

Matter and Motion

Fall, Winter, Spring 2017 – 2018
sites.evergreen.edu/mnm1718

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This rigorous introductory program integrates **first-year university calculus, chemistry, and physics** to explore how scientists make sense of the natural world. Careful observation of the natural world reveals an underlying order, which scientists try to understand and explain through model building and experimentation. Physical scientists seek to reveal the fundamental nature of matter, its composition, and its interactions; such understanding forms the essential background for our modern technological society. This program lays the foundation for developing this understanding. **Students will be supported in developing a firm background in college-level science, becoming prepared for further intermediate and advanced work in the mathematical and physical sciences.**

The program is **intended for students with solid high-school level backgrounds in science and mathematics**; in particular, **a good grasp of precalculus (including algebra and trigonometry) will be assumed**. Equally **important for success**, however, will be a **commitment to working hard and effectively in groups**. The program will have **significant collaborative laboratory and workshop components**.

The work will be **intensive and challenging but also exciting**; students should expect to spend **at least 50 hours per week** engaged with material during and outside of class. The program will include **readings, lectures, labs, workshops, and projects**, along with **frequent homework sets, writing assignments, quizzes, and exams**.

Successful students will improve their conceptual understanding and problem-solving abilities, ability to reason critically and collaborate effectively, and gain hands-on experience in physical science. Students will learn to apply their skills and knowledge to complex problems that show the rich interconnectedness of mathematical and physical systems. **By the end of the program, successful students will have covered material equivalent to a year of calculus, general chemistry with lab, and calculus-based physics with lab, and will be prepared for upper-division work in chemistry, mathematics, and physics.** Particular upper-division Evergreen science programs that students will be prepared for include: Physical Systems and Applied Mathematics (2018-19); Environmental Analysis (2018-19); Atoms, Molecules, and Reactions (2019-20); and Mathematical Systems (2019-20).

Prerequisites: The most important prerequisites are college level study skills and the **appropriate math background**. For this math-heavy program, students must have **fluency with precalculus** (including algebra and trigonometry). A diagnostic math assessment exam will be made available over the summer, along with access to review/self-study materials so that students can make sure they are appropriately prepared for fall.

Fall Textbooks (Note: math and science textbooks are expensive but will be used for multiple quarters.):

- Calculus: TBD
- Chemistry: *General Chemistry: Atoms First (2nd Edition)*, McMurray and Fay, ISBN: 9780321809261
- Physics: TBD

Likely Credit Equivalencies (Fall):

Calculus I – 4 credits; General Chemistry with Lab I – 6 credits; University Physics with Lab I – 6 credits.

Partial Credit Options: Students with previous background in calculus or chemistry are encouraged to take the full 16 credit program as the integration of calculus, chemistry, and physics enhances learning in all subject areas. However, students who have successfully earned credit in college-level general chemistry with lab with satisfactory achievement or better may consider a partial credit option: 10 credits in calculus and physics. Students interested in this option should register for the full 16 credits, then contact faculty Krishna Chowdary (chowdark@evergreen.edu) to discuss the reduced credit option.

Tentative Preliminary Weekly Schedule **subject to change**			
Monday	Tuesday	Wednesday	Thursday
	8:00 – 12:00 Science Lab		
9:00 – 10:00 Quiz		9:00 – 10:00 Physics	9:00 – 10:30 Chemistry
10:15 – 11:15 Calculus		10:15 – 11:15 Calculus	11:00 – 1:00 Calculus/Physics Workshop
11:30 – 12:30 Physics	1:00 – 5:00 Science Lab	11:30 – 1:00 Math Lab	
1:30 – 3:00 Chemistry			