Articulation Agreement by Major

Effective during the 2022-2023 Academic Year

To: University of California, Merced 2022-2023 General Catalog, Semester	From: De Anza College 2022-2023 General Catalog, Quarter

Materials Science and Engineering, B.S.

ADMISSIONS MAJOR SELECTION CRITERIA

Thank you for your interest in UC Merced!

For admission to the **Materials Science and Engineering, B.S.** major, students must earn an overall transferrable GPA of 2.4 or better, and complete classes articulated with the following UC Merced courses by the end of spring term prior to fall enrollment or by the end of fall term prior to spring enrollment. All major preparation courses requires a "C" or better.

REQUIRED major preparation courses:

- CHEM 002
- MATH 021, MATH 022, MATH 023, MATH 024
- PHYS 008 & PHYS 008L, PHYS 009 & PHYS 009L

Additional Major Preparation Recommended Prior to Transfer:

- * ENGR 045, ENGR 057, ENGR 151(Lower Division Credit only)
- CHEM 010
- ME 021 (strongly encouraged) OR BIOE 021
- BIO 001 OR BIO 005 OR BIOE 002 OR ESS 001 OR ESS 005
- MATH 032

* ENGR 045 is a prerequisite to upper division courses-MSE 109 and MSE 110 and Technical Electives in the major. Completing it in advance before transfer can speed up time to graduation.

AP Exam Score & Course Exemptions

- An AP Biology score of 4 or 5 exempts BIO 001 and BIO 001L
- An AP Chemistry score of 5 exempts CHEM 002 and CHEM 010
- An AP Mathematics: Calculus AB score of 4 or 5 exempts Math 021
- An AP Mathematics: Calculus BC score of 3 exempts MATH 021
- An AP Mathematics: Calculus BC score of 4 or 5 exempts Math 021 and Math 022
- An AP Mathematics: Calculus BC Subscore AB score 3 or higher exempts Math 021
- An AP Physics: Physics C: Mechanics score of 5 exempts PHYS 008 and PHYS 008L
- An AP Environmental Sciences score of 4 or 5 exempts ESS 001

UC Merced Advance Placement (AP) and International Baccalaureate (IB) credit policies are detailed in the link below:
Advance Placement (AP) and International Baccalaureate (IB) Examinations

IMPORTANT TRANSFER INFORMATION

In addition to the Major Selection Criteria, all Upper-Division Transfer applicants must meet minimum University of California admissions requirements. Visit https://admissions.ucmerced.edu/transfer/requirements for more specific UC Merced admissions information.

Prior to Transferring to UC Merced, please be advised of the following for Junior Transfers:

1) WRI 001 and WRI 010 are admissions requirements: In most situations, WRI 001 is fulfilled by IGETC 1A English Composition and WRI 010 is fulfilled by IGETC 1B Critical Thinking/English Composition. However best practice is to complete the articulated course for WRI 001 and WRI 010. Please scroll towards the bottom of the agreement to find the articulation for each course.

2) Transfer Admissions Guarantee (TAG): UC Merced is one of the six UC's that offers Transfer Admissions Guarantee. Please visit the TAG website for more information: https://admissions.ucmerced.edu/transfer/tag

3) General Education (GE Requirements): While general education is not required for admission, it can help speed up your time to graduation once you transfer to UC Merced. We highly recommend reviewing the **Transfer Students: Satisfying General Education** page in the catalog for a more extensive explanation of the requirements.

Please note the School of Engineering strongly discourages IGETC, but accepts it; students are encouraged to focus primarily on lower division major preparation and fulfilling UCM minimum admissions requirements. If you elect to complete IGETC, the courses may double count with the major courses listed below. Please visit your Community College Counselor to learn more.

4. This agreement displays all lower-division (or Major Preparation) courses required in the major. UC Merced courses on the left, approved (articulated) transfer courses to the right.

5. Changes to this Agreements: Major requirements are subject to change from one academic year to the next. Newly-articulated courses are added

on a rolling basis, and articulated courses can be revised. Visit ASSIST every semester for the latest information and consult with an Academic Counselor at your institution on a regular basis.

For more questions about admissions, please email: transfer@ucmerced.edu.

ABOUT THIS MAJOR

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.

Indeed, employment prospects are excellent. Nationally, the number of students who graduate in Materials Science and Engineering each year is much smaller than the number of well-paying MSE jobs that are advertised at any one time. Further job growth is projected, especially focused in areas related to the development of new materials, including sustainable materials for nanotechnology, biotechnology and energy storage, rather than traditional areas of materials manufacturing. The MSE major at UC Merced reflects this expectation, with an emphasis on materials issues that will ensure the long-term relevance of our MSE degree.

Visit the 22-23 catalog page for the Lower Division and Upper Division requirements for the major.

The Materials Science and Engineering program at UC Merced is accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org.

MAJOR PREPARATION COURSES REQUIRED FOR TRANSFER

Minimum grade required: C or better
Required for admission

CHEM 002 - General Chemistry I (4.00) ←

CHEM 1A - General Chemistry (5.00)
--- And ---
CHEM 1B - General Chemistry (5.00)

--- Or ---

CHEM 1A - General Chemistry (5.00)
--- And ---
CHEM 1BH - General Chemistry - HONORS (5.00)

--- Or ---

CHEM 1AH - General Chemistry - HONORS (5.00)
--- And ---
CHEM 1BH - General Chemistry - HONORS (5.00)

--- Or ---

CHEM 1AH - General Chemistry - HONORS (5.00)
--- And ---
CHEM 1B - General Chemistry (5.00)

--- And ---

MATH 021 - Calculus I for Physical Sciences & Engineering (4.00) ←

MATH 1A - Calculus (5.00)
--- And ---
MATH 1B - Calculus (5.00)

--- Or ---

MATH 1AH - Calculus - HONORS (5.00)
--- And ---
MATH 1BH - Calculus - HONORS (5.00)

MATH 022 - Calculus II for Physical Sciences & Engineering (4.00)	←	**MATH 1B** - Calculus (5.00) **--- And ---** **MATH 1C** - Calculus (5.00) **--- Or ---** **MATH 1BH** - Calculus - HONORS (5.00) **--- And ---** **MATH 1CH** - Calculus - HONORS (5.00)
MATH 023 - Vector Calculus (4.00)	←	**MATH 1C** - Calculus (5.00) **--- And ---** **MATH 1D** - Calculus (5.00) **--- Or ---** **MATH 1CH** - Calculus - HONORS (5.00) **--- And ---** **MATH 1DH** - Calculus - HONORS (5.00)
MATH 024 - Linear Algebra and Differential Equations (4.00)	←	**MATH 2A** - Differential Equations (5.00) **--- And ---** **MATH 2B** - Linear Algebra (5.00)

--- And ---

PHYS 008 - Introductory Physics I for Physical Sciences (3.00) **--- And ---** **PHYS 008L** - Introductory Physics I for Physical Sciences Lab (1.00)	←	**PHYS 4A** - Physics for Scientists and Engineers: Mechanics (6.00)
PHYS 009 - Introductory Physics II for Physical Sciences (3.00) **--- And ---** **PHYS 009L** - Introductory Physics II for Physical Sciences Lab (1.00)	←	**PHYS 4B** - Physics for Scientists and Engineers: Electricity and Magnetism (6.00) **--- And ---** **PHYS 4C** - Physics for Scientists and Engineers: Fluids, Waves, Optics and Thermodynamics (6.00)

ADDITIONAL MAJOR PREPARATION COURSES

Minimum grade required: C or better

ENGR 045 - Introduction to Materials (4.00) • *Recommended to be completed prior to transfer* • *Prerequisite(s) for upper division course(s) in this major, concentration or track*	←	No Course Articulated
ENGR 057 - Statics and Dynamics (4.00) • *Recommended to be completed prior to transfer*	←	No Course Articulated
ENGR 151 - Strength of Materials (4.00)	←	No Course Articulated

--- And ---

CHEM 010 - General Chemistry II (4.00) • *Recommended to be completed prior to transfer*	←	**CHEM 1B** - General Chemistry (5.00) **--- And ---** **CHEM 1C** - General Chemistry and Qualitative Analysis (5.00) **--- Or ---** **CHEM 1BH** - General Chemistry - HONORS (5.00) **--- And ---** **CHEM 1CH** - General Chemistry and Qualitative Analysis - HONORS (5.00)

COMPUTING REQUIREMENT

Minimum grade required: C or better

ME 021 - Engineering Computing (4.00) • *Preferred course* • *Recommended to be completed prior to transfer*	←	No Course Articulated
--- Or ---		
BIOE 021 - Introduction to Computing with Python (4.00)	←	No Course Articulated

BIOLOGICAL OR ENVIRONMENTAL SYSTEMS SCIENCE REQUIREMENT

Select 1 Course from the following

Minimum grade required: C or better
Recommended to be completed prior to transfer

BIO 001 - Contemporary Biology (4.00)	←	No Course Articulated
BIO 001 - Contemporary Biology (4.00) **--- And ---** **BIO 001L** - Contemporary Biology Lab (1.00) • *Acceptable substitute*	←	**BIOL 6AH** - Form and Function in the Biological World - HONORS (6.00) **--- And ---** **BIOL 6CH** - Ecology and Evolution - HONORS (6.00) **--- Or ---** **BIOL 6A** - Form and Function in the Biological World (6.00) **--- And ---** **BIOL 6C** - Ecology and Evolution (6.00) **--- Or ---** **BIOL 6AH** - Form and Function in the Biological World - HONORS (6.00) **--- And ---** **BIOL 6C** - Ecology and Evolution (6.00) **--- Or ---** **BIOL 6A** - Form and Function in the Biological World (6.00) **--- And ---** **BIOL 6CH** - Ecology and Evolution - HONORS (6.00)
BIO 005 - Concepts & Issues in Biology Today (4.00)	←	**BIOL 10** - Introductory Biology (5.00) **--- Or ---** **BIOL 10H** - Introductory Biology - HONORS (5.00)
BIOE 002 - Molecular Biology for Engineers (4.00)	←	No Course Articulated
ESS 001 - Introduction to Earth Systems Science (4.00)	←	No Course Articulated
ESS 005 - Introduction to Biological Earth Systems (4.00)	←	No Course Articulated

ADDITIONAL LOWER DIVISION COURSE

MATH 032 - Probability and Statistics (4.00)	←	**MATH 23** - Engineering Statistics (5.00)

TECHNICAL ELECTIVES

Select 1 Course from the following

****REFER TO CATALOG****
Minimum grade required: C or better
Only lower division courses listed

BIOE 045 - Introduction to Biomaterials (4.00)	←	No Course Articulated
CHEM 008 - Principles of Organic Chemistry (3.00)	←	No Course Articulated
CHEM 008 - Principles of Organic Chemistry (3.00) **--- And ---** **CHEM 008L** - Principles of Organic Chemistry Lab (1.00) • *Acceptable substitute*	←	**CHEM 12A** - Organic Chemistry (5.00) **--- And ---** **CHEM 12B** - Organic Chemistry (5.00)
CHEM 100 - Organic Synthesis and Mechanism (4.00) • *Lower division credit only*	←	No Course Articulated
CHEM 100 - Organic Synthesis and Mechanism (4.00) **--- And ---** **CHEM 100L** - Organic Chemistry Laboratory (1.00) • *Acceptable substitute* • *Lower division credit only*	←	**CHEM 12B** - Organic Chemistry (5.00) • *Lower division credit only* **--- And ---** **CHEM 12C** - Organic Chemistry (5.00) • *Lower division credit only*
PHYS 010 - Introductory Physics III (4.00)	←	**PHYS 4C** - Physics for Scientists and Engineers: Fluids, Waves, Optics and Thermodynamics (6.00) **--- And ---** **PHYS 4D** - Physics for Scientists and Engineers: Modern Physics (6.00)

ACADEMIC WRITING - CHOOSE ONE COURSE FROM:

****REFER TO TOP OF AGREEMENT****
Minimum grade required: C or better

WRI 001 - Academic Writing (4.00)	←	**ESL 5** - Advanced Composition and Reading (5.00) **--- Or ---** **EWRT 1A** - Composition and Reading (5.00) **--- Or ---** **EWRT 1AH** - Composition and Reading - HONORS (5.00) **--- Or ---** **EWRT 1AS** - Intensive Composition and Reading Stretch: First Quarter (5.00) • *UC credit limitation applies; refer to UC-transferability list* **--- And ---** **EWRT 1AT** - Intensive Composition and Reading Stretch: Second Quarter (5.00) • *UC credit limitation applies; refer to UC-transferability list*

COLLEGE READING AND COMPOSITION - CHOOSE ONE COURSE FROM:

****REFER TO TOP OF AGREEMENT****
Minimum grade required: C or better

WRI 010 - College Reading and Composition (4.00)	←	**COMM 9** - Argumentation: Analysis of Oral and Written Communication (5.00) **--- Or ---** **COMM 9H** - Argumentation: Analysis of Oral and Written Communication - HONORS (5.00) **--- Or ---** **EWRT 1B** - Reading, Writing and Research (5.00) **--- Or ---** **EWRT 1C** - Literature and Composition (5.00) **--- Or ---** **EWRT 2** - Critical Reading, Writing and Thinking (5.00) **--- Or ---** **EWRT 2H** - Critical Reading, Writing and Thinking - HONORS (5.00) **--- Or ---** **PHIL 3** - Critical Thinking and Writing (5.00)

END OF AGREEMENT