CASE SCHOOL OF ENGINEERING
CASE WESTERN RESERVE UNIVERSITY

## MATERIALS SCIENCE AND ENGINEERING

# Dual Degree Program Course Requirements

| Engineering Requirements for all majors/departments | | |
|---|---|---|
| **Course Code** | **Course Title** | **Semester Credit Hours** |
| CHEM 105 | Principles of Chemistry I | 3 |
| CHEM 106 | Principles of Chemistry II | 3 |
| CHEM 113 | Principles of Chemistry Lab | 2 |
| ENGR 131 | Elementary Computer Programming (JAVA) | 3 |
| MATH 121 | Calculus for Science and Engineering I | 4 |
| MATH 122 | Calculus for Science and Engineering II | 4 |
| MATH 223 | Calculus for Science and Engineering III | 3 |
| MATH 224 | Elementary Differential Equations | 3 |
| PHYS 121 | General Physics I | 4 |
| PHYS 122 | General Physics II | 4 |
| | Humanities and Social Science<br>(including college level writing proficiency) | 22 |
| | Physical Education (2 semesters) | 0 |
| | | **55** |

***Please Note***: The course sequence serves as an example of the classes necessary to complete the Dual Degree Program. Courses and the semesters taken will be based on the student's transfer credit and discussion with the Case Western Reserve University faculty advisor.

## Sample Course Sequence for Materials Science and Engineering

Fall Year 1

| Subject Code | Course Number | Course Title | Hours per Week | | Semester Credit Hours |
|---|---|---|---|---|---|
| | | | Class | Lab | |
| EMSE | 102 | Materials Science Seminar | 1 | 0 | 1 |
| EMSE | 201 | Introduction to Materials Science and Engineering | 3 | 0 | 3 |
| EMSE | 310 | Applications of Diffraction Principles (Lab) | 0 | 2 | 1 |
| EMSE | 312 | Diffraction Principles | 3 | 0 | 3 |
| EMSE | 314 | Electrical, Magnetic, and Optical Properties of | 3 | 0 | 3 |
| CHEM | 355 | Physical Chemistry I | 3 | 0 | 3 |
| | | Open Elective (if needed) | 3 | 0 | 3 |
| | | | 16 | 2 | 17 |

Spring Year 1

| Subject Code | Course Number | Course Title | Hours per Week | | Semester Credit Hours |
|---|---|---|---|---|---|
| | | | Class | Lab | |
| EMSE | 270 | Materials Lab I | 0 | 3 | 2 |
| EMSE | 202 | Phase Diagrams and Phase | 3 | 0 | 3 |
| ENGL | 398N | Professional Communications for | 3 | 0 | 3 |
| ENGR | 200 | Statics and Strength of Materials | 3 | 0 | 3 |
| ENGR | 210 | Introduction to Circuits and | 3 | 2 | 4 |
| | | | 12 | 5 | 15 |

Fall Year 2

| Subject Code | Course Number | Course Title | Hours per Week | | Semester Credit Hours |
|---|---|---|---|---|---|
| | | | Class | Lab | |
| EMSE | 280 | Materials Lab II | 0 | 3 | 2 |
| EMSE | 203 | Applied Thermodynamics | 3 | 0 | 3 |
| EMSE | 301 | Fundamentals of Materials Processing | 3 | 0 | 3 |
| EMSE | 302 | Fundamentals of Materials Processing Lab | 0 | 3 | 1 |
| EMSE | 398 | Senior Project in Materials I | 0 | 2 | 1 |
| ENGR | 225 | Thermo, Fluid Dynamics, Heat & Mass Transfer | 4 | 0 | 4 |
| | | Technical Elective | 3 | 0 | 3 |
| | | Open Elective (if needed) | 3 | 0 | 3 |
| | | | 16 | 8 | 20 |

Spring Year 2

| Subject Code | Course Number | Course Title | Hours per Week | | Semester Credit Hours |
|---|---|---|---|---|---|
| | | | Class | Lab | |
| EMSE | 290 | Materials Lab III | 0 | 3 | 2 |
| EMSE | 303 | Mechanical Behavior of Materials | 3 | 0 | 3 |
| EMSE | 313 | Engineering Applications of Materials | 3 | 0 | 3 |
| EMSE | 399 | Senior Project in Materials II | 0 | 4 | 2 |
| | | Technical Elective | 3 | 0 | 3 |
| | | Technical Elective | 3 | 0 | 3 |
| | | Open Elective (if needed) | 3 | 0 | 3 |
| | | | 15 | 7 | 19 |