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

Physics, Mathematical and Computational Physics Emphasis, B.S.

ADMISSIONS MAJOR SELECTION CRITERIA

Thank you for your interest in UC Merced!

For admission to the **Physics, Mathematical and Computational Physics Emphasis, B.S.** major (formerly named Computational and Mathematical Physics emphasis), students must earn an overall transferable GPA of 2.8 or better, and must 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 For Transfer:

- MATH 021
- MATH 022
- PHYS 008 & PHYS 008L
- PHYS 009 & PHYS 009L

Additional Major Preparation Courses: Recommended Prior to Transfer:

- CHEM 002
- * PHYS 010
- * MATH 023, * Math 024, Math 032
- CSE 019 or MATH 050 or ME 021
- One additional Lower-Division (Course numbered 1-99 at UC Merced) Natural Science or Engineering course excluding physics or math.

* PHYS 010 is a prerequisite to PHYS 137 (Quantum Mechanics Core) which is an Upper Division required course. Completing PHYS 010 before transfer can help speed up time to graduation.
* MATH 023 and MATH 024 are prerequisites for upper division course in the major. Completing them before transfer can help speed up time to graduation.

AP Exam Score & Course Exemptions

- An AP Chemistry score of 5 exempts CHEM 002 and CHEM 010
- An AP Environmental Sciences: score of 4 or 5 exempts ESS 001
- 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 5 exempts PHYS 008 and PHYS 008L

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 Natural Sciences does not recommend 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

Physics is the study of nature at its most fundamental. Its scope covers everything from the tiniest particles of matter—such as atoms, electrons, and quarks—to the structure of the entire universe, encompassing innumerable galaxies and stars.

Mathematical and Computational Physics focuses on the development of mathematical methods and computational techniques to model and analyze physical systems. The skills developed with this emphasis can be applied across a wide variety physics domains and to a range of technical professions beyond physics ranging from mathematics to engineering to finance.

Students interested in pursuing a career in physics teaching should complete the Natural Sciences Education (NSED) minor along with the physics major. The NSED minor is designed to prepare UC Merced students for admission to the credential program required to teach high school physics or pursue graduate studies in education.

MAJOR PREPARATION COURSES REQUIRED FOR TRANSFER

Minimum grade required: C or better
Required for admission

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)

--- 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
Recommended to be completed prior to transfer

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)
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 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)

COMPUTER SCIENCE COURSE

Select 1 Course from the following

Minimum grade required: C or better

Recommended to be completed prior to transfer

CSE 019 - Introduction to Computing (4.00)	←	**CIS 26A** - C as a Second Programming Language (4.50) **--- Or ---** **CIS 26B** - Advanced C Programming (4.50) • *Effective next fall, this course will no longer articulate* **--- Or ---** **CIS 22A** - Beginning Programming Methodologies in C++ (4.50) **--- And ---** **CIS 22B** - Intermediate Programming Methodologies in C++ (4.50) **--- Or ---** **CIS 22A** - Beginning Programming Methodologies in C++ (4.50) **--- And ---** **CIS 22BH** - Intermediate Programming Methodologies in C++ - HONORS (4.50) **--- Or ---** **CIS 27** - Programming in C++ for C/Java Programmers (4.50) **--- Or ---** **CIS 36A** - Introduction to Computer Programming Using Java (4.50) **--- And ---** **CIS 36B** - Intermediate Problem Solving in Java (4.50) **--- Or ---** **CIS 41A** - Python Programming (4.50)
MATH 050 - Beginning MATLAB Programming (2.00)	←	No Course Articulated
ME 021 - Engineering Computing (4.00)	←	No Course Articulated

LOWER DIVISION MAJOR COURSES

Minimum grade required: C or better

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

--- And ---

****REFER TO CATALOG****
****REFER TO TOP OF AGREEMENT****

One additional Natural Sciences or Engineering course	←	Articulates as Course-to-Course Only

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