**BACHELOR OF SCIENCE WITH A MAJOR IN ASTRONOMY AND ASTROPHYSICS**

In the bachelor of science in astronomy and astrophysics program students become well versed in different aspects of modern astronomy and astrophysics. Coursework includes quantum physics, mechanics, and astrophysics, as well as a range of electives in computer science and physics topics. Classes incorporate hands-on experience with state-of-the-art telescopes, satellites, and data analysis.

All students in the astronomy and astrophysics major complete a capstone project as well as a symposium course in which they learn to present their research findings and review their peers’ projects. Students leave the program ready to begin graduate-level education in astronomy, astrophysics, physics or a related field, and they are able to apply their scientific and problem-solving skills in a variety of workplaces.

Visit the program website (https://physics.columbian.gwu.edu/undergraduate/) for additional information.

**ADMISSIONS**

For more information on the admission process, please visit the Office of Undergraduate Admissions website. Applications may be submitted via the Common Application.

Supporting documents not submitted online should be mailed to:

Office of Undergraduate Admissions  
The George Washington University  
800 21st Street NW, Suite 100  
Washington DC 20052

Contact for questions: gwadm@gwu.edu or 202-994-6040

**REQUIREMENTS**

The following requirements must be fulfilled:

The general requirements stated under Columbian College of Arts and Sciences, Undergraduate Programs (http://bulletin.gwu.edu/arts-sciences/#degeregulationtext).

Program-specific curriculum:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 1021</td>
<td>University Physics I</td>
<td></td>
</tr>
<tr>
<td>PHYS 1022</td>
<td>University Physics II</td>
<td></td>
</tr>
<tr>
<td>PHYS 2023</td>
<td>Modern Physics</td>
<td></td>
</tr>
<tr>
<td>MATH 1231</td>
<td>Single-Variable Calculus I</td>
<td></td>
</tr>
<tr>
<td>MATH 1232</td>
<td>Single-Variable Calculus II</td>
<td></td>
</tr>
<tr>
<td>MATH 2233</td>
<td>Multivariable Calculus</td>
<td></td>
</tr>
<tr>
<td>MATH 2184</td>
<td>Linear Algebra I</td>
<td></td>
</tr>
<tr>
<td>MAE 1117</td>
<td>Introduction to Engineering</td>
<td></td>
</tr>
<tr>
<td>or CSCI 1012</td>
<td>Introduction to Programming with Python</td>
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**Advanced courses (49 credits):**

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<tr>
<th>Code</th>
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<tbody>
<tr>
<td>MATH 3342</td>
<td>Ordinary Differential Equations</td>
<td></td>
</tr>
<tr>
<td>PHYS 3100</td>
<td>Math Methods for Physics</td>
<td></td>
</tr>
<tr>
<td>PHYS 2151W</td>
<td>Intermediate Laboratory I: Techniques and Methods</td>
<td></td>
</tr>
<tr>
<td>PHYS 2152</td>
<td>Intermediate Laboratory II: Instrumentation</td>
<td></td>
</tr>
<tr>
<td>ASTR 2121</td>
<td>Introduction to Modern Astrophysics</td>
<td></td>
</tr>
<tr>
<td>PHYS 3161</td>
<td>Mechanics</td>
<td></td>
</tr>
<tr>
<td>PHYS 3164</td>
<td>Thermal and Statistical Physics</td>
<td></td>
</tr>
<tr>
<td>PHYS 3165</td>
<td>Electromagnetic Theory I</td>
<td></td>
</tr>
<tr>
<td>PHYS 3166</td>
<td>Electromagnetic Theory II</td>
<td></td>
</tr>
<tr>
<td>PHYS 3167</td>
<td>Principles of Quantum Physics</td>
<td></td>
</tr>
<tr>
<td>PHYS 3181</td>
<td>Computational Physics</td>
<td></td>
</tr>
<tr>
<td>PHYS 4195W</td>
<td>Physics Capstone</td>
<td></td>
</tr>
<tr>
<td>ASTR 4195</td>
<td>Undergraduate Research in</td>
<td></td>
</tr>
<tr>
<td>PHYS 4200</td>
<td>Physics Symposium</td>
<td></td>
</tr>
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</table>

**Electives**

Two of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ASTR 2131</td>
<td>Astrophysics Seminar</td>
<td></td>
</tr>
<tr>
<td>ASTR 3141</td>
<td>Data Analysis in Astrophysics</td>
<td></td>
</tr>
<tr>
<td>ASTR 3161</td>
<td>Space Astrophysics</td>
<td></td>
</tr>
</tbody>
</table>

One of the following:

<table>
<thead>
<tr>
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<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 3127</td>
<td>Biophysics: Macroscopic Physics in the Life Sciences</td>
<td></td>
</tr>
<tr>
<td>PHYS 3128</td>
<td>Biophysics: Microscopic Physics in the Life Sciences</td>
<td></td>
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</table>
GENERAL EDUCATION

In addition to the University General Education Requirement (http://bulletin.gwu.edu/university-regulations/general-education/#text), undergraduate students in Columbian College must complete a further, College-specific general education curriculum—Perspective, Analysis, Communication, or G-PAC (http://bulletin.gwu.edu/arts-sciences/gpac/). Together with the University General Education Requirement, G-PAC engages students in active intellectual inquiry across the liberal arts. Students achieve a set of learning outcomes that enhance their analytical skills, develop their communication competencies, and invite them to participate as responsible citizens who are attentive to issues of culture, diversity, and privilege.

G-PAC approved courses, Dean’s Seminars, and Sophomore Colloquia that may be available for registration are listed on the CCAS Advising website (https://advising.columbian.gwu.edu/general-education-courses/).

Coursework for the University General Education Requirement is distributed as follows:

- Writing—one approved course in university writing and two approved writing in the disciplines (WID) courses.
- Humanities—one approved course in the humanities that involves critical or creative thinking skills.
- Mathematics or Statistics—one approved course in either mathematics or statistics.
- Natural or Physical Science—one approved laboratory course that employs the process of scientific inquiry.
- Social Sciences—two approved courses in the social sciences.

Coursework for the Columbian College general education curriculum is distributed as follows:

- Arts—one approved course in the arts that involves the study or creation of artwork based on an understanding or interpretation of artistic traditions or knowledge of art in a contemporary context.
- Global or Cross-Cultural Perspective—one approved course that analyzes the ways in which institutions, practices, and problems transcend national and regional boundaries.
- Humanities—one approved course in the humanities that involves critical thinking skills (in addition to the one course in this category required by the University General Education Requirement).

Certain courses are approved to fulfill the requirement in more than one of these categories.

Courses taken in fulfillment of G-PAC also may be counted toward majors or minors. Transfer courses taken prior to, but not after, admission to George Washington University may count toward the University General Education Requirement and G-PAC, if those transfer courses are equivalent to GW courses that have been approved by the University and the College.