Honor’s only courses: The Department of Physics has one sequence of courses designated for BHC students, PHY 121H/131H; but these courses are usually not recommended for physics majors. The PHY121H/131H sequence is for BHC students with a wide spectrum of interests, including chemistry, life sciences, and engineering. Most physics majors should take the PHY150/151 sequence instead. Because this sequence is for physics majors only, the chosen topics and the depth of coverage are tailored towards those who plan careers in physics. The relatively small number of BHC physics majors each year does not justify offering separate honors sections for the PHY150/151 sequence. Nevertheless, BHC students can receive honors credit in PHY150 and/or PHY151 via the Honor’s Enrichment Contract.

Honor’s Enrichment Contracts: Most faculty members in the Department of Physics are enthusiastic about directing Honor’s Enrichment Contracts for BHC students. These contracts will often involve additional projects, which are to be completed during the semester with the guidance of the faculty member. Most faculty also welcome input from the students on how they could further explore the ideas presented in the class. Any interested student should contact the professor as soon as possible at the start of the semester.

Honors credit for key physics classes: Two of the core courses in the physics-majors’ curriculum have been designated to receive honors credit. BHC students who successfully complete PHY 201 (Mathematical Methods in Physics I) and PHY 333 (Electronic Circuits and Measurements I) will receive honors credit for these classes. In other words, 3 hours of lower-division honors credit, and 3 hours of upper-division honors credit are available from the standard sequence of classes taken by physics majors.
Faculty research interests in the Department of Physics.

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Experimental nuclear and particle physics

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Nanoscience and materials

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Astrophysics and cosmology, Beyond Center

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Accelerator physics and free-electron lasers

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Ultrafast phenomena in condensed matter physics

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Free-electron laser science: interface between accelerator physics and nanoscience

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Holographic gauge-gravity dualities, mapping strongly-coupled theories to weakly-coupled

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Theoretical high-energy physics, gravity

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Theoretical condensed matter physics

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Theoretical nuclear physics, high-energy physics, and condensed matter physics

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Materials synthesis and application using first-principles computation

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Electron microscopy and materials physics

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Computational nano-optics; coherent control of light and matter

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Fast spectroscopy of energy exchange between degrees of freedom in crystals

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Diffraction physics and complex materials

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Experimental solid state physics

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Biological and condensed matter physics

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Cosmology, gravitation, particle physics

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Theoretical particle physics, color perception
Senior honors projects in physics

There is a wide range of exciting and fundamental research pursued by the faculty in the Department of Physics. The physics faculty are delighted to work with honors students on their senior research projects. Physics honors projects usually involve significant original research. Thus, it is important that physics honors students choose a thesis director early in their junior year, and that they progress steadily towards a timely completion of the project. The written thesis can be short, but the content should be of sufficient quality for publication in a research journal.

Suggested Timeline

Junior Year: Fall semester
1) Choose a thesis director.
2) Agree on a thesis topic with your director.
3) Read background information on your chosen topic.
4) Meet with your director often, once a week if possible, to ensure that you are on track.

Junior Year: Spring semester
1) Start original research.
2) Continue reading background information and recent articles on your thesis topic.
3) Meet with your director often, once a week if possible, to ensure that you are on track.

Junior-Senior Year: Summer
The bulk of the research should be accomplished during the summer between junior and senior years. This is when you, and your thesis director, are likely to have the most time to work on the project.

Senior Year: Fall semester
1) Finish research.
2) Start writing the thesis
3) Continue reading background information and recent articles on your thesis topic.
4) Meet with your director often, once a week if possible, to ensure that you are on track.

Senior Year: Spring semester
1) Finish writing the thesis early in the spring semester.
2) Meet with your director often. Expect several changes to the thesis.
3) Provide copies of your thesis to the readers four weeks before the defense.
4) Prepare and practice your defense well in advance.
Honors physics courses for physics majors

All physics majors are encouraged to take the introductory physics sequence for physics majors, PHY150 and PHY151. Honors credit can be earned in these classes via footnote 18 projects. Although equivalent credit can be obtained from the general science and engineering sequence, including the honors sections PHY121H and PHY131H, the PHY150/151 courses are specially designed for physics majors, thus providing a stronger foundation for future studies in physics. Furthermore, the PHY150/151 sequence is generally limited to less than 30 students, providing a more personalized and interactive environment.

Three hours of lower division honors credit are automatically earned by honors students who complete the first semester of Mathematical Methods of Physics (PHY201). Similarly, three hours of upper division honors credit are earned by honors students who complete the upper division electronics laboratory (PHY333).

Honors credit may also be available in other physics courses via the footnote 18 option. Students should discuss this option with the instructor for the course. In any case, all physics classes for physics majors are limited to 30 students or less, so the atmosphere is usually informal and interactive. Connecting with the outstanding faculty who are chosen to teach the physics-majors courses enhances the undergraduate experience, and increases the opportunities for research in the department, giving you a head start for your senior honors project and your career.