

# **Matter and Motion, 2015-16**

## **Program Syllabus – Winter Quarter**

sites.evergreen.edu/mnm1516

Matter and Motion is a full-time three-quarter interdisciplinary program that integrates the study of mathematics, chemistry, and physics and places them in their cultural and historical context as exemplars of human experience, endeavor, and achievement. Calculus and physics will be covered in all three quarters, and chemistry in fall and winter. Upon completion, students will have gained hands-on experience with and a working knowledge of scientific and mathematical concepts and laboratory techniques, an ability to reason critically about and solve applied and fundamental problems in math, chemistry, and physics, and an increased understanding of how issues of power, identity, privilege, and equity intersect with the teaching, learning, and practice of math and science.

Students who successfully complete the winter quarter of this program should achieve process skills and content mastery equivalent to:

- one quarter of integral calculus (4 credits, Calculus II);
- one quarter of calculus-based physics with lab (5 credits, University Physics II with Lab)
- one quarter of general chemistry (7 credits, General Chemistry II with Lab)

### **Program Faculty:**

Krishna Chowdary (F) <a href="mailto:chowdark@evergreen.edu">chowdark@evergreen.edu</a> Lab 2 3255, (360) 867-6156	Riley Rex (F, W) <a href="mailto:rexx@evergreen.edu">rexx@evergreen.edu</a> Lab 2 3271, (360) 867-6235	Neil Switz (W, S) <a href="mailto:switzn@evergreen.edu">switzn@evergreen.edu</a> Lab 1 1010, (360) 867-6019
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### **Program Support**

Science Instructional Technician: Sina Hill, [hills@evergreen.edu](mailto:hills@evergreen.edu), Lab 1 2009, (360) 867-6466

Tutors/Graders: Pat Culhane, Pyxie Star

## **Required Texts & Materials**

You must have access to your own copy of the program texts.

- Chemistry: An Atoms First Approach (Zumdahl, 1st edition), ISBN-10: 0840065329, ISBN-13: 9780840065322
- Calculus: Single and Multivariable, 6th Edition plus WileyPLUS Registration Card (Hughes-Hallet 2013, 6th edition), ISBN-10: 1118562402, ISBN-13: 9781118562406). In addition to the textbook, you must also get access to the online system WileyPLUS.
- Physics for Scientists and Engineers with Modern Physics, 3rd edition plus Student Workbook plus MasteringPhysics with eText – Access Card Package (Knight 2013, 3rd edition), ISBN-10: 0321844351, ISBN- 13: 9780321844354. In addition to the textbook, you must also get the student workbook and access to the online homework and tutorial system MasteringPhysics.
- Chaos: Making a New Science (Gleick, James) ISBN: 0-7493-8606-1, ISBN 13: 9780749386061
- A scientific calculator that, in addition to the basic arithmetic functions, is capable of powers, roots, trigonometric functions (sin, cos, tan), exponential and logarithmic functions, and the inverse of those functions. A graphing calculator is fine, as is a calculator phone app.
- 1 pair of lab goggles for chemistry, available for purchase at the Science Support Center on the 2nd floor of Lab 1.
- 1 bound notebook for chemistry lab notes.

**Preliminary Winter Quarter Weekly Schedule \*\*Subject to change\*\***

<b>Monday</b>	<b>Tuesday</b>	<b>Wednesday</b>	<b>Thursday</b>	<b>Friday</b>
<b>10:00 – 12:00</b> <b>Calculus</b> <b>Cal West or Lab II</b> <b>2238</b>	<b>9:30 – 12:00</b> <b>Chemistry quiz, quiz</b> <b>revisions, lecture</b> <b>Lab II 2238</b>	<b>No class</b>	<b>9:30 – 12:00</b> <b>Chemistry lecture,</b> <b>workshop</b> <b>Lab II 2238</b>	<b>10:00 –</b> <b>12:00</b> <b>Physics</b> <b>Cal West</b>
<b>1:00 – 3:00</b> <b>Physics</b> <b>Cal West or Lab II</b> <b>2238</b>	<b>12:00 – 5:00</b> <b>Lab</b> <b>Lab II 1241</b>	<b>No class</b>	<b>1:00 – 3:00</b> <b>Calculus</b> <b>Lab II 2238</b>	

**Due Dates & Tutoring \*\* Subject to change \*\***

<b>Sun</b>	<b>Mon</b>	<b>Tue</b>	<b>Wed</b>	<b>Thur</b>	<b>Fri</b>	<b>Sat</b>
	<b>10:00 AM:</b> <b>Chem HW</b> <b>due.</b> <b>Postlab due</b>	<b>9:30 AM:</b> <b>Chem Quiz</b>		<b>9:30 AM:</b> <b>Physics HW</b> <b>due</b>	<b>10:00 AM:</b> <b>Calculus</b> <b>HW due</b>	
<b>Time TBA, room</b> <b>TBA. Pat chem,</b> <b>physics tutoring.</b>	<b>8 pm. Chem</b> <b>Reading</b> <b>Response due</b>	<b>1 pm:</b> <b>Prelab due</b>	<b>Time TBA, room</b> <b>TBA. Pyxie calc,</b> <b>physics, chem</b> <b>tutoring</b>			

**Topical Coverage, Winter Quarter \*\*Subject to change \*\***

Week	Calculus	Physics	Chemistry	Seminar	Notes
1	§3.9, §10.1-10.3. Approximations	Ch. 13, Gravity	Ch. 12, Chemical Kinetics		
2	§5.1-5.2, Definite Integral	Ch. 14, Oscillations	Ch. 13, Chemical Equilibrium	TBA. Chaos	
3	§5.2-5.3	Ch. 20, Traveling Waves	Ch. 14, Acids and Bases		ML King Day – Monday Jan. 18th. No class.
4	§6.1-6.2, Antiderivatives	Ch. 21, Superposition	Ch. 15, Acid-base Equilibria	TBA. Chaos	
5	Midterm	Midterm	Midterm		
6	§6.3-6.4	Ch. 25, Electric Charges	Ch. 17 Thermodynamics	TBA. Chaos	
7	§7.1-7.3, Integration Techniques	Ch. 26, Electric Field	Ch. 18, Electrochemistry		President's Day – Monday, Feb. 15th. No class.
8	§7.4-7.5	Ch. 28, Electric Potential	Ch. 19, Nuclear Chemistry	TBA. Chaos	
9	§8.1-8.3, Using Integrals. §8.4-8.5 if time.	Ch. 29, Potential & Field. 30 & 31, DC circuits, if time.	Ch. 22, Intro to Organic Chemistry		
10	Exam	Exam	Exam		
Evals	Evaluation Week (Mon. March 14th – Fri. March 18th)				