MATERIALS SCIENCE, COMPREHENSIVE MAJOR

Liberal Arts (Code 250-010)

University Requirements

GRADUATION REQUIREMENTS FOR BACCALAUREATE DEGREE

Credit Requirements	
Minimum total for graduation [1]	120
Upper division credits (courses numbered 300 and higher)	39
Liberal Education Core (http://catalog.uwec.edu/undergraduate/graduation-requirements/#header1)	36
Academic Concentrations (http://catalog.uwec.edu/undergraduate/graduation-requirements/#header16)	
Grade Point Requirements (http://catalog.uwec.edu/undergraduate/graduation-requirements/#header14) [2]	
Total	2.00 average
Resident	2.00 average
Major	2.00 average
Minor	2.00 average
Certificate	2.00 average
University Residency Requirements (http://catalog.uwec.edu/undergraduate/graduation-requirements/#header15)	
Minimum total	30
Senior year	23
Major, Standard, upper division in residence	12
Major, Comprehensive, upper division in residence	21
Certificate	25 percent of credits
Procedures Required for Graduation	
Obtain admission to the degree program and/or the College offering it.	
Apply for graduation on CampS.	

[1] Certain programs exceed this minimum.
[2] See special requirements in each College.

Applicability of Credits Toward Graduation

Junior College or Two-Year College Credits. A maximum of 72 semester credits earned in a junior college or two-year college will be accepted as degree credits at UW-Eau Claire.

Extension Credits. Credits earned in credit outreach courses offered by UW-Eau Claire are treated as resident credits. Credits earned in extension courses offered by other units of the University of Wisconsin System are treated as transfer credits. All other (non-UW) extension and correspondence credits are normally limited to one-fourth of the total required for graduation from any curriculum.

WTCS Credits. A maximum of 72 semester credits earned in college parallel programs at Madison Area Technical College, Milwaukee Area Technical College, Nicolet Area Technical College, or Chippewa Valley Technical College may be accepted as degree credits at UW-Eau Claire. A set number of general education courses will be accepted from other technical schools.

Occupational and technical courses may also be considered for transfer if the quality and content of the course work from the technical college is judged to be comparable to course work at UW-Eau Claire. Refer to the Transfer Credit Wizard (https://my.uwec.edu/psp/PUBLIC/EMPLOYEE/HRMS/c/EAU_SS_CUSTOM.EAU_TRNCRDWZ.GBL) or contact the UW-Eau Claire Admissions Office for information about the current transfer policy.

USAFI Credit. UW-Eau Claire will accept up to 32 semester credits for work done through the United States Armed Forces Institute, under the provision for non-UW correspondence credit (see Extension Credits above).

Activity Credit (band, chorus, drama, KINS 100-184 courses) Students may count toward graduation no more than one credit of KINS 110-184 courses. Students may count toward graduation no more than four credits earned in any single activity course and no more than 12 credits resulting from any combination of activity courses (excluding KINS 110-184 courses).

Other Restricted Credits. For other University restrictions, see the following: Cooperative Education; Credit by Examination; Satisfactory/Unsatisfactory Registration; Transfer of Credits. College or departmental restrictions may also be placed on Independent Study (399-499 courses), Directed Study (395-495), and other types of credits.

APPLICABILITY OF CREDITS TOWARD GRADUATION	**Credit Restrictions**
Satisfactory/Unsatisfactory	
Total degree credit	maximum 12
Major, Standard	maximum 1 course
Major, Comprehensive	maximum 2 courses
Minor	maximum 1 course
Credit by Examination	
Total degree credit	maximum ¼ of total
Major or minor	maximum ½ of total
Two-Year College Credits	
Total degree credit	maximum 72 credits
Activity credit (band, chorus, drama, KINS 100-184)	
Total KINS 100-184	maximum 1 credit
Total Band, chorus, drama	maximum 12 credits
Single course band, chorus, drama	maximum 4 credits
Extension credits	
UW-System	no maximum
Other extension/correspondence	maximum ¼ of total
USAFI	
USAFI	maximum 32 credits

Liberal Education Core

The University of Wisconsin-Eau Claire measures learning outcomes to ensure that its graduates have achieved a liberal education and prepared themselves

to contribute to a complex society. Upon graduation, each undergraduate will have met the five learning goals of our liberal education core and the 12 learning outcomes they comprise.

LIBERAL EDUCATION CORE REQUIREMENTS	a minimum of 36 credits
Knowledge Goal	
Knowledge Outcome 1 (K1): Natural Sciences (http://catalog.uwec.edu/undergraduate/attribute-k1/)	Two (2) learning experiences
One experience in laboratory science must be selected from either K1 or K2.	
Knowledge Outcome 2 (K2): Social Sciences (http://catalog.uwec.edu/undergraduate/attribute-k2/)	Two (2) learning experiences
One experience in laboratory science must be selected from either K1 or K2.	
Knowledge Outcome 3 (K3): Humanities (http://catalog.uwec.edu/undergraduate/attribute-k3/)	Two (2) learning experiences
Knowledge Outcome 4 (K4): Fine Arts (http://catalog.uwec.edu/undergraduate/attribute-k4/)	One (1) learning experience
Skills Goal	
Skills Outcome 1 (S1): Written and Oral Communication (http://catalog.uwec.edu/undergraduate/attribute-S1/)	Two (2) learning experiences
One S1 must meet the University Writing Requirement (http://catalog.uwec.edu/undergraduate/graduation-requirements/#header10)	
Skills Outcome 2 (S2): Mathematics (http://catalog.uwec.edu/undergraduate/attribute-S2/)	One (1) learning experience
One S2 to meet the University Mathematics Requirement (http://catalog.uwec.edu/undergraduate/graduation-requirements/#header11)	
Skills Outcome 3 (S3): Creativity (http://catalog.uwec.edu/undergraduate/attribute-S3/)	One (1) learning experience
Responsibility Goal	
Responsibility Outcome 1 (R1): Equity, Diversity, and Inclusivity (http://catalog.uwec.edu/undergraduate/attribute-R1/)	Two (2) learning experiences
One R1 must satisfy Design for Diversity (http://catalog.uwec.edu/undergraduate/attribute-DDIV/#header13)	
Responsibility Outcome 2 (R2): Global Perspectives (http://catalog.uwec.edu/undergraduate/attribute-R2/)	One (1) learning experience
Responsibility Outcome 3 (R3): Civic and Environmental Issues (http://catalog.uwec.edu/undergraduate/attribute-R3/)	One (1) learning experience
Integration Goal	
Integration Outcome 1 (I1): Integration (http://catalog.uwec.edu/undergraduate/attribute-I1/)	Two (2) learning experiences
Service-Learning Goal	
Service-Learning (http://catalog.uwec.edu/undergraduate/attribute-SL/#header13)	30 hours

College Degree Requirements

Bachelor of Arts or Bachelor of Science Degree (B.A./B.S.)

University Graduation Requirements. All candidates for degrees must fulfill the requirements for credits, curriculum, GPA, and University residency as specified in the section of this catalog titled University Graduation Requirements (http://catalog.uwec.edu/undergraduate/graduation-requirements/).

College Graduation Requirements: Grade Point Averages. All candidates for degrees in the College of Arts and Sciences must earn minimum resident and total GPAs of 2.00 in the major, the minor, and the certificate. The resident and total GPAs for the major are computed using all attempted credits applicable to the major including those offered by departments other than the major department. The resident and total GPAs for the minor and the certificate are computed similarly.

Major-Minor and Major-Certificate Requirements. A standard major (a minimum of 36 credits) must be supplemented by a minor (a minimum of 24 credits) or by a certificate (12 to 18 credits) to meet graduation requirements for completing a first and second degree program. No minor or certificate is required with a Comprehensive Major (60 or more credits) or with two majors of 36 or more credits each.

Certain degree programs, which include Comprehensive Majors, may require more than the minimum of 120 credits for graduation.

Acceptable academic program combinations are determined at the college level. A major and a minor or a major and certificate or two majors (if available) may not be elected in the same department or program, except in the approved combinations listed here (http://catalog.uwec.edu/undergraduate/arts-sciences/#academicprogramstext).

College Credits. Earn at least 90 credits in courses offered by the College of Arts and Sciences.

Bachelor of Arts Degree in the College of Arts and Sciences (B.A.)

Fulfillment of all University Graduation Requirements (which includes the Liberal Education Core); all College-level degree requirements (major and minor/certificate emphases, GPAs, earning at least 90 credits in Arts and Sciences course work); foreign language competency at the 102 level. Foreign language competency may be met in one of two ways: (1) Achieve a score on the foreign language placement test that qualifies the student to enter the 201-level course in a foreign language. (2) Earn a grade of at least C (not C-) or a mark of S in a 102-level foreign language course (or AIS 112 or AIS 122 / LANG 122 or CSD 103).

Bachelor of Science Degree in the College of Arts and Sciences (B.S.)

Fulfillment of all University Graduation Requirements (which includes the Liberal Education Core); all College-level degree requirements (major and minor/certificate emphases, GPAs, earning at least 90 credits in Arts and Sciences course work); mathematics competency at the MATH 111, MATH 112 or MATH 113 level. Mathematics competency can be met in one of three ways: (1) Achieve a score on the mathematics placement test that qualifies the student to enter MATH 114. (2) Earn a grade of at least C (not C-) or a mark of S in MATH 111, MATH 112, or MATH 113. (3) Achieve a satisfactory score on the

MATH 112 competency test. This test may be attempted no more than two times.

Major Requirements

Liberal Arts (Code 250-010)

The structure of the major is unique: it integrates an engineering-oriented field into a liberal arts and sciences degree, and is thus deliberately interdisciplinary and broadly defined, consistent with a liberal education approach. Students specialize through a chosen emphasis. The major serves students who plan to enter the workforce after graduation as well as students interested in graduate education in areas such as Materials Science, Engineering, Chemistry, and Physics.

The major is comprised of a minimum of 63 credits, including completion of core courses, at least six credits from courses in the Materials Science electives, and at least six credits in a chosen emphasis. Credits applied toward the electives and emphasis must be unique credits.

Code	Title	Credits
CORE COURSES		
Materials Science		
MSE 221	Living in a Materials World	3
MSE 286	Engineering Sophomore Seminar	1
MSE 315	Materials Characterization	4
MSE 334	Soft Materials	4
MSE 350	Thermodynamics of Materials	4
MSE 357	Phase Transformation & Kinetics	3
MSCI 384	Materials Science Junior Seminar	1
MSCI 484	Materials Science Capstone I	1
MSCI 485	Materials Science Capstone II	2
Chemistry		
CHEM 115	Chemical Principles	6
or		
CHEM 105 & CHEM 106 & CHEM 109	General Chemistry I Lecture and General Chemistry I Laboratory and General Chemistry II with Lab [1]	9
CHEM 325	Organic Chemistry I with Laboratory	4
Mathematics		
MATH 114	Calculus I	4
MATH 215	Calculus II	4
Physics		
PHYS 231	University Physics I	5
PHYS 232	University Physics II	5
ELECTIVE COURSES		**6**
MSE 256	Introduction to Computer Aided Design	
MSE 307	Engineering Statistics	
MSE 362	Microelectronic Materials Processing	
MSE 363	Microelectronic Materials Processing Lab	
MSE 367	Macroprocessing of Materials	
MSE 368	Macroprocessing Materials Lab	
MSE 372	Transport Phenomena	
MSE 374	Electrical, Optical and Magnetic Properties of Materials	
MSE 451	Computational Materials Science	
MSE 475	Nanomaterials	
MSE 493	Collaborative Internship	
MSE 494	Off-campus Materials Science Internship	
MSCI 395	Directed Studies	
MSCI 399	Independent Study - Juniors	
MSCI 499	Independent Study - Seniors	

[1] Only six credits apply to major.

NOTES:

1. A maximum of three credits total from MSCI 395, MSCI 399, and MSCI 499 and MSE 493 and MSE 494 may be applied toward the Electives category.
2. MATH 312 is recommended for students planning to attend graduate school.

EMPHASIS REQUIREMENTS

Six credits in an Emphasis required. All six emphasis credits must meet the requirements described in either A or B below.

A. Defined emphasis

- Be from the same prefix
- Be from the following prefixes: BIOL, BME, CHEM, CS, GEOL, MATH, MGMT, PHYS
- Be from UWEC courses numbered 300 or above, or from courses appropriate for a major, such as: BIOL 221, BIOL 222, BIOL 223, BME courses 200 level and above, CHEM 213, CHEM 218, CS 145, CS 148, CS 163, CS 170, CS 245, CS 252, GEOL 106, GEOL 110, GEOL 115, GEOL 118, and MATH 216

B. Distributed emphasis

The student may pursue an emphasis that reflects a thematic area of concentration and intentional connections. Such an emphasis, with approval of the faculty advisor, must draw from courses appropriate for a major in another area distinct from Materials Science or Materials Science and Engineering.

Program Learning Outcomes

Students completing this program will be expected to meet the following learning outcomes:

- Identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
- Communicate effectively with a range of audiences.
- Recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
- Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
- Develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.

- Acquire and apply new knowledge as needed, using appropriate learning strategies.

Sample Degree Plan

Materials Science, Comprehensive Major, B.S.

The following is a sample degree plan, based on the 2023-2024 catalog. It is based on the 120-credit graduation requirement and assumes no transferred credits, no requirements waived by placement tests, no courses taken in the summer or winter, no repeated courses, and no remedial courses that may be required. This sample degree plan is intended for first-year students entering UW-Eau Claire in the fall semester. Your own degree plan may differ depending on the course of study selected (second major, minor, etc.). UW-Eau Claire cannot guarantee all courses will be offered as shown, but will provide a range of courses that may enable prepared students to fulfill their requirements in a timely period. This sample degree plan is just a guide. Please consult your advisor, your degree audit, and the catalog to create your own degree plan. *Note*: In order to earn the required minimum of 120 credits for the degree in four years, you should plan to take 15 credits each semester or 30 credits each year.

To earn a degree, students must fulfill all University Graduation Requirements, including the Liberal Education (LE) Core. LE Core course work in the following sample degree plan uses abbreviations such as LE-K1, LE-S2, LE-R3, and LE-I1 to represent the learning outcomes students will meet via completion of their liberal education course work. Please click (https://catalog.uwec.edu/undergraduate/graduation-requirements/)here for a description of the Liberal Education Core outcomes and requirements. Note that the LE Core may be completed through both course and non-course experiences.

Students in this major have the option to pursue either a Bachelor of Arts (B.A.) or a Bachelor of Science (B.S.) degree. The degrees are distinguished by foreign language competency for the B.A. and a higher level of mathematics competency for the B.S.

FIRST YEAR		
FIRST SEMESTER		
CHEM 105	General Chemistry I Lecture	3
CHEM 106	General Chemistry I Laboratory (LE-K1L)	2
WRIT 114	Intensive Blugold Seminar in Critical Reading and Writing (LE-S1)	5
OR		
WRIT 116	Blugold Seminar in Critical Reading and Writing (LE-S1)	
MATH 112	Precalculus Mathematics (LE-S2)	4
LE Option: Knowledge 3 (LE-K3) Humanities		3
TOTAL		17
SECOND SEMESTER		
CHEM 109	General Chemistry II with Lab	4
MSE 221	Living in a Materials World	3
MATH 114	Calculus I (LE-S2)	4
LE Option: Knowledge 2 (LE-K2) Social Sciences		3
TOTAL		14
SECOND YEAR		
FIRST SEMESTER		
MATH 215	Calculus II	4
PHYS 231	University Physics I (LE-K1)	5
MSE 286	Engineering Sophomore Seminar	1
MSE 315	Materials Characterization (LE-S3)	4
LE Option: Skills 1 (LE-S1) Written and Oral Communication		3
TOTAL		17
SECOND SEMESTER		
CHEM 325	Organic Chemistry I with Laboratory	4
PHYS 232	University Physics II (LE-K1)	5
LE Option: Responsibility 1 (LE-R1) Equity, Diversity, and Inclusivity		3
LE Option: Responsibility 2 (LE-R2) Global Perspectives		3
TOTAL		15
THIRD YEAR		
FIRST SEMESTER		
MSCI 384	Materials Science Junior Seminar	1
MSE 350	Thermodynamics of Materials	4
MSE 357	Phase Transformation & Kinetics	3
LE Option: Responsibility 1 (LE-R1, DDIV) Equity, Diversity, and Inclusivity with Design for Diversity		3
LE Option: Responsibility 3 (LE-R3) Civic and Environmental Issues		3
TOTAL		14
SECOND SEMESTER		
MAT. SCI. Emphasis Course [c]		3-4
MSCI or MSE Elective [b]		2-4
LE Option: Integration (LE-I1)		3
LE Option: Knowledge 2 (LE-K2) Social Sciences		3
General Elective [a]		3
TOTAL		14-17
FOURTH YEAR		
FIRST SEMESTER		
MSE 334	Soft Materials	4
MSCI 484	Materials Science Capstone I	1
MAT. SCI. Emphasis course [c]		2-3
LE Option: Knowledge 4 (LE-K4) Fine Arts		3
General Electives [a]		3-5
TOTAL		13-16
SECOND SEMESTER		
MSCI 485	Materials Science Capstone II (LE-I1)	2
MSCI or MSE Electives [b]		2-4
LE Option: Knowledge 3 (LE-K3) Humanities		3
General Electives [a]		5-7
TOTAL		12-16

Minimum total for the baccalaureate degree = 120 credits

a General Electives – should be chosen to ensure that 120 credits total and at least 39 credits of upper division courses (300 & 400 level) are included; the major includes at least 27 such credits (counting the Mat. Sci. Elective). Electives can be selected from any discipline as long as the student meets the course prerequisites; courses outside of science and engineering are especially recommended. Study Abroad and Domestic Intercultural Immersion also meet some Electives; please consult an advisor.

b Mat. Sci Elective – 6 credits are required from courses with MSCI or MSE prefix (beyond those required for the core). Choose from MSE 256, MSE 362, MSE 363, MSE 367, MSE 368, MSE 372, MSE 374, MSE 451, MSE 475, MSE 493,

MSE 494 or MSCI 395, MSCI 399, or MSCI 499. Up to 3 credits total from independent study, research, or internship (MSE 493, MSE 494 or MSCI 395, MSCI 399, or MSCI 499) may be applied towards the requirement.

c Mat Sci Emphasis – For either emphasis, 6 credits total are required. The emphasis may be met in one of two ways:

A. Defined emphasis

- Be from the same prefix
- Be from the following prefixes: BIOL, BME, CHEM, CS, GEOL, MATH, MGMT, PHYS
- Be from UWEC courses numbered 300 or above, or from courses appropriate for a major, such as: BIOL 221, BIOL 222, BIOL 223; BME courses 200 level and above, CHEM 213, CHEM 218; CS 145, CS 148, CS 163, CS 170, CS 245, CS 252; GEOL 106, GEOL 110, GEOL 115, GEOL 118; and MATH 216
- Be approved by the faculty advisor

B. Distributed emphasis
The student may pursue an emphasis that reflects a thematic area of concentration and intentional connections. Such an emphasis, with approval of the faculty advisor, must draw from courses appropriate for a major in another area distinct from Materials Science and Engineering or its cognate subjects.

Note: All students must complete the 30-hour Service-Learning Requirement via a non-credit or credit option (see Undergraduate Graduation Requirements (http://catalog.uwec.edu/undergraduate/graduation-requirements/)).

RECOMMENDATIONS FOR 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. There are many additional high impact opportunities available. Talk to your academic advisor for more information about incorporating HIPs like Study Abroad (https://studyabroad.apps.uwec.edu/), Intercultural Immersion (https://www.uwec.edu/immersion/), Internship (https://www.uwec.edu/career-services/info-students/internships/), and/or Student/Faculty Collaborative Research (https://www.uwec.edu/orsp/students/student-faculty-collaborative-research-guide/) into your time at UW-Eau Claire.
Students are especially encouraged to explore immersion experiences including faculty/student collaborative research, off-campus summer research, off-campus internship, Study Abroad, Domestic Intercultural Immersion, or other HIP experience.

Liberal Education (LE) Core Guidance

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).
- SL—Service Learning; 30 hours

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.