DEPARTMENT OF PHYSICS AND ASTRONOMY

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Email: physics@gmu.edu  
Website: physics.gmu.edu

Administration

• Paul So, Chair  
• Jie Zhang, Associate Chair for Research  
• John Cressman, Associate Chair for Laboratory Instruction  
• Ernest Barreto, Graduate Advisor (Physics)  
• Chi Yang, Graduate Advisor (Engineering Physics)  
• Joseph Weingartner, Undergraduate Advisor (Physics, Astronomy & Astrophysics)  
• Fernando Camelli, Undergraduate Advisor (Computational & Engineering Physics)  
• Erhai Zhao, Undergraduate Advisor (Physics)  
• Phil Rubin, Undergraduate Advisor (Incoming, First-years, and Transfers)

The Department of Physics and Astronomy is dedicated to the dissemination and advancement of physics and astronomy through instruction, research, and outreach.

The department provides rigorous training for physics and astronomy students and prepares them to be successful, confident, and versatile in their ability to apply physics and astronomy principles within any chosen field. The department also aims to deliver and instill a broad-based understanding of general physics and astronomy principles and practices to the wider university community through our Mason Core (http://catalog.gmu.edu/mason-core/) (general education) courses. Our student-centric curriculum and instruction use a mixture of traditional and current pedagogical techniques informed by on-going educational research. It is our goal to help students to develop versatility and creativity through repeated analytical practices and problem-solving training in their coursework and faculty-led research projects.

Research in the department focuses on pushing the frontiers of physics and astronomy in a broad range of topics using theoretical, experimental, observational, and computational approaches. The department maintains many active collaborations with scientists across different disciplines within the university community and with other national and international institutions. The department believes strongly in incorporating both graduate as well as undergraduate students in our research programs. It is our goal to see students arriving with an enthusiasm and curiosity for physics and astronomy and leaving as true scientists ready to conduct their own scientific investigations.

Undergraduate Programs


Undergraduate Research Opportunities

The department offers many opportunities for undergraduate students to become involved with research. Students should consult with faculty working on research topics of interest to them, based on their exploration of the department's website (http://physics.gmu.edu/).

Bachelor's/Accelerated Master's Degree

Information regarding this program can be found in the Physics, BS/Accelerated Masters section of this catalog.

Graduate Programs

This department offers the Applied and Engineering Physics, MS (http://catalog.gmu.edu/colleges-schools/science/physics-astronomy/applied-engineering-physics-ms/). The department also supports the Energy and Sustainability concentration in the Interdisciplinary Studies, MAIS (http://catalog.gmu.edu/colleges-schools/humanities-social-sciences/interdisciplinary-studies/interdisciplinary-studies-mais/). Additionally, the department offers a Physics, PhD (http://catalog.gmu.edu/colleges-schools/science/physics-astronomy/physics-phd/). These graduate programs are strongly supported by the extensive research activities of the faculty, including many collaborations with scientists and engineers at regional government laboratories.

Faculty

Department Faculty  
Professors  
Barreto, Becker, Kan, Lohner, Mishin, Oluseyi, Rubin, Satija, Satyapal, Sauer, So, Summers, Trefil, Weigel, Yang, Zhang, Zhao

Associate Professors  
Camelli, Cressman, Djordjevic, Dreyfus, Gliozzi, Marzougui, Nikolic, Oerter, Plavchan, Rosenberg, Sheng, Tian, Vora, Weingartner, Yigit

Assistant Professors  
Belle, Ericson, Ghahari Kermani, Ghimire, Parks

Emeriti  
Ceperley, Dworzecka, Ehrlich, Ellsworth, Lieb

Research Faculty  
Attie, Balmaceda, Bilitza, Braga, Cigan, Deneva, Dhadly, Duxbury, Fischer, Johnson, Mariska, Mazin, Meier, Odstrcil, Poland, Prescott, Purja Pun

Requirements & Policies

Requirements

Writing Intensive Requirement

George Mason requires all undergraduate students to complete at least one course designated as “writing intensive” in their majors at the 300-level or above. Students majoring in physics fulfill this requirement.
by successfully completing PHYS 407 Senior Laboratory in Modern Physics (Mason Core) (http://catalog.gmu.edu/mason-core/), PHYS 410 Computational Physics Capstone (Mason Core) (http://catalog.gmu.edu/mason-core/), or ASTR 402 RS: Methods of Observational Astronomy (Mason Core) (http://catalog.gmu.edu/mason-core/) depending upon their concentration (see program requirements (https://catalog.gmu.edu/colleges-schools/science/physics-astronomy/physics-bs/)). Astronomy majors fulfill the requirement by completing ASTR 402 RS: Methods of Observational Astronomy (Mason Core) (http://catalog.gmu.edu/mason-core/).

**Teacher Licensure**

Students who wish to become teachers should consult the College of Education and Human Development (http://catalog.gmu.edu/colleges-schools/education-human-development/) section of this catalog and attend an information session early in their undergraduate career. For more information, visit the Graduate School of Education’s website (https://gsed.gmu.edu/).

**Physics for Non-majors**

**Recommended for biology, geology, premedical, and mathematics students who seek a BA degree:**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>PHYS 243</td>
<td>College Physics I (Mason Core)</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 244</td>
<td>College Physics I Lab (Mason Core)</td>
<td>1</td>
</tr>
<tr>
<td>PHYS 245</td>
<td>College Physics II (Mason Core)</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 246</td>
<td>College Physics II Lab (Mason Core)</td>
<td>1</td>
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**Recommended for non-science majors:**

<table>
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<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>PHYS 106</td>
<td>The Quantum World: A Continuous Revolution in What We Know and How We Live (Mason Core)</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 111</td>
<td>Introduction to the Fundamentals of Atmospheric Science (Mason Core)</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 112</td>
<td>Introduction to the Fundamentals of Atmospheric Science Lab (Mason Core)</td>
<td>1</td>
</tr>
<tr>
<td>PHYS 103</td>
<td>Physics and Everyday Phenomena I (Mason Core)</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 104</td>
<td>Physics and Everyday Phenomena II (Mason Core)</td>
<td>4</td>
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</tbody>
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The following courses constitute a calculus-based sequence in general physics to be taken by physics and engineering majors, chemistry, computer science, and mathematics students who are pursuing a BS degree:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>PHYS 160 &amp; PHYS 161 &amp; PHYS 260 &amp; PHYS 261</td>
<td>University Physics I (Mason Core)</td>
<td>8</td>
</tr>
<tr>
<td>&amp; PHYS 263</td>
<td>University Physics II (Mason Core)</td>
<td>8</td>
</tr>
<tr>
<td>&amp; PHYS 103 &amp; PHYS 104</td>
<td>and Physics and Everyday Phenomena I (Mason Core)</td>
<td>8</td>
</tr>
<tr>
<td>&amp; PHYS 243 &amp; PHYS 244 &amp; PHYS 245 &amp; PHYS 246</td>
<td>and College Physics I Lab (Mason Core)</td>
<td>8</td>
</tr>
<tr>
<td>&amp; PHYS 160 &amp; PHYS 161 &amp; PHYS 260 &amp; PHYS 262 &amp; PHYS 263</td>
<td>and College Physics II (Mason Core)</td>
<td>8</td>
</tr>
<tr>
<td>&amp; PHYS 160 &amp; PHYS 161 &amp; PHYS 260 &amp; PHYS 262 &amp; PHYS 263</td>
<td>and College Physics II Lab (Mason Core)</td>
<td>8</td>
</tr>
</tbody>
</table>

**Programs**

- Applied and Engineering Physics, MS
- Astronomy Minor
- Astronomy, BS
- Astrophysics Minor
- Physics Minor
- Physics, BS

Students may receive credit for only one of the following three sequences:
• Physics, PhD
• Renewable Energy Interdisciplinary Minor