Major Requirements (72-75 cr)
Offered: F - Fall, S - Spring, Su - Summer
Prerequisite - (0-7 cr)
(if required by placement assessment)
- CHEM106 Principles of Chemistry (F, S, Su)
- MATH111 Precalculus (F, S, Su)

Core (36 cr)
- PHYS 191 University Physics I (F, Su)
- PHYS 192 University Physics II (S, Su)
- PHYS 198 Introductory Physics Seminar (S)
- PHYS 210 Intermediate Mechanics (Alt F*)
- PHYS 220 Oscillations/Waves/Optics (Alt F**)
- PHYS 230 Intermediate Physics Lab (Alt F)
- PHYS 300 Jr./Senior Phys. Seminar (Alt F)
- PHYS 320 Statistical & Thermal Phys. (Alt S*)
- PHYS 330 Advanced Physics Lab (Alt S)
- PHYS 340 Electricity & Magnetism (Alt S*)
- PHYS 360 Modern Physics (Alt S)
- PHYS 464 Quantum Mechanics (Alt F)

*Offered in same academic year.
**Offered in same academic year, after *.

Collaterals (27 cr)
- CHEM 120 General Chemistry I (F, S, Su)
- CHEM 121 General Chemistry II (F, S, Su)
- CSIT 104 Computational Concepts (F, S)
- MATH 122 Calculus I (F, S, Su)
- MATH 221 Calculus II (F, S, Su)
- MATH 222 Calculus III (F, S)
- MATH 335 Linear Algebra** (F, S)
- MATH 420 Ordinary Differential Eqs (F, S)

Electives (9-12 cr)
Pick three courses from list on page 2:
- Physics elective
- Physics elective
- Physics elective

**Required prerequisite; not included in 27 cr.
Completion of MATH collaterals including MATH 335 and 420 qualifies for a Math Minor.

7 Tips for Success in PHYSICS
1. Meet regularly with your adviser to make sure you are taking appropriate courses each semester.
2. Prioritize major courses; Gen. Ed. courses can be taken any time to reach 15+ credits per semester.
3. If averaging a C or below in a required course, seek help. Your options include: course instructor, student tutors, your advisor, department chairperson, and CSAM Academic Advising (csamssc@montclair.edu)
4. Use summer session to catch-up or push ahead in the MATH sequence and/or PHYS 191/192.
5. Find out when PHYS and MATH courses will be offered. Most courses must be taken in sequence but are not offered yearly. Consult the department website or ask your advisor.
6. Participate in department events, seminars, physics club, and telescope nights.

Prerequisite: Courses must be taken sequentially.
Corequisite: Courses may be taken at the same time or as a prerequisite.

START HERE
PreCalc MATH 111
Calc I MATH 122
Calc II MATH 221
Calc III MATH 222
Linear Algebra (MATH335)
Ordinary Differential Equations (MATH 420)
Quantum Mechanics (PHYS 464)

Intermediate Mechanics (PHYS 210)
Oscillations, Waves & Optics (PHYS 220)
Electricity & Magnetism (PHYS 340)
Statistics & Thermal Physics (PHYS 320)
Modern Physics (PHYS 360)
Junior/Senior Physics Seminar (PHYS 300)

Advanced Physics Lab (PHYS 330)

Physics Elective
Physics Elective
Physics Elective

Pathway to Graduation

Initial Placement Options
Math
1. MATH 111 Precalculus
2. MATH 122 Calculus I
3. MATH 221 Calculus II
Chemistry:
1. CHEM 106 Principles of Chemistry
2. CHEM 121 General Chemistry I

Major Map last updated 10/5/19.
Physics Electives (with prerequisites)

**Select 3**

**Regularly Offered Electives:**
- PHYS 280 Astronomy for Physicists (PHYS 191)
- PHYS 180 Astronomy for Everyone (no prerequisite, and primarily for non-majors)
- PHYS 350 Modern Optics (PHYS 210 or 220)
- PHYS 368 Fluid Mechanics (MATH 222)
- PHYS 461 Special & General Relativity (PHYS 340 or PHYS 360 or PHYS 368 or MATH 368)
- PHYS 480 Astrophysics (PHYS 320 or PHYS 340 or PHYS 360 or PHYS 368)
- PHYS 495 Research/Independent Study in Physics (departmental permission)

**Infrequently Offered Electives:**
- PHYS 245 Fundamentals of Electronic (PHYS 192 or 194)
- PHYS 310 Advanced Mechanics (PHYS 210 or PHYS 220)
- PHYS 325 Computational Physics (MATH 221, PHYS 192 & CSIT 104 or 111)
- PHYS 377 Mathematical Physics (MATH 222)
- PHYS 380 Observational Astronomy (PHYS 230 or PHYS 280)
- PHYS 341 Electronics & Digital Circuits (PHYS 230)
- PHYS 462 Nuclear Physics (PHYS 360)
- PHYS 470 Solid State Physics (PHYS 360)
- PHYS 399 Special Topics in Physics (with department approval)
- PHYS 451 Radiation and Medical Physics (PHYS 330 or PHYS 360 are co-requisites)

Other Requirements

**General Education (32 cr)**
- *Courses in red should be taken as early as possible*
  - GNED199 (1)
  - C1: WRIT105 (3)
  - C2: WRIT106 (3)
  - C3. CMST 101 (3)
  - D. Fine & Performing Arts (3)
  - F.1. Great Works & their Influences (3)
  - F2. Philosophical & Religious Perspectives (3)
  - G. Computer Science -- CSIT 104 meets requirement.
  - J. Physical Educaion (1)
  - K1. American & European History (3)
  - K2. Global Cultural Perspectives (3)
  - K3. Social Science Perspectives (3)
  - L. Interdisciplinary Studies (3)

**University Requirements (3-9 cr)**
- World Languages (3-6) determined by placement test
- World Cultures (0-3)*
  *some World Cultures courses fulfill other Gen Ed Requirements, especially Global Cultural Perspectives.

**Free Electives (4-13 cr)**
- Note: Prerequisite classes (MATH 111 PreCalc, CHEM 106 Intro Chemistry, and MATH 335 Linear Algebra) will take up free elective credits.
- For remaining electives consider:
  - taking CSIT/Data Science courses that can help with the first post-graduation job.
  - exploring a personal interest.
  - 5-year dual-degree options.

Consult the Physics & Astronomy website or your major advisor to clarify course availability. Other concentrations or dual-degree programs have modified course requirements.

**Suggested Sequence (required courses)**

<table>
<thead>
<tr>
<th>Year 1</th>
<th><strong>Fall</strong></th>
<th><strong>Spring</strong></th>
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<tbody>
<tr>
<td></td>
<td>PHYS 191</td>
<td>PHYS 192</td>
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<tr>
<td></td>
<td>GNED 199 (freshmen)</td>
<td>PHYS 198</td>
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<tr>
<td>Complete MATH 111, 122, 221 by Year 2, including summer session. Complete CHEM 120, 121, &amp; CSIT 104 before Year 3.</td>
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<tr>
<td>Year 2</td>
<td>PHYS 210</td>
<td>PHYS 320 (follows 210)</td>
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<td></td>
<td>PHYS 230</td>
<td>PHYS 340 (follows 210)</td>
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<td></td>
<td>MATH 222</td>
<td>MATH 335</td>
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<tr>
<td>Year 3</td>
<td>PHYS 220</td>
<td>PHYS 360 (follows 220)</td>
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<td>MATH 420</td>
<td>PHYS 330</td>
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<td>(PHYS 210 or 220 can be taken following</td>
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<tr>
<td>Year 4</td>
<td>PHYS 300 completion of 192 &amp; Calculus 1, 2)</td>
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