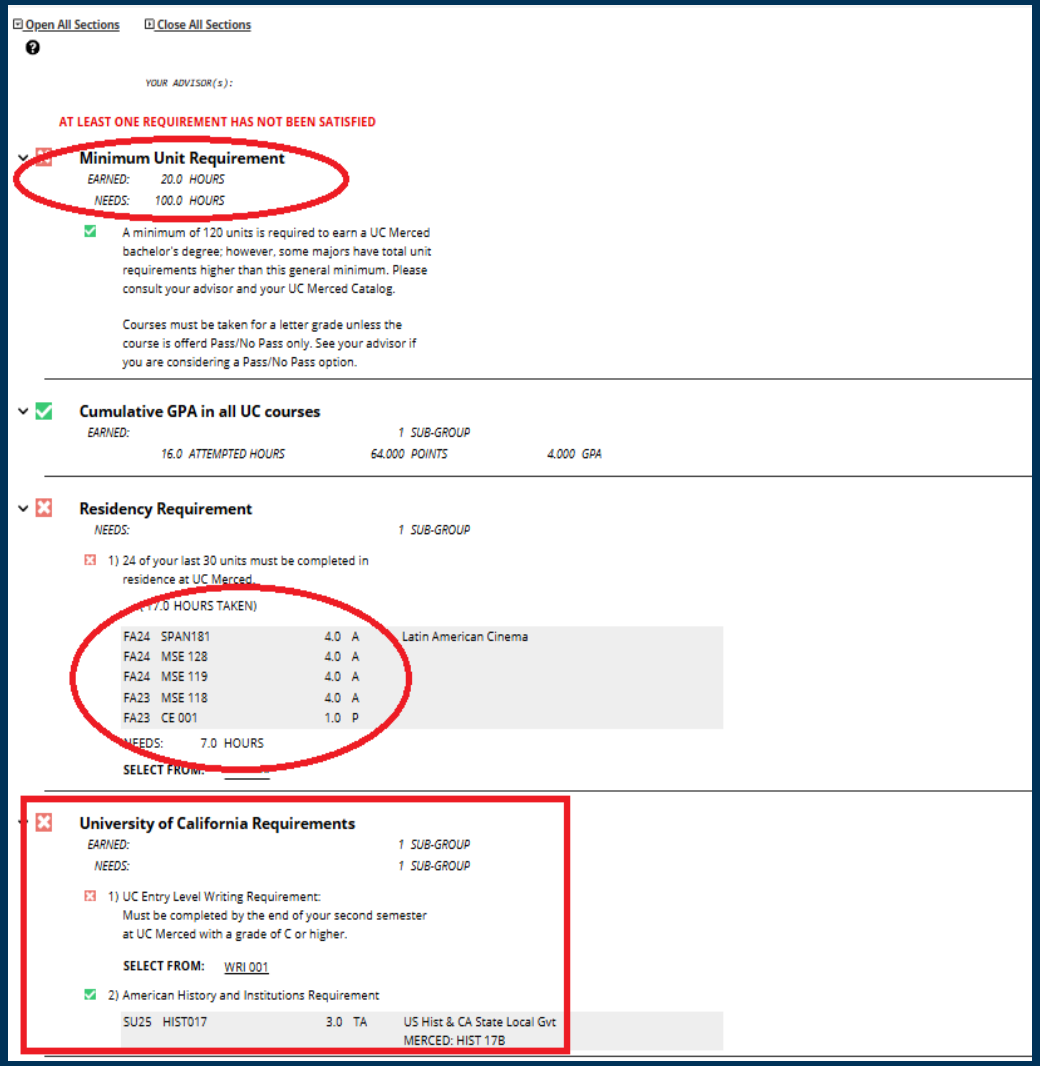


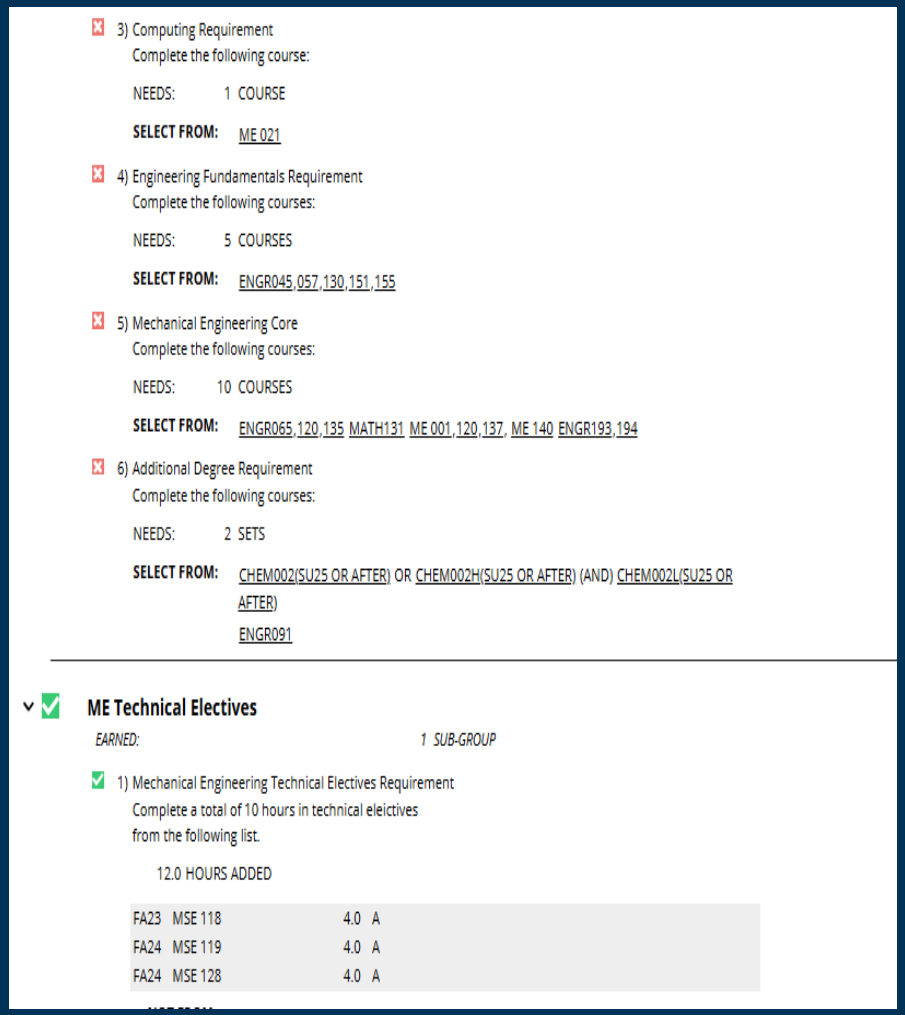


- An audit is your official student record
- Includes all of your completed, in-progress and outstanding degree requirements

- After making changes to your courses (adding/dropping) it is recommended you run an audit to see how your changes reflect on your degree audit

- MyDegreePath Requirement
- Minimum Unit Requirement
- Courses taken
- University Requirement
- General Education
    - Lower Division
    - General Upper Div.
    - GE in Soc, Lit, Media
    - GE in Life Sci, Phys
- Major Requirement
- Emphasis
- Intellectual Experiences





Note the following:

- ✓ and ✗ on **Audit**
- **IP vs letter grade**
- **Non – UC transfer work**
  *** no GPA**
- **Course and unit credit may not be up to date, contact us or registrar**
- **Official transcripts only way to update**
- **Official AP/IB need as well**

Again, for an Audit report:

1. **log into** myconnect.ucmerced.edu,
2. **select "MyStudentRecord"**
3. **select "MyDegreePath"**
4. **Select "RunAudit"**

Creating Grad Plans

MyDegreePath currently does not have the feature to create grad plan.

It is scheduled to return Spring 2026

- You can use grad plan template
  - https://engr-advising.ucmerced.edu/jumpstart3
- You can use graduation plan found on Catalog 2024-2025
  - https://catalog.ucmerced.edu/content.php?catoid=23&navoid=2429
- You can use the 4-year flow charts:
  - https://engr-advising.ucmerced.edu/majors

SCHOOL OF ENGINEERING
UCMERCED

Name _____

School of Engineering: Graduation Planning

Semester: Fall 2015 Semester #5 (Example)

Course	Title	Units
MATH 032	Statistics	4 units
ME 021	Engineering Computing	4 units
ART 003B	Intermediate Painting (Arts/Humanities GE)	4 units
ENGR 045	Introduction to Materials	4 units

Semester_____

Course	Title	Units

Semester_____

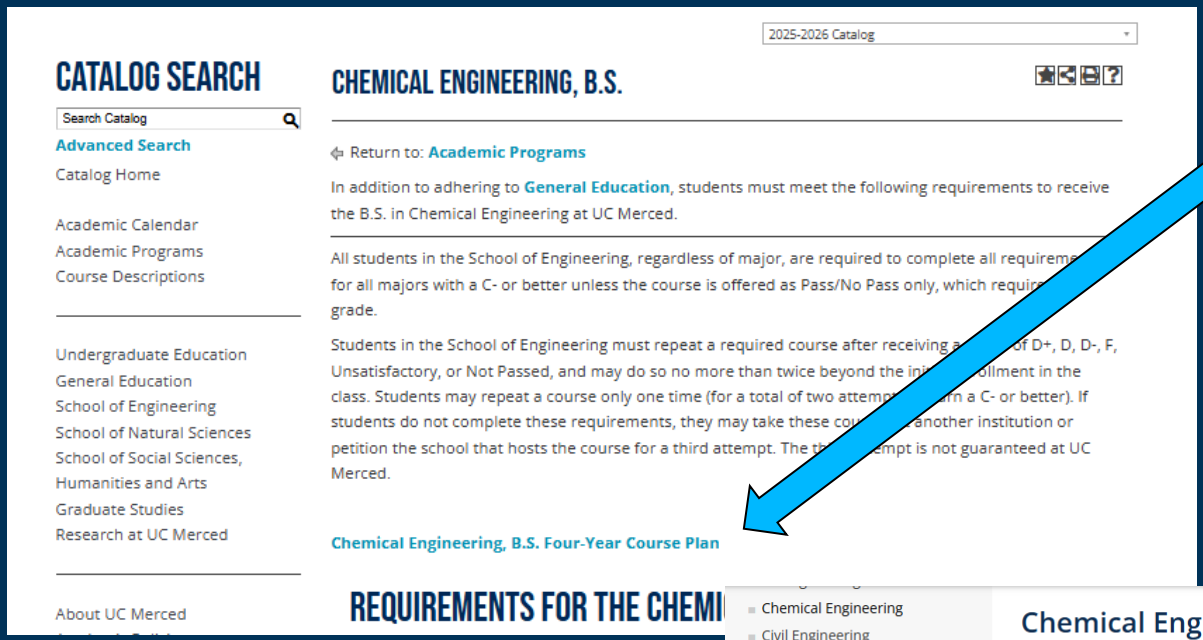
Course	Title	Units

Semester_____

Course	Title	Units

4 Year Course Plan:

https://catalog.ucmerced.edu/content.php?catoid=24&navoid=2734



https://engr-advising.ucmerced.edu/majors

*not all catalog years may have a flow chart

TIPS for CheE Major

FIRST YEAR	
Fall	**Spring**
CHE 001: Introduction to Chemical and Materials Engineering	MATH 022: Calculus II for Physical Sciences and Engineering
MATH 021: Calculus I for Physical Sciences and Engineering	PHYS 009: Introductory Physics II for Physical Sciences and PHYS 009L
PHYS 008: Introductory Physics I for Physical Sciences and PHYS 008L	CHEM 010: General Chemistry II and CHEM 010L
CHEM 002: General Chemistry I and CHEM 002L	WRI 010: College Reading and Composition
SPRK 010: Spark Seminar	
SECOND YEAR	
Fall	**Spring**
MATH 024: Linear Algebra and Differential Equations	MATH 023: Vector Calculus
ENGR 030: Introduction to Conservation Principles in Engineering	ME 021: Engineering Computing
ENGR 045: Introduction to Materials	ENGR 120: Fluid Mechanics
ENGR 057: Statics and Dynamics	ENGR 091: Professional Development: People in an Engineered World
THIRD YEAR	
Fall	**Spring**
ENGR 130: Thermodynamics	CHE 111: Kinetics and Reactor Design
CHEM 008: Principles of Organic Chemistry and CHEM 008L	CHE 120: Heat Transfer and Numerical Methods
CHE 110: Mass Transfer and Separation	CHEM 112: Quantum Chemistry and Spectroscopy
General Education: Area B–Approaches to Knowledge Social Science, Literary and Textual Analysis, Media and Visual Analysis, Societies and Cultures of the Past	Major Science Elective
SUMMER BETWEEN THIRD AND FOURTH YEAR	
CHE 150: Unit Operations Lab I	
FOURTH YEAR	
Fall	**Spring**
CHE 130: Plant Design	CHEM 153: Physical Chemistry Laboratory
ENGR 194: Engineering Capstone Design II	Major Technical Elective/Emphasis Requirement or Elective
Major Technical Elective/Emphasis Requirement or Elective	Major Technical Elective/Emphasis Requirement or Elective
General Education: Area B–Approaches to Knowledge Social Science, Literary and Textual Analysis, Media and Visual Analysis, Societies and Cultures of the Past	General Education: Area B–Approaches to Knowledge Social Science, Literary and Textual Analysis, Media and Visual Analysis, Societies and Cultures of the Past

Engr 30 is only offered in the Spring semester

Look at course prerequisite ahead of time Example: CHEE 110 requires ENGR 30, 120, Phys 9 and Chem 10

Pay attention to Capstone requirements

Take Math 24 before Math 23. Why? Because most upper div. In ChemE requires Math 24

Chem 10 is the key course for most upper division in ChemE

Specific Technical Elective that you want to enroll in such as CEE 160 requires Enve 20, CE 20, ESS 20

Chemical Engineering Major

REQUIREMENTS FOR THE CHEMICAL ENGINEERING MAJOR

LOWER DIVISION MAJOR REQUIREMENTS [65 UNITS]

MATHEMATICS REQUIREMENT [16 UNITS]

Complete the following courses:

- **MATH 021: Calculus I for Physical Sciences and Engineering** Units: 4
- **MATH 022: Calculus II for Physical Sciences and Engineering** Units: 4
- **MATH 023: Vector Calculus** Units: 4 or **MATH 023H**
- **MATH 024: Linear Algebra and Differential Equations** Units: 4

CHEMISTRY REQUIREMENT [15 UNITS]

Complete the following courses:

- **CHEM 002: General Chemistry I** Units: 4
- **CHEM 002L: General Chemistry I Lab** Units: 1
- **CHEM 008: Principles of Organic Chemistry** Units: 4 or **CHEM 008H**
- **CHEM 008L: Principles of Organic Chemistry Lab** Units: 1 or **CHEM 008HL**
- **CHEM 010: General Chemistry II** Units: 4
- **CHEM 010L: General Chemistry II Lab** Units: 1

PHYSICS REQUIREMENT [10 UNITS]

Complete the following courses:

- **PHYS 008: Introductory Physics I for Physical Sciences** Units: 4
- **PHYS 008L: Introductory Physics I for Physical Sciences Lab** Units: 1
- **PHYS 009: Introductory Physics II for Physical Sciences** Units: 4
- **PHYS 009L: Introductory Physics II for Physical Sciences Lab** Units: 1

SCIENCE ELECTIVE [5 UNITS]

Complete one of the following courses:

- **BIOE 002: Fundamentals of Molecular Biology** Units: 4 and **BIOE 002L**
- **BIO 011: Introduction to Molecular Biology** Units: 4 and **BIO 011L**

SCIENCE ELECTIVE [5 UNITS]

Complete one of the following courses:

- **BIOE 002: Fundamentals of Molecular Biology** Units: 4 and **BIOE 002L**
- **BIO 011: Introduction to Molecular Biology** Units: 4 and **BIO 011L**

ENGINEERING REQUIREMENT [14 UNITS]

Complete the following courses:

- **ENGR 030: Introduction to Conservation Principles in Engineering** Units: 4
- **ENGR 045: Introduction to Materials** Units: 4
- **ENGR 057: Statics and Dynamics** Units: 4
- **ENGR 091: Professional Development: People in an Engineered World** Units: 2

COMPUTING REQUIREMENT [4 UNITS]

Complete the following course:

- **ME 021: Engineering Computing** Units: 4

CHEMICAL ENGINEERING REQUIREMENT [1 UNIT]

Complete the following course:

- **CHE 001: Introduction to Chemical and Materials Engineering** Units: 1

UPPER DIVISION MAJOR REQUIREMENTS [38 UNITS]

CHEMISTRY REQUIREMENT [6 UNITS]

Complete the following courses:

- **CHEM 112: Quantum Chemistry and Spectroscopy** Units: 4
- **CHEM 153: Physical Chemistry Laboratory** Units: 2

ENGINEERING REQUIREMENT [7 UNITS]

Complete the following courses:

- **ENGR 120: Fluid Mechanics** Units: 4

Chemical Engineering Technical Electives

TECHNICAL ELECTIVE REQUIREMENT [9-12 UNITS]

Complete a minimum of 3 technical electives chosen from the lists below.

GENERAL ENGINEERING AND SCIENCES

- **CHE 162: 3D Printing Research and Development** Units: 4
- **CHE 165: Plastic Pollution** Units: 3
- **CHE 195: Chemical Engineering Undergraduate Research** Units: *
- **CHE 196H: Honors Thesis for Chemical Engineering** Units: 2 *
- **MSE 104: Engineering Living Systems** Units: 3
- **MSE 104L: Engineering Living Systems Lab** Units: 1
- **MSE 110: Solid State Materials** Units: 4
- **MSE 113: Materials Characterization** Units: 4
- **MSE 114: Polymeric Materials** Units: 4
- **MSE 115: Ceramic Materials** Units: 3
- **MSE 116: Composites** Units: 3
- **MSE 117: New Materials** Units: 3
- **MSE 118: Introduction to Nanotechnology and Nanoscience** Units: 4
- **MSE 119: Computational Materials Science** Units: 4
- **MSE 121: Mechanical Behavior of Materials** Units: 4
- **MSE 128: Electronic Materials and Semiconductor Device Fabrication** Units: 4
- **MSE 151: Materials Processing & Performance I: Materials Thermodynamics and Kinetics** Units: 4
- **MSE 152: Materials Processing & Performance II: Materials Selection** Units: 4

NANOTECHNOLOGY-THEME TECHNICAL ELECTIVES

- **MSE 118: Introduction to Nanotechnology and Nanoscience** Units: 4
- **MSE 119: Computational Materials Science** Units: 4
- **MSE 128: Electronic Materials and Semiconductor Device Fabrication** Units: 4
- **ENGR 170: Introduction to Electron Microscopy** Units: 3

ENVIRONMENTAL AND SUSTAINABLE ENGINEERING-THEME TECHNICAL ELECTIVES

- **CHEM 160: Introduction to Scientific Computing for Chemists** Units: 3
- **CEE 105: Environmental Engineering Chemistry** Units: 4
- **CEE 160: Sustainable Energy** Units: 4
- **ENGR 156: Technical and Professional Writing for Scientists and Engineers** Units: 4
- **ENGR 170: Introduction to Electron Microscopy** Units: 3
- **ESS 170: Fundamentals of Soil Science** Units: 3
- **MSE 113: Materials Characterization** Units: 4
- **MSE 114: Polymeric Materials** Units: 4
- **MSE 161: Sustainable Energy: Powering the World with Minimal Use of Materials** Units: 4

TISSUE ENGINEERING-THEME TECHNICAL ELECTIVES

- **BIO 101: Biochemistry I** Units: 4
- **BIO 110: The Cell** Units: 4
- **BIO 118: Gene Editing Research Lab** Units: 3
- **BIO 150: Embryos, Genes, and Development** Units: 4
- **BIO 150L: Developmental Biology Laboratory** Units: 3
- **BIO 152: Cancer Genetics and Tumor Biology** Units: 4
- **BIO 180: Mathematical Modeling for Biology** Units: 4
- **BIO 182: Bioinformatics** Units: 4
- **ENGR 156: Technical and Professional Writing for Scientists and Engineers** Units: 4
- **ENGR 170: Introduction to Electron Microscopy** Units: 3
- **MSE 104: Engineering Living Systems** Units: 3 and **MSE 104L**
- **MSE 113: Materials Characterization** Units: 4
- **MSE 114: Polymeric Materials** Units: 4

Emphasis: Computational and Material Science and Engineering

COMPUTATIONAL EMPHASIS

Computational tools such as machine learning, materials simulation, and multi-scale modeling are revolutionizing nearly all aspects of our modern world. These tools enable materials properties prediction and discovery; rapid synthesis and characterization of new materials for emerging applications; and control of chemical and materials processing for improved quality control for semiconductors, beverages and food, and other manufacturing applications.

COMPUTATIONAL EMPHASIS CORE REQUIREMENT [11-12 UNITS]

Complete the following courses in satisfaction of the CHE technical elective r

- **MSE 119: Computational Materials Science** Units: 4

AND ONE OF THE FOLLOWING

- **ENGR 143: Statistical Quality Control** Units: 4
- **ENGR 145: Machine Learning for Engineers** Units: 4
- **MATH 180: Applied Statistics and Machine Learning** Units: 4

AND ONE OF THE FOLLOWING

- **MATH 131: Numerical Methods for Scientists and Engineers** Units:
- **ME 135: Finite Element Analysis** Units: 4
- **ME 137: Computer Aided Engineering** Units: 3

MATERIALS SCIENCE AND ENGINEERING EMPHASIS

Materials Science and Engineering (MSE) applies fundamental principles of physics, chemistry and biology to the design and production of materials with desired combinations of mechanical, optical, electrical, magnetic, electrochemical, biocompatible and other properties. Also encompassed in MSE are the methods by which particular atomic and molecular arrangements (nanostructures and microstructures) are achieved, the overall financial and environmental cost of the ingredients and processes used to produce particular materials, and characterization of materials structure and properties. The Materials Emphasis will help equip Chemical Engineering students with knowledge and skills of importance to existing materials industries, such as semiconductor, polymer, battery, automobile, and aerospace manufacturing; and for new materials industries, such as 3D printing and additive manufacturing.

MATERIALS SCIENCE AND ENGINEERING EMPHASIS CORE REQUIREMENT [12 UNITS]

Complete the following courses in satisfaction of the CHE technical elective requirement:

- **MSE 110: Solid State Materials** Units: 4
- **MSE 151: Materials Processing & Performance I: Materials Thermodynamics and Kinetics** Units: 4
- **MSE 152: Materials Processing & Performance II: Materials Selection** Units: 4

Emphasis in – Nanotechnology and Semiconductor

NANOTECHNOLOGY EMPHASIS

Nanotechnology is shaping – and will continue to shape – the needs of future workforces. To prepare our graduates for current and future industrial needs, it is pertinent to have an education program that clearly shows students how nanotechnology connects and interacts with each traditional field. Also, aspects of nanotechnology that are not covered by traditional disciplines need to be taught. We therefore offer a Nanotechnology Emphasis that fills this educational gap and is complementary to our other programs. In addition to teaching nanoscale synthesis, characterization and fabrication, as well as simulation, other salient aspects of this Emphasis include:

i. enabling students to learn the knowledge and skills that bridge basic research and appli
specific device development;
ii. enabling students to integrate knowledge from different fields, and thus to stay abreast
exciting scientific breakthroughs and discoveries that are advancing the field of nanotec
every day.

NANOTECHNOLOGY EMPHASIS CORE REQUIREMENT [11-12 UNITS]

Complete the following courses in satisfaction of the CHE technical elective requirement:

- **MSE 118: Introduction to Nanotechnology and Nanoscience** Units: 4
- **MSE 128: Electronic Materials and Semiconductor Device Fabrication** Units: 4

AND ONE OF THE FOLLOWING

- **ENGR 170: Introduction to Electron Microscopy** Units: 3
- **MSE 119: Computational Materials Science** Units: 4

SEMICONDUCTOR EMPHASIS

Semiconductors are the foundation for everything from electronic devices to home appliances to aerospace. Chemical engineers with the fundamental knowledge of semiconductors, semiconductor devices, and systems; and understanding of process controls and characterization methods for semiconductor production are in high demand to meet semiconductor workforce needs and ensure national security and leadership in semiconductor research, development, and production.

SEMICONDUCTOR EMPHASIS CORE REQUIREMENT [11-12 UNITS]

Complete the following courses in satisfaction of the CHE technical elective requirement:

- **MSE 128: Electronic Materials and Semiconductor Device Fabrication** Units: 4

AND ONE OF THE FOLLOWING

- **ENGR 143: Statistical Quality Control** Units: 4
- **ENGR 145: Machine Learning for Engineers** Units: 4
- **MATH 180: Applied Statistics and Machine Learning** Units: 4

AND ONE OF THE FOLLOWING

- **ENGR 170: Introduction to Electron Microscopy** Units: 3
- **MSE 113: Materials Characterization** Units: 4

TIPS for MSE Major

FIRST YEAR	
Fall	**Spring**
MSE 001: Introduction to Chemical and Materials Engineering	MATH 022: Calculus II for Physical Sciences and Engineering
MATH 021: Calculus I for Physical Sciences and Engineering	PHYS 009: Introductory Physics II for Physical Sciences and PHYS 009L
PHYS 008: Introductory Physics I for Physical Sciences and PHYS 008L	CHEM 002: General Chemistry I and CHEM 002L
WRI 010: College Reading and Composition	Major *Biological or Environmental Systems Science Requirement*
SPRK 010: Spark Seminar	ENGR 091: Professional Development: People in an Engineered World
SECOND YEAR	
Fall	**Spring**
MATH 024: Linear Algebra and Differential Equations	MATH 023: Vector Calculus
ENGR 057: Statics and Dynamics	ENGR 080: Statistical Modeling and Data Analysis or MATH 032: Probability and Statistics
Major *Computing Requirement*	ENGR 045: Introduction to Materials
CHEM 010: General Chemistry II and CHEM 010L	General Education: Area B–Approaches to Knowledge Social Science, Literary and Textual Analysis, Media and Visual Analysis, Societies and Cultures of the Past
THIRD YEAR	
Fall	**Spring**
ENGR 130: Thermodynamics	MSE 110: Solid State Materials
ENGR 151: Strength of Materials	MSE 151: Materials Processing & Performance I: Materials Thermodynamics and Kinetics
ENGR 155: Engineering Economic Analysis	ENGR 120: Fluid Mechanics
General Education: Area B–Approaches to Knowledge Social Science, Literary and Textual Analysis, Media and Visual Analysis, Societies and Cultures of the Past	General Education: Area B–Approaches to Knowledge Social Science, Literary and Textual Analysis, Media and Visual Analysis, Societies and Cultures of the Past
FOURTH YEAR	
Fall	**Spring**
MSE 152: Materials Processing & Performance II: Materials Selection	MSE 194: Capstone Design
MSE 113: Materials Characterization	Major *Technical Elective/Emphasis Requirement or Elective*
Major *Technical Elective/Emphasis Requirement or Elective*	Major *Technical Elective/Emphasis Requirement or Elective*
Major *Technical Elective/Emphasis Requirement or Elective*	General Education: Upper Division Crossroads

Must complete your MATH, CHEM, PHYS – Focus on your main courses, then your GE

Recommend to take MATH 24 before MATH 23 – prereqs for Engr 120 & 130

Plan ahead for your Technical Electives due to the prerequisite

Look at for Engr 194 Capstone – MSE 113 and MSE 152

Many upper div. In MSE requires Engr 45

Material Science and Engineering Major

REQUIREMENTS FOR THE MATERIALS SCIENCE AND ENGINEERING MAJOR

All School of Engineering students are required to complete the following lower-division major preparation courses.

REQUIRED MAJOR PREPARATION [50 UNITS]

MATHEMATICS REQUIREMENT [20 UNITS]

Complete the following five courses:

- **MATH 021: Calculus I for Physical Sciences and Engineering** Units: 4
- **MATH 022: Calculus II for Physical Sciences and Engineering** Units: 4
- **MATH 023: Vector Calculus** Units: 4 or **MATH 023H: Honors Vector Calculus**
- **MATH 024: Linear Algebra and Differential Equations** Units: 4
- **ENGR 080: Statistical Modeling and Data Analysis** Units: 4 (strongly encouraged) or **MATH 032**

PHYSICS REQUIREMENT [10 UNITS]

Complete the following four courses:

- **PHYS 008: Introductory Physics I for Physical Sciences** Units: 4 or **PHYS 008H: Honors Introductory Physics I for Physical Sciences**
- **PHYS 008L: Introductory Physics I for Physical Sciences Lab** Units: 1
- **PHYS 009: Introductory Physics II for Physical Sciences** Units: 4 or **PHYS 009H: Honors Introductory Physics II for Physical Sciences**
- **PHYS 009L: Introductory Physics II for Physical Sciences Lab** Units: 1

CHEMISTRY REQUIREMENT [10 UNITS]

Complete the following courses:

- **CHEM 002: General Chemistry I** Units: 4
- **CHEM 002L: General Chemistry I Lab** Units: 1
- **CHEM 010: General Chemistry II** Units: 4
- **CHEM 010L: General Chemistry II Lab** Units: 1

COMPUTING REQUIREMENT [4 UNITS]

Choose one of the following options:

- **ME 021: Engineering Computing** Units: 4 (strongly encouraged), or
- **BIOE 021: Introduction to Computing with Python** Units: 4
- **EE 021: Introduction to Electrical Engineering Programming** Units: 4

BIOLOGICAL OR ENVIRONMENTAL SYSTEMS SCIENCE REQUIREMENT [4 UNITS]

Choose one of the following courses:

- **ANTH 005: Introduction to Biological Anthropology** Units: 4
- **BIO 003: To Know Ourselves: Molecular Basis of Health and Disease** Units: 4
- **BIO 005: Concepts and Issues in Biology Today** Units: 4
- **BIO 011: Introduction to Molecular Biology** Units: 4 and **BIO 011L** (strongly encouraged for students interested in biologically-based upper division technical electives, such as **MSE 104**)
- **BIO 043: Biodiversity and Conservation** Units: 4
- **BIO 047: Astrobiology** Units: 4
- **BIO 060: Nutrition** Units: 4
- **BIO 104: Biophysics** Units: 4
- **BIO 113: Sustainability in the Anthropocene** Units: 4
- **BIOE 002: Fundamentals of Molecular Biology** Units: 4 (strongly encouraged for students interested in biologically-based upper division technical electives, such as **MSE 104**)
- **ENVE 010: Environment in Crisis** Units: 4
- **ESS 001: Introduction to Earth Systems Science** Units: 4
- **ESS 002: Sustainability Science** Units: 4
- **ESS 005: Introduction to Biological Earth Systems** Units: 4
- **ESS 050: Ecosystems of California** Units: 4
- **PH 137: Insects and Public Health** Units: 4

ADDITIONAL DEGREE REQUIREMENT [2 UNITS]

- **ENGR 091: Professional Development: People in an Engineered World** Units: 2

ENGINEERING FUNDAMENTALS REQUIREMENT [18 UNITS]

Complete the following courses:

- **ENGR 057: Statics and Dynamics** Units: 4
- **ENGR 120: Fluid Mechanics** Units: 4
- **ENGR 130: Thermodynamics** Units: 3
- **ENGR 151: Strength of Materials** Units: 4
- **ENGR 155: Engineering Economic Analysis** Units: 3

MSE – Technical Electives

MATERIALS SCIENCE AND ENGINEERING CORE [25 UNITS]

The MSE core consists of courses designed to give all students a common foundation of core knowledge and skills specific to the discipline:

LOWER DIVISION CORE [5 UNITS]

Complete the following courses:

- **MSE 001: Introduction to Chemical and Materials Engineering** Units: 1
- **ENGR 045: Introduction to Materials** Units: 4

UPPER DIVISION CORE [20 UNITS]

Complete the following courses:

- **MSE 110: Solid State Materials** Units: 4
- **MSE 113: Materials Characterization** Units: 4
- **MSE 151: Materials Processing & Performance I: Materials Thermodynamics and Kinetics** Units: 4
- **MSE 152: Materials Processing & Performance II: Materials Selection** Units: 4
- **MSE 194: Capstone Design** Units: 4

TECHNICAL ELECTIVE REQUIREMENT [12 UNITS MINIMUM]

Technical electives should be selected in a manner that is complementary to, yet integrated with, your major area of study, and should be determined through close interaction with your major area advisor.

At least 8 units of these 12 units must be upper division courses. At least 6 units of these electives must be selected from those that are "MSE 1xx" (except MSE 195 and 196H) or ENGR 170 or ENGR 170L or ENGR 143 or ENGR 145. However, 4 units of MSE 195 and 196H may be used to help satisfy the *remaining* 6 required technical elective units. No more than one of the following courses may be used to fulfill technical elective requirements: ENGR 156, or ENVE 164.

The following list has been approved; you may also choose graduate level MBSE courses or technical electives from others offered in the School of Engineering, subject to prior approval by the MSE faculty and the satisfaction of any prerequisites on a case-by-case basis:

- MSE 165: Plastic Pollution
- **MSE 104: Engineering Living Systems** Units: 3
- **MSE 104L: Engineering Living Systems Lab** Units: 1
- **MSE 114: Polymeric Materials** Units: 4
- **MSE 115: Ceramic Materials** Units: 3
- **MSE 116: Composites** Units: 3
- **MSE 117: New Materials** Units: 3
- **MSE 118: Introduction to Nanotechnology and Nanoscience** Units: 4
- **MSE 119: Computational Materials Science** Units: 4
- **MSE 121: Mechanical Behavior of Materials** Units: 4
- **MSE 128: Electronic Materials and Semiconductor Device Fabrication** Units: 4
- **MSE 161: Sustainable Energy: Powering the World with Minimal Use of Materials** Units: 4
- **MSE 162: 3D Printing Research and Development** Units: 4
- **MSE 195: Upper Division Undergraduate Research** Units: *
- **MSE 196H: Honors Thesis for Materials Science and Engineering** Units: 2 *
- **BIOE 045: Introduction to Biomaterials** Units: 4
- **BIOE 102: Biosensors** Units: 4
- **BIOE 110: Self-Assembling Molecular Systems** Units: 3
- **BIOE 111: Biomembranes** Units: 3
- **BIOE 112: Biomolecule-Substrate Interactions** Units: 3
- **CHEM 100: Organic Synthesis and Mechanism** Units: 4
- **CHEM 112: Quantum Chemistry and Spectroscopy** Units: 4
- **CHEM 113: Chemical Thermodynamics and Kinetics** Units: 4
- **CHEM 153: Physical Chemistry Laboratory** Units: 2
- **ENGR 143: Statistical Quality Control** Units: 4
- **ENGR 145: Machine Learning for Engineers** Units: 4
- **ENGR 156: Technical and Professional Writing for Scientists and Engineers** Units: 4
- **ENGR 170: Introduction to Electron Microscopy** Units: 3
- **ENGR 170L: Introduction to Electron Microscopy Laboratory** Units: 1
- **ME 120: Component Design** Units: 3
- **ME 121: Introduction to Manufacturing Processes** Units: 3
- **ME 129: Tribology** Units: 3
- **ME 135: Finite Element Analysis** Units: 4
- **ME 137: Computer Aided Engineering** Units: 3
- **ME 138: Introduction to Computational Fluid Dynamics** Units: 4
- **PHYS 108: Thermal and Statistical Physics Core** Units: 4
- **PHYS 116: Mathematical Methods** Units: 4
- **MATH 131: Numerical Methods for Scientists and Engineers** Units: 4
- **MATH 180: Applied Statistics and Machine Learning** Units: 4

*A maximum of 4 units of MSE 195 and MSE 196H combined can apply to the technical elective requirement.

ADDITIONAL DEGREE RECOMMENDATIONS [1-8 UNITS]

- **ENGR 096: Human-Centered Research and Design** Units: 2
- **ENGR 097: Engineering Service Learning I** Units: 2
- **ENGR 192: Intellectual Property for Engineers and Scientists** Units: 1
- **ENGR 197: Engineering Service Learning II** Units: 3

MSE – Emphasis in Computational, Nanotechnology, and Semiconductor

COMPUTATIONAL EMPHASIS

Computational tools such as machine learning, materials simulation, and multi-scale modeling are revolutionizing nearly all aspects of our modern world. These tools enable materials properties prediction and discovery; rapid synthesis and characterization of new materials for emerging applications; and control of chemical and materials processing for improved quality control for semiconductors, beverages and food, and other manufacturing applications.

COMPUTATIONAL EMPHASIS CORE REQUIREMENT [11-12 UNITS]

Complete the following courses:

- **MSE 119: Computational Materials Science** Units: 4

AND ONE OF THE FOLLOWING

- **ENGR 143: Statistical Quality Control** Units: 4
- **ENGR 145: Machine Learning for Engineers** Units: 4
- **MATH 180: Applied Statistics and Machine Learning** Units: 4

AND ONE OF THE FOLLOWING

- **MATH 131: Numerical Methods for Scientists and Engineers** Units: 4
- **ME 135: Finite Element Analysis** Units: 4
- **ME 137: Computer Aided Engineering** Units: 3

COMPUTATIONAL EMPHASIS TECHNICAL ELECTIVE REQUIREMENT [1-4 UNITS]

If needed, complete one of the below MSE major technical elective courses, to meet the 12-unit MS major technical elective requirement. The course should be one that is not used to complete the computational core requirements, above. The computational core requirements complete 11-12 u (depending on classes taken) of the 12 technical elective units required for the MSE major.

- MSE 165: Plastic Pollution
- **MSE 104: Engineering Living Systems** Units: 3
- **MSE 104L: Engineering Living Systems Lab** Units: 1
- **MSE 114: Polymeric Materials** Units: 4
- **MSE 115: Ceramic Materials** Units: 3
- **MSE 116: Composites** Units: 3
- **MSE 117: New Materials** Units: 3
- **MSE 118: Introduction to Nanotechnology and Nanoscience** Units: 4
- **MSE 119: Computational Materials Science** Units: 4
- **MSE 121: Mechanical Behavior of Materials** Units: 4
- **MSE 128: Electronic Materials and Semiconductor Device Fabrication** Units: 4
- **MSE 161: Sustainable Energy: Powering the World with Minimal Use of Materials** Units: 4
- **MSE 162: 3D Printing Research and Development** Units: 4

NANOTECHNOLOGY EMPHASIS

Nanotechnology is shaping – and will continue to shape – the needs of future workforces. To prepare our graduates for current and future industrial needs, it is pertinent to have an education program that clearly shows students how nanotechnology connects and interacts w aspects of nanotechnology that are not covered by traditional disciplii therefore offer a Nanotechnology Emphasis that fills this educational other programs. In addition to teaching nanoscale synthesis, characte and simulation, other salient aspects of this Emphasis include:

i. enabling students to learn the knowledge and skills that bridge ba specific device development;
ii. enabling students to integrate knowledge from different fields, an exciting scientific breakthroughs and discoveries that are advancir every day.

NANOTECHNOLOGY EMPHASIS CORE REQUIREMENT [11-12 UNITS

Complete the following courses in addition to the MSE core course

- **MSE 118: Introduction to Nanotechnology and Nanoscience**
- **MSE 128: Electronic Materials and Semiconductor Device Fa**

AND ONE OF THE FOLLOWING

- **ENGR 170: Introduction to Electron Microscopy** Units: 3
- **MSE 119: Computational Materials Science** Units: 4

NANOTECHNOLOGY EMPHASIS TECHNICAL ELECTIVE REQUIREMEN

If needed, complete one of the MSE major technical elective course technical elective requirement. The course should be one that is no nanotechnology core requirements, above. The nanotechnology co depending on the courses taken, of the 12 technical elective units r

- MSE 165: Plastic Pollution
- **MSE 104: Engineering Living Systems** Units: 3
- **MSE 104L: Engineering Living Systems Lab** Units: 1
- **MSE 114: Polymeric Materials** Units: 4
- **MSE 115: Ceramic Materials** Units: 3
- **MSE 116: Composites** Units: 3
- **MSE 117: New Materials** Units: 3
- **MSE 118: Introduction to Nanotechnology and Nanoscience**

SEMICONDUCTOR EMPHASIS

Semiconductors are the foundation for everything from electronic devices to home appliances to aerospace. Materials engineers with the fundamental knowledge of semiconductor properties, devices and systems, and with understanding of process controls and characterization methods for semiconductor production, are in high demand to meet workforce needs and ensure national security and leadership in semiconductor research, development, and production.

SEMICONDUCTOR EMPHASIS CORE REQUIREMENT [11-12 UNITS]

Complete the following courses:

- **MSE 128: Electronic Materials and Semiconductor Device Fabrication** Units: 4

AND ONE OF THE FOLLOWING

- **ENGR 143: Statistical Quality Control** Units: 4
- **ENGR 145: Machine Learning for Engineers** Units: 4
- **MATH 180: Applied Statistics and Machine Learning** Units: 4

AND ONE OF THE FOLLOWING

- **ENGR 170: Introduction to Electron Microscopy** Units: 3
- **MSE 119: Computational Materials Science** Units: 4

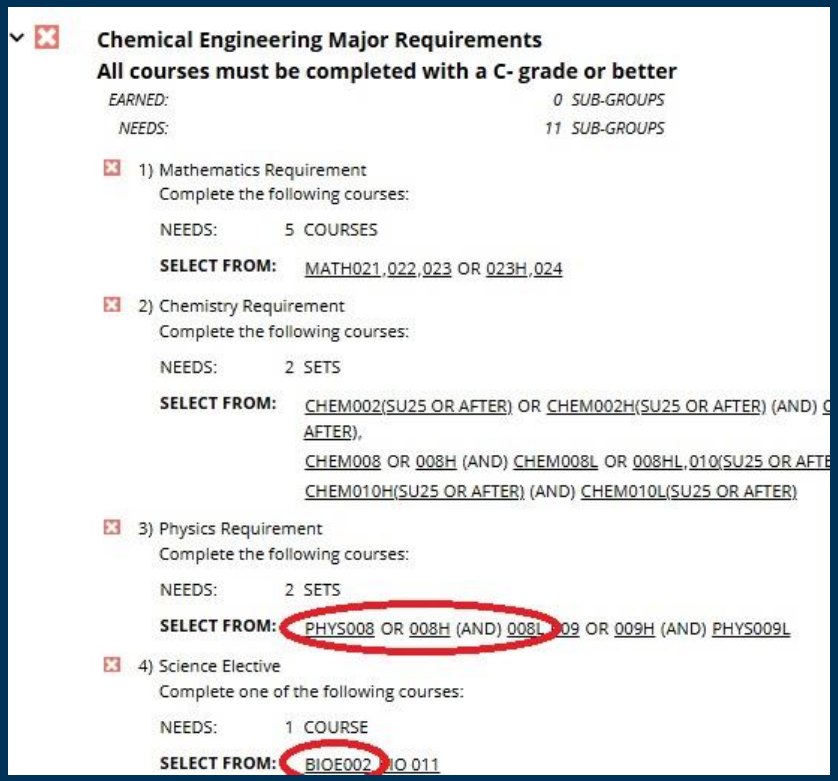
SEMICONDUCTOR EMPHASIS TECHNICAL ELECTIVE REQUIREMENT [1-4 UNITS]

If needed, complete one of the MSE major technical elective courses, to meet the 12-unit MSE major technical elective requirement. The course should be one that is not used to complete the semiconductor core requirements, above. The semiconductor core requirements complete 11-12, depending on the courses taken, of the 12 technical elective units required for the MSE major.

- MSE 165: Plastic Pollution
- **MSE 104: Engineering Living Systems** Units: 3
- **MSE 104L: Engineering Living Systems Lab** Units: 1
- **MSE 114: Polymeric Materials** Units: 4
- **MSE 115: Ceramic Materials** Units: 3
- **MSE 116: Composites** Units: 3
- **MSE 117: New Materials** Units: 3
- **MSE 118: Introduction to Nanotechnology and Nanoscience** Units: 4

General Education:Life Science & Physical Science

- CHEE major will have both requirements in Life Science and Physical Science completed.
  - Life science will be completed with your core BioE 002 or Bio 011
  - Physical Science will be completed by taking Phys 8/8L



Chemical Engineering Major Requirements
All courses must be completed with a C- grade or better

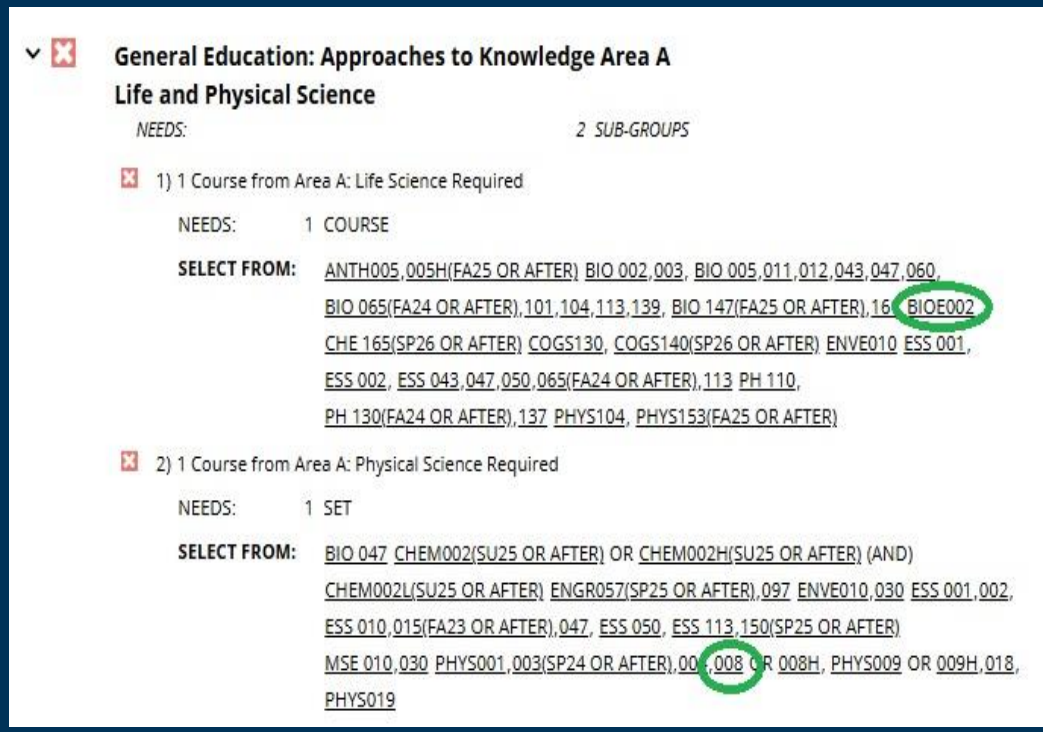
EARNED: *0 SUB-GROUPS*
NEEDS: *11 SUB-GROUPS*

1) Mathematics Requirement
Complete the following courses:
NEEDS: 5 COURSES
SELECT FROM: MATH021,022,023 OR 023H,024

2) Chemistry Requirement
Complete the following courses:
NEEDS: 2 SETS
SELECT FROM: CHEM002(SU25 OR AFTER) OR CHEM002H(SU25 OR AFTER) (AND) C
AFTER),
CHEM008 OR 008H (AND) CHEM008L OR 008HL,010(SU25 OR AFTE
CHEM010H(SU25 OR AFTER) (AND) CHEM010L(SU25 OR AFTER)

3) Physics Requirement
Complete the following courses:
NEEDS: 2 SETS
SELECT FROM: PHYS008 OR 008H (AND) 008L, 009 OR 009H (AND) PHYS009L

4) Science Elective
Complete one of the following courses:
NEEDS: 1 COURSE
SELECT FROM: BIOE002, BIO 011



General Education: Approaches to Knowledge Area A
Life and Physical Science

NEEDS: *2 SUB-GROUPS*

1) 1 Course from Area A: Life Science Required
NEEDS: 1 COURSE
SELECT FROM: ANTH005,005H(FA25 OR AFTER) BIO 002,003, BIO 005,011,012,043,047,060,
BIO 065(FA24 OR AFTER),101,104,113,139, BIO 147(FA25 OR AFTER),16 BIOE002
CHE 165(SP26 OR AFTER) COGS130, COGS140(SP26 OR AFTER) ENVE010 ESS 001,
ESS 002, ESS 043,047,050,065(FA24 OR AFTER),113 PH 110,
PH 130(FA24 OR AFTER),137 PHYS104, PHYS153(FA25 OR AFTER)

2) 1 Course from Area A: Physical Science Required
NEEDS: 1 SET
SELECT FROM: BIO 047 CHEM002(SU25 OR AFTER) OR CHEM002H(SU25 OR AFTER) (AND)
CHEM002L(SU25 OR AFTER) ENGR057(SP25 OR AFTER),097 ENVE010,030 ESS 001,002,
ESS 010,015(FA23 OR AFTER),047, ESS 050, ESS 113,150(SP25 OR AFTER)
MSE 010,030 PHYS001,003(SP24 OR AFTER),00 ,008 OR 008H, PHYS009 OR 009H,018,
PHYS019

General Education: Social Science, Arts & Humanities

- None of the courses from CHEE major will fulfill the General Education in Area B
- Select your courses wisely based on your interest
- Tips, select a course in General Education Area B when you don't meet the prerequisite for your Major courses
- Other Tips, look at the badge courses – FYI: you can find a GE course that fulfill two of your badge

Upper Division Common Course Requirements

- Chemical Engineering:
  - Catalog year 2024 – Must take ChE 125 to fulfill the culminating experience (was not included in the past)
  - Catalog year 2025 – ChE 125 (now included)
  - Both catalog year must take ChE 150 and 151 for Capstone
- Material Science and Engineering:
  - Culminating Experience – Engr 194

Catalog Year 24 vs Catalog Year 25

CHEMICAL ENGINEERING CORE REQUIREMENT [25 UNITS]

Complete the following courses:

- CHE 110: Mass Transfer and Separation Units: 4
- CHE 111: Kinetics and Reactor Design Units: 4
- CHE 120: Heat Transfer and Numerical Methods Units: 4
- CHE 130: Process Control and Plant Design Units: 4
- CHE 150: Unit Operations Units: 6
- ENGR 194: Engineering Capstone Design II Units: 3

CHEMICAL ENGINEERING CORE REQUIREMENT [26 UNITS]

Complete the following courses:

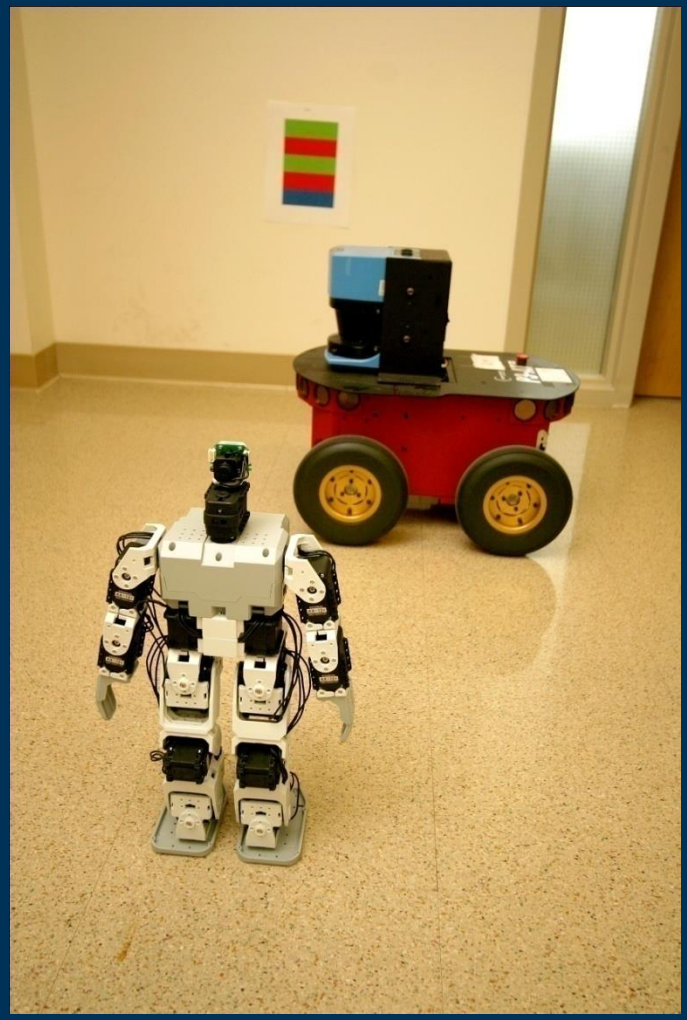
- CHE 110: Mass Transfer and Separation Units: 4
- CHE 111: Kinetics and Reactor Design Units: 4
- CHE 120: Heat Transfer and Numerical Methods Units: 4
- CHE 125: Process Control Units: 4
- CHE 130: Plant Design Units: 4
- CHE 150: Unit Operations Lab I Units: 3
- CHE 151: Unit Operations Lab II Units: 3

Things to Remember

- **Courses and their requirements can and do change (pre-reqs), so make sure you communicate with your advisor regularly and check for SOEADVISING@UCMERCED.EDU emails**

- ***Full-Time Status*: Students must enroll in at least 12 units each semester**

- ***Journey to 30:* Students must enroll in 15 units in a semester to meet graduation on time**



Normal Progress Policy

Student progress is reviewed every Fall term by the School of Engineering. If a student is not meeting the normal progress standard, the school may place a hold on the student's academic record, which can prevent registration for future terms.

Normal progress includes:

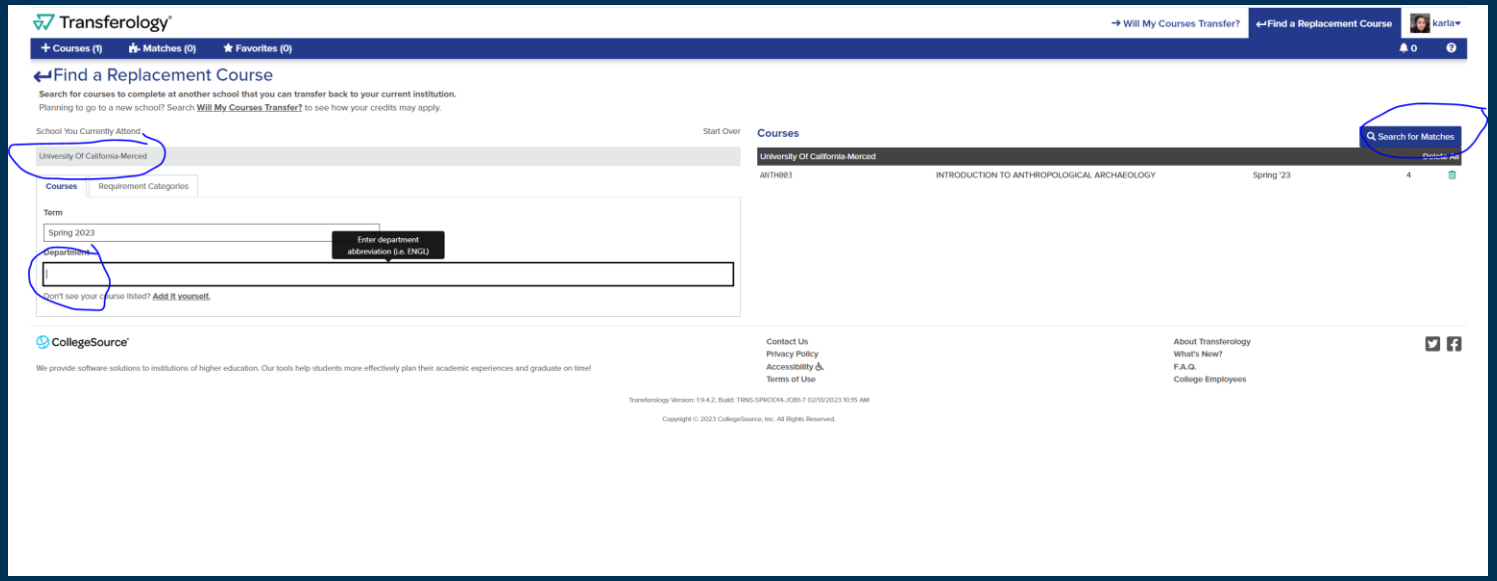
- Maintaining good academic standing
- Successfully completing required coursework
- Enrolling in course(s) needed to complete their degree
- Enrolling in the appropriate number of credits

Taking a Class During Summer

- Taking Classes at UC Merced
  - Enroll in at least 6 units to apply for summer fin aid

- Taking classes at another institution
  - Make sure course is equivalent to UC Merced course by using transferology.com or ASSIST
  - Apply and enroll in course

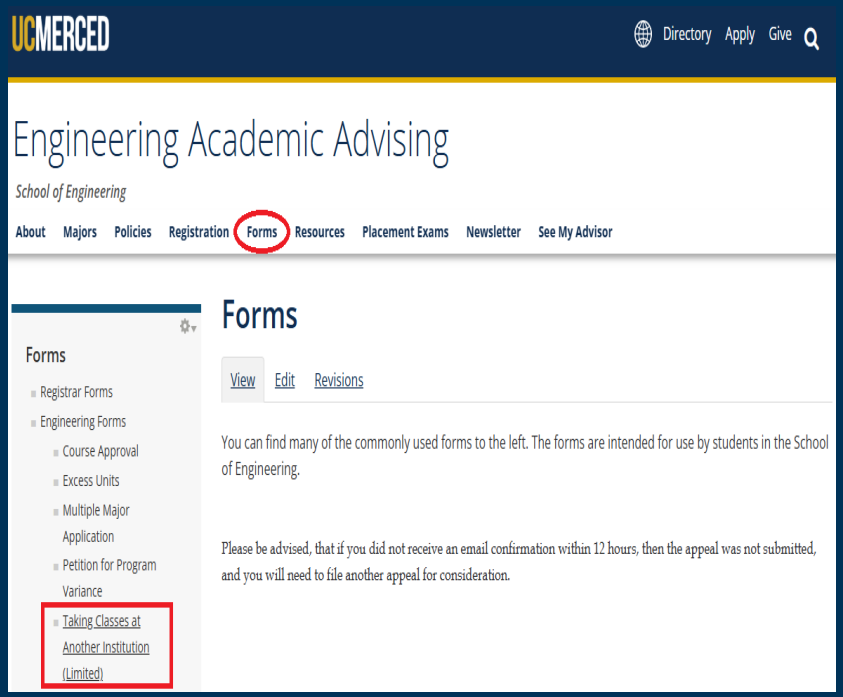
Send screen shot to academic advisor and ask for temporary override for Fall Courses



Can I Take a Course Outside of UC Merced? Fall/Spring

You have to ask for permission before enrolling...or you won't get credit...

- You can take a course through
  - UC Online
  - Merced College (Intersegmental Cross Enrollment Program)
  - any other Community College
- You must have 12 units within your home campus.
- Requirement: “Taking Classes at Another Institution” form through our website.



We will not know you are enrolled unless you fill out the form and ask us for temporary overrides to enroll in next term courses

Take a Course Outside UC Merced

- All Temporary overrides are removed the Monday before the semester begins
  - This date is about 2 weeks before courses start

Make sure to send me proof of passing course to advisor as soon as available.

Can I change my major, add a Minor or Double Major?

Policies: https://engr-advising.ucmerced.edu/policies/declaration-major

- Yes, you can do this now...

There are some majors in which you can't double major

Example: ME and MSE

Double major: only 12 units can be shared

Minor: only 4 units can be shared

How to Declare?

Go to the Office of the Registrar website – Forms

JumpStart 3rd year

- Attend/view one workshop hosted by the School of Engineering (this one)
- Attend one career-related event
- Complete the webform where you will:
  - Answer questions related to career event
  - Answer questions related to this presentation
  - Plan courses two terms [Fall/Spring] graduation plan. (Summer is optional)

QUESTIONS?