

## Materials Science and Engineering, B.S., Comprehensive Major (251-001)

The following is a hypothetical schedule, based on the 2018-2019 catalog, to complete this 128-credit degree program. It assumes no transferred credits, no requirements waived by placement tests, and no courses taken in the summer. UW-Eau Claire cannot guarantee all courses will be offered as shown, but will provide a range of courses that will enable prepared students to fulfill their requirements in a timely period. This is just a guide. Please consult your advisor, the catalog, and your degree audit for specific requirements.

### FIRST YEAR

| FIRST SEMESTER   |                                  |           | SECOND SEMESTER  |                             |           |
|------------------|----------------------------------|-----------|------------------|-----------------------------|-----------|
| Subj/Area/Course | Title                            | Crs       | Subj/Area/Course | Title                       | Crs       |
| MATH 114         | Calculus I (S2)                  | 4         | MATH 215         | Calculus II                 | 4         |
| WRIT 114/116     | Blugold Seminar (S1)             | 5         | PHYS 231         | University Physics I (K1)   | 5         |
| CHEM 105/106     | General Chemistry I (K1)         | 5         | CHEM 109         | General Chemistry II        | 4         |
| MSE 120          | Introduction to Engineering (S3) | 2         | MSE 221          | Living in a Materials World | 3         |
| <b>TOTAL</b>     |                                  | <b>16</b> | <b>TOTAL</b>     |                             | <b>16</b> |

### SECOND YEAR

| FIRST SEMESTER   |                            |           | SECOND SEMESTER  |  |           |
|------------------|----------------------------|-----------|------------------|--|-----------|
| Subj/Area/Course | Title                      | Crs       | Subj/Area/Course | Title                                  | Crs       |
| PHYS 232         | University Physics II (K1) | 5         | MATH 312         | Differential Equations & Lin. Algebra  | 4         |
| PHYS 255         | Statics                    | 3         | MSE 334          | Soft Materials                         | 4         |
| MSE 256          | Introduction to CAD        | 1         | MSE 315          | Materials Characterization (S3)        | 4         |
| CHEM 325         | Organic Chemistry I        | 4         | LE CORE ELECTIVE | Civic, Social & Environ. Respons. (R3) | 3         |
| LE CORE ELECTIVE | Communication (S1)         | 3         |                  |  |           |
| <b>TOTAL</b>     |                            | <b>16</b> | <b>TOTAL</b>     |  | <b>15</b> |

### THIRD YEAR

| FIRST SEMESTER – Apply for Admission to Major |                              |                    | SECOND SEMESTER  |  |             |
|---|------------------------------|--------------------|------------------|--|-------------|
| Subj/Area/Course                              | Title                        | Crs                | Subj/Area/Course | Title  | Crs         |
| MATH 345                                      | Probability and Statistics   | 4                  | MSE 367          | Macroprocessing of Materials                           | 3           |
| MSE 350                                       | Thermodynamics of Materials  | 4                  | MSE 368          | Macroprocessing Lab                                    | 2           |
| MSE 357                                       | Phase Transformations        | 3                  | MSE 372          | Transport Phenomena                                    | 3           |
| MSE 386                                       | Engineering Jr. Seminar I    | 0.5                | MSE 387          | Engineering Jr. Seminar II                             | 0.5         |
| LE CORE ELECTIVE                              | EDI and Humanities (R1 + K3) | 3                  | LE CORE ELECTIVE | Social Science & Global Learn. (K2+ R2)                | 3           |
| ELECTIVES <sup>a</sup>                        | Any appropriate elective     | 1-3                | LE CORE ELECTIVE | Humanities & EDI & Design for Diversity (K3 + R1 + DD) | 3           |
|   |                              |                    | LE CORE ELECTIVE | Integrative Learning (I1)                              | 3           |
| <b>TOTAL</b>                                  |                              | <b>15.5 - 17.5</b> | <b>TOTAL</b>     |  | <b>17.5</b> |

### FOURTH YEAR

| FIRST SEMESTER         |                                  |              | SECOND SEMESTER        |                                 |              |
|------------------------|----------------------------------|--------------|------------------------|---------------------------------|--------------|
| Subj/Area/Course       | Title                            | Crs          | Subj/Area/Course       | Title                           | Crs          |
| MSE 362                | Microelectronic Mats. Processing | 2            | MSE 451                | Computational Materials Science | 4            |
| MSE 374                | Physics of Solids                | 4            | MSE 475                | Nanomaterials                   | 3            |
| MSE 486                | Engr. Capstone I                 | 2            | MSE 487                | Engr. Capstone II (I1)          | 2            |
| MSE Elective           | Science or Engr. Elective        | 3            | MSE Elective           | Science or Engr. Elective       | 3            |
| LE Core Elective       | Social Science (K2)              | 3            | LE Core Elective       | Fine Arts (K4)                  | 3            |
| ELECTIVES <sup>a</sup> | Any appropriate elective         | 1-3          | ELECTIVES <sup>a</sup> | Any appropriate elective        | 0-2          |
| <b>TOTAL</b>           |                                  | <b>15-17</b> | <b>TOTAL</b>           |                                 | <b>15-17</b> |

## RECOMMENDATIONS FOR OPTIONAL HIGH IMPACT PRACTICES (HIPs)

The University of Wisconsin-Eau Claire encourages all students to participate in High Impact Practices. The following information identifies any specific recommendations that faculty in this major have concerning which HIPs might be most beneficial to students, and any recommendations about when those HIPs best fit into the degree plan. Students should also consult their faculty advisor for information on HIPs.

Faculty/student research, off-campus summer research, internships, and study abroad are strongly encouraged and valued by the Program faculty. Please consult a faculty advisor about HIP opportunities as well as appropriate ways by which courses associated with a HIP can be applied towards the requirements for graduation.

## NOTES

### Liberal Education Core (LE Core)

The LE Core comprises 17 learning experiences across 11 learning outcomes. Students must complete a minimum of 36 credits in courses approved for the LE Core.

- K1 – Natural Sciences; two experiences (one lab science experience is required in K1 or K2).
- K2 – Social Sciences; two experiences (one lab science experience is required in K1 or K2).
- K3 – Humanities; two experiences.
- K4 – Fine Arts; one experience.
- S1 – Written and Oral Communication; two experiences (one experience must satisfy the University writing requirement).
- S2 – Mathematics; one experience (must satisfy the University math competency requirement).
- S3 – Creativity; one experience (can be fulfilled in a student's major).
- R1 – Equity, Diversity, and Inclusivity; two experiences (one experience must meet the UW System Design for Diversity (DD) requirement).
- R2 – Global Perspectives; one experience.
- R3 – Civic and Environmental Issues; one experience.
- I1 – Integration; two experiences (one experience can be fulfilled in a student's major).

### Additional LE Core Information

- Most LE Core learning experiences are course based, and many courses meet more than one learning outcome (e.g., K3 and R2 or K1 and R3).
- Some learning experiences can also be met outside of a traditional course (e.g., undergraduate research (S3), study abroad (I1)).
- S1 – An English placement score that fulfills the University writing requirement fulfills one S1 experience.
- S1 – A foreign Language placement score that qualifies the student to enter the 102 level satisfies one S1 experience.
- S1, R2 – A foreign language placement score that qualifies the student to enter the 202 level satisfies one experience in S1 and the R2 experience.
- S2 – A math placement score that qualifies the student to enter Math 111, 112, 113 or 114 fulfills the S2 experience.
- S3 – Completion of two credits from any approved music ensemble fulfills the S3 experience.
- I1 – Any semester long study abroad program can fulfill one I1 experience.

### Course Suggestions

<sup>a</sup> Electives can be selected from any discipline as long as the student meets the course prerequisites, but courses *outside* of science and engineering are especially recommended. Note that completing the major also meets the 39 credits of upper division courses (300-400 level), not counting courses in MSE Electives or LE Core.

<sup>b</sup>MSE Elective – Appropriate Engineering or Science courses from UW-EC and partner campuses (UW-River Falls, UW-Stout, and Chippewa Valley Technical College) should be chosen in consultation with a faculty adviser. Other courses already identified:

#### UW-River Falls

AE 255 – Welding and Metal Manufacturing  
GE 450 – Engineering Project Management

#### UW-Stout

ENGGR 210 - Engr. Graphics Using Solid Modeling  
INMGTR 335 – Lean Manufacturing Systems  
MECH 294 - Mechanics of Materials  
MFGT 341 - Injection Molding Technology (pre-req is their Intro to Plastics)  
PLE 305 - Extrusion Theory and Application (pre-req is Thermo and Transport)

#### CVTC

MSE 363

#### UW-EC

PHYS 340, 350, 356, 360, 361, 362  
CHEM 213, 326, 352  
CS 145, 163, 170, 245, 252, 330  
MATH 216, 313, 314, 315, 316, 317, 318, 324, 351, 352, 354, 355, 358, 440, 441, 443

### Application to Major

Students must apply to the MSE program at least four semesters prior to graduation. Applications for admission to MSE are typically due in the Spring semester; application forms can be found on the Materials Science and Engineering website, or can be picked up at the Mat Sci office (P177).

The following courses must be completed prior to applying (or be completed by the end of spring semester) with an overall average GPA of 2.5 -

Chem 105/106 and 109 (or Chem115), Math 114 and 215, MSE 120 and 221, Phys 231, and WRIT 114/116/118