Marlan and Rosemary Bourns College of Engineering

Suggested Course Plan for a UC Riverside Major in

# MATERIALS SCIENCE & ENGINEERING

Catalog Year: 2020

| *Fall Quarter* | *Units* | *Winter Quarter* | *Units* | *Spring Quarter* | *Units* |
|---|---|---|---|---|---|
| **FIRST YEAR** | | | | | |
| CHEM 001A & CHEM 01LA | 5 | CHEM 001B & CHEM 01LB | 5 | CHEM 001C & CHEM 01LC | 5 |
| *General Chemistry & Lab* | | *General Chemistry & Lab* | | *General Chemistry & Lab* | |
| ENGL 001A | 4 | ENGL 001B | 4 | MATH 009C | 4 |
| *Beginning Composition* | | *Intermediate Composition* | | *First Year Calculus* | |
| MATH 009A | 4 | MATH 009B | 4 | Breadth _____ | 4 |
| *First Year Calculus* | | *First Year Calculus* | | *Humanities/Social Sciences* | |
| MSE 001 | 2 | Breadth _____ | 4 | MSE 002L | 1 |
| *Fund. of Materials Science & Engr.* | | *Biological Sci (BIOL 002, or 003, or 005A/LA)* | | *General Materials Lab* | |
| **SECOND YEAR** | | | | | |
| CHEM 008A & CHEM 08LA | 4 | MATH 010A | 4 | CS 009M/009P/010A | 4 |
| *Organic Chemistry* | | *Multivariable Calculus* | | *Intro to Programming* | |
| MATH 046 | 4 | ME 010 | 4 | EE 001A & EE 01LA | 4 |
| *Differential Equations* | | *Statics* | | *Engineering Circuit Analysis I & Lab* | |
| PHYS 040A | 5 | PHYS 040B | 5 | MATH 010B | 4 |
| *Physics (Mechanics)* | | *Physics (Heat/Waves/Sound)* | | *Multivariable Calculus* | |
| MSE 003L | 1 | MSE 004L | 1 | PHYS 040C | 5 |
| *General Materials Lab* | | *General Materials Lab* | | *Physics (Electricity/Magnetism)* | |
| **THIRD YEAR** | | | | | |
| EE 138 | 4 | BIEN 140A/CEE 140A | 4 | ENGR 180W* | 4 |
| *Electrical Properties of Materials* | | *Biomaterials* | | *Technical Communications* | |
| ME 114 | 4 | CHE 100 | 4 | MSE 135 | 4 |
| *Intro to Materials Science & Engr* | | *Engineering Thermodynamics* | | *Intro to Inorganic Mat Synthesis* | |
| STAT 155 | 4 | ME 110 | 4 | MSE 160 | 4 |
| *Probability & Statistics for Engr* | | *Mechanics of Materials* | | *Nanostructure Characterization Lab* | |
| Breadth _____ | 4 | MSE 134 | 4 | Technical Elective** | 4 |
| *Humanities/Social Sciences* | | *Microstruct Transform in Materials* | | _____ | |
| **FOURTH YEAR** | | | | | |
| ME 156 | 4 | MSE 175A | 4 | MSE 175B | 4 |
| *Mechanical Behavior of Materials* | | *Senior Design Project* | | *Senior Design Project* | |
| MSE 161 | 4 | Technical Elective** | 4 | Technical Elective** | 4 |
| *Analytical Materials Characterization* | | _____ | | _____ | |
| Technical Elective** | 4 | Technical Elective** | 4 | Breadth _____ | 4 |
| _____ | | _____ | | *Humanities/Social Sciences* | |
| Breadth _____ | 4 | Breadth _____ | 4 | Breadth _____ | 4 |
| *Humanities/Social Sciences* | | *Humanities/Social Sciences* | | *Humanities/Social Sciences* | |

Total Units: 190

Maximum units: 216

To earn a B.S., you must complete all College and University requirements. For a full list of requirements, go to catalog.ucr.edu.

## ENGLISH COMPOSITION*

A C or better is required in all English Composition courses to satisfy the graduation requirement. ENGR 180W fulfills the third quarter of English Composition.

## BREADTH REQUIREMENTS

For an approved list of Breadth courses: http://student.engr.ucr.edu/policies/requirements/breadth.html.

Humanities: (3 courses)

A. World History: _____

B. Fine Arts, Lit., Phil. or Rlst: _____

C. Human Persp. on Science: _____

Social Sciences: (3 courses)

A. Econ. or Posc.: _____

B. Anth., Psyc, or Soc.: _____

C. General Social Science: _____

Biological Science _____

Ethnicity: (1 course)

1. _____

Upper Division: (2 courses)

1. _____

2. _____

## TECHNICAL ELECTIVES **

Please note that Technical Electives may be offered throughout the Academic Year. Consult with your Academic Advisor about potential offerings. See approved technical electives on back.

Course Plan is subject to change.

# Materials Science & Engineering Technical Electives & Focus Areas

You must complete 5 courses (at least 20 units) of Technical Elective coursework, selected from the courses below. Units are listed in ().

**Polymers and Biomaterials**

| | |
|---|---|
| BIEN/MSE 136 | Tissue Engineering (4) |
| BIEN 140B | Biomaterials (4) |
| MSE 197 | Research for Undergraduates (1-4) |

**Electronic, Photonic, and Magnetic Materials**

| | |
|---|---|
| EE 133 | Solid-State Electronics (4) |
| EE 136 | Semiconductor Device Processing (4) |
| EE 137 | Intro to Semiconductor Optoelectronic Devices (4) |
| EE 139 | Magnetic Materials (4) |
| EE 162 | Introduction to Nanoelectronics (4) |
| MSE 197 | Research for Undergraduates (1-4) |

**Synthesis and Processing of Nanomaterials**

| | |
|---|---|
| CHE 105 | Introduction to Nanoscale Engineering (4) |
| CHE 161 | Nanotechnology Processing Laboratory (3) |
| EE 162 | Introduction to Nanoelectronics (4) |
| MSE 197 | Research for Undergraduates (1-4) |

**Structural Materials**

| | |
|---|---|
| MSE 142 | Corrosion Science (4) |
| MSE 143 | Failure Analysis and Prevention (4) |
| MSE 148 | Advanced Solidification Processing (4) |
| MSE 197 | Research for Undergraduates (1-4) |

**Computation and Modeling of Materials**

| | |
|---|---|
| ME 153 | Finite Element Methods (4) |
| MSE 155 | Materials Science of the Solid State (4) |
| MSE 156 | Atomistic Modeling of Materials (4) |
| MSE 197 | Research for Undergraduates (1-4) |

* Note that many Technical Electives will require that you complete additional courses as pre-requisites not accounted for in the undergraduate program. Consult the Faculty Advisor regarding the pre-requisite coursework for the Technical Electives you would like to take.