

DEPARTMENT OF PHYSICS AND ASTRONOMY

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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 (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

The department offers the Physics, BS and the Astronomy, BS. Also available are the Physics Minor, the Astronomy Minor, and the Renewable Energy Interdisciplinary Minor.

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. The department also supports the Energy and Sustainability concentration in the Interdisciplinary Studies, MAIS. Additionally, the department offers a 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, Rubin, Satija, Satyapal, Sauer, So, Summers, Trefil, Yang, Zhang

Associate Professors

Camelli, Cressman, Djordjevic, Dreyfus, Geller, Gliozzi, Marzougui, Nikolic, Oerter, Rosenberg, Sheng, Tian, Weigel, Weingartner, Wyczalkowski, Yigit, Zhao

Assistant Professors

Belle, Ericson, Ghirmire, Plavchan, Vora

Emeriti

Ceperley, Dworzecka, Ehrlich, Ellsworth, Evans, Lieb

Research Faculty

Bilitza, Deneva, Dere, Duxbury, Huang, Johnson, Kwon, Mariska, Meier, Odstrcil, Poland, Purja Pun, Secrest, Tarr

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) or ASTR 402 RS: Methods of Observational Astronomy (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).

Teacher Licensure

Students who wish to become teachers should consult the College of Education and 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://gse.gmu.edu>).

Physics for Non-majors

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

PHYS 243 College Physics I (Mason Core), PHYS 244 College Physics I Lab (Mason Core), PHYS 245 College Physics II (Mason Core), and PHYS 246 College Physics II Lab (Mason Core)

Recommended for non-science majors:

PHYS 101 , PHYS 102 , PHYS 103 Physics and Everyday Phenomena I (Mason Core), and PHYS 104 Physics and Everyday Phenomena II (Mason Core)

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:

PHYS 160 University Physics I (Mason Core), PHYS 161 University Physics I Laboratory (Mason Core), PHYS 260 University Physics II (Mason Core), PHYS 261 University Physics II Laboratory (Mason Core) or PHYS 265 Intermediate University Physics Laboratory, PHYS 262 University Physics III (Mason Core), and PHYS 263 University Physics III Laboratory (Mason Core)

Students may receive credit for only one of the following three sequences:

Code	Title	Credits
PHYS 103 & PHYS 104	Physics and Everyday Phenomena I (Mason Core) and Physics and Everyday Phenomena II (Mason Core)	8
PHYS 243 & PHYS 244 & PHYS 245 & PHYS 246	College Physics I (Mason Core) and College Physics I Lab (Mason Core) and College Physics II (Mason Core) and College Physics II Lab (Mason Core)	8
PHYS 160 & PHYS 161 & PHYS 260 & PHYS 262 & PHYS 263	University Physics I (Mason Core) and University Physics I Laboratory (Mason Core) and University Physics II (Mason Core) and University Physics III (Mason Core) and University Physics III Laboratory (Mason Core)	11

Programs

- Applied and Engineering Physics, MS
- Astronomy Minor
- Astronomy, BS
- Physics Minor
- Physics, BS
- Physics, PhD
- Renewable Energy Interdisciplinary Minor