

# HONOURS BSC IN PHYSICS - BIOLOGICAL PHYSICS OPTION

Why is our world the way it is? How can we understand and explain what we observe around us, from the smallest sub-atomic particles to the largest galaxies? How can we apply this understanding to manipulate our world? Studying physics gives insight into the fundamental laws of nature.

But an education in physics gives so much more. The rigorous training our students receive in analyzing and understanding complex problems is valuable in many future careers. While many of our graduates have established careers in universities and in the high tech sector as research and development scientists, others have used their physics degrees as a springboard to careers in finance, administration, medicine, management or education. The range of career opportunities is perhaps wider than for any other students with a science education.

Physicists have revolutionized the way we live our lives, with groundbreaking discoveries and new technologies, transferable to other fields such as biology or finance. Our professors and graduates are an important part of this chain. Many of our professors have also been recognized for their teaching and are seen as world-class researchers in their fields of expertise.

The research conducted by the professors in the Department of Physics is concentrated in several sub-specialties, including the physics of biological and complex systems, condensed matter physics, photonics and the physics of geomaterials. Depending upon your choice of program, you have the opportunity to take courses and participate in research projects in these specialized areas.

In addition to the Honours BSc in Physics, we offer three other Honours BSc programs. The first is in physics-mathematics, which provides enriched mathematics training within a physics program. The second is the option in photonics, which gives students a solid training in physics and a more applied and industry-related training in photonics. The third is the option in biological physics, which teaches students to apply a rigorous education in physics to various areas of life sciences. We also offer a Major in Physics that can form the core of an Honours BSc when combined with a major or a minor in another discipline in the Faculty of Science, or in another faculty. Finally, starting in fall 2016, we will offer a five-year integrated program in physics (BSc) and electrical engineering (BASc), jointly with the School of Electrical Engineering and Computer Science (SEECs). This unique program will offer a full education in physics and electrical engineering. Graduates will be sought after by industry and academia, as they will have the capacity to develop technology from a basic physics idea to the final product.

The Department of Physics also has strong graduate programs, leading to an MSc or PhD. They give students the opportunity to work on cutting edge science in a research group led by one or more department professors.

This program is offered in English and in French.

## Program Requirements

Co-operative education is available with this program.

The French immersion stream is available with this program.

BIO 1140	Introduction to Cell Biology	3 Units
CHM 1311	Principles of Chemistry	3 Units
MAT 1320	Calculus I	3 Units
3 course units from:		3 Units
MAT 1322 Calculus II		
MAT 1325 Calculus II and an Introduction to Analysis		
MAT 1341	Introduction to Linear Algebra	3 Units
PHY 1121	Fundamentals of Physics I	3 Units
PHY 1122	Fundamentals of Physics II	3 Units
3 course units from:		3 Units
MAT 2122 Multivariable Calculus		
MAT 2322 Calculus III for Engineers		
3 course units from:		3 Units
MAT 2324 Ordinary Differential Equations and the Laplace Transform		
MAT 2384 Ordinary Differential Equations and Numerical Methods		
PHY 2104	Introduction to Circuit Theory and Electronics	3 Units
PHY 2311	Waves and Optics	3 Units
PHY 2323	Electricity and Magnetism	3 Units
PHY 2325	Physics in Biology	3 Units
PHY 2333	Mechanics	3 Units
PHY 2361	Modern Physics	3 Units
BIO 3153	Cell Biology	3 Units
PHY 3320	Electromagnetic Theory	3 Units
PHY 3325	Introduction to Molecular Biophysics	3 Units
PHY 3341	Theoretical Physics	3 Units
PHY 3350	Thermodynamics	3 Units
PHY 3355	Statistical Thermodynamics	3 Units
PHY 3370	Introductory Quantum Mechanics	3 Units
PHY 3902	Physics and Applied Physics Laboratory I	3 Units
PHY 3904	Physics and Applied Physics Laboratory II	3 Units
PHY 4006	Physics Research Project	6 Units
PHY 4322	Biological Physics	3 Units
3 optional course units in mathematics (MAT) at the 2000, 3000 or 4000 level, excluding MAT 2379 <sup>1</sup>		3 Units
6 optional course units in biology (BIO) at the 2000, 3000 or 4000 level		6 Units
12 elective course units from the Faculty of Arts, the Faculty of Education, the Faculty of Law, the Faculty of Social Sciences or the Telfer School of Management		12 Units
18 elective course units <sup>1,2</sup>		18 Units
Total:		120 Units

### Note(s)

- <sup>1</sup> (MAT 2141 or MAT 2342) or (MAT 2371 or MAT 2377) is recommended.
- <sup>2</sup> Of the 18 elective course units, some breadth in other sciences is recommended. In particular, the following courses are recommended: CHM 1321, (GNG 1106 or ITI 1120). ITI 1120 is a prerequisite for most computer science (CSI) courses. GNG 1106 is recommended for students not taking further computer science courses (CSI).

*This is a copy of the 2021-2022 catalog.*

This message is intended for students registered in the Faculty of Science. If the components of your program of study require common compulsory courses, you will have to replace the units as follows:

1. 1000-level courses must be replaced with elective course units;
2. 2000-level courses and above must be replaced with optional course units from either discipline at the same level or above.

Please note that all programs in the Faculty of Science require a minimum of 12 elective course units from the Faculty of Arts, the Faculty of Education, the Faculty of Law, the Faculty of Social Sciences or the Telfer School of Management. Once you have decided on the replacement courses, please inform the Office of Undergraduate Programs of the Faculty of Science by email at [infosci@uOttawa.ca](mailto:infosci@uOttawa.ca) so that we may amend your Academic Advisement accordingly.