



YEAR 1: PHYS

- **Please explain how Physics labs are scheduled?**
Most of the first year labs run for 3 hours each week. For more information on the labs (schedules, rooms, etc.), you may visit the [Undergraduate Laboratories \(UGL\) web site](#). Although labs may appear as half-blocks in BearTracks, they take place weekly so nothing should be scheduled in the same day/time slot (ie. CHEM labs).
- **What is Python, and will it help me with my physics labs?**
Anaconda Python is a widely used, dynamic programming language and is available for free download on the web. This program will be incorporated in your first year Physics Honors and Specialization program. Matlab will also be used and is available at [OnTheHub](#) with your CCID.
- **Do you suggest taking a physics elective even if we are in a bio type degree? How about degrees in other areas of Science?**
Physics is connected to all areas of science and knowledge in this area has played a significant role in the progression of many scientific disciplines and technologies. Like any other science course, Physics can serve as an excellent elective but should only be considered if you are interested in the topic. If you have questions about how physics can relate to your area of study, contact your department.
- **Would you recommend taking Physics for professional programs?**
Every professional program has their own prerequisite requirements and many include physics courses. Be sure to check individual programs for admission requirements and to whether you should be adding PHYS courses to your schedule.



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- **Is chemistry 30 (or equivalent) knowledge going to be relevant in a physics degree?**

A Physical Sciences major/minor combines education in both chemistry and Physics, so completion of high school Chemistry and Physics is required. For all other Physics programs, Chemistry 30 or equivalent is not required

- **What is the difference between PHYS 114, 124 and 144?**
PHYS 114 - is a survey, "big picture" course that is meant for students who do not plan to continue in physics. It cannot be used as a prerequisite for any other physics course and will not prepare students for the physics component of the MCAT exam, and so on.

PHYS 124/126 - first year algebra-based physics courses covering a broad array of topics

PHYS 144/146 - first year calculus-based physics courses covering a smaller array of topics in greater depth.

- **What content is covered in PHYS 124 vs 144?**
PHYS 124 and PHYS 144 both start with kinematics, before going to Newtonian dynamics and the conservation laws of energy and linear momentum (reviews material from Physics 20, Alberta grade 11 physics, in much greater detail and the momentum topic from Physics 30). But calculus-based 144 covers a multitude of more general cases like non-constant acceleration, variable forces, curved paths. Both courses then do angular kinematics, dynamics and angular momentum conservation.

At this point they diverge, PHYS 144 wraps up with an introduction to Einstein's theory of special relativity, whereas PHYS 124 then covers Newtonian gravity, simple harmonic motion, waves (mechanical, sound and light), before briefly recapitulating modern physics taught in PHYS 30.



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- **What content is covered in PHYS 126 vs 146?**

The only common overlap between PHYS 126 and 146 are a brief introduction to fluids. PHYS 126 spends most of the course on electricity and magnetism, which is not covered in calculus-based physics, but rather dedicated courses on electricity and magnetism (all heavily calculus-based) start in second year.

PHYS 146, develops oscillations (including damped and forced), before turning in detail to waves (mechanical, sound and light) in significantly greater detail than PHYS 124. PHYS 146 ends with a formal introduction to quantum mechanics including an introduction to the Schrodinger wave equation, which is the basis for all of chemistry.

- **Is Physics 30 (or equivalent) required for PHYS 124 or 144? Are there dis-advantages if we did not take it?**

The prerequisites for PHYS 124 are Physics 20 and Math 30-1. While Physics 30 is not required for PHYS 124 it would be extremely helpful for both PHYS 124 and in particular PHYS 126, as many of the topics covered in Physics 30 (linear momentum, electricity and magnetism) are revisited again in both courses in greater detail.

**Note: Physics 30 is a required prerequisite for the PHYS 144/146 stream.*

- **Which university math course should we take with PHYS 114, 124 and 144?**

Students registered in PHYS 144/146 must also register in MATH 144/146 (or the Honors versions MATH 117/118) as they are required co-requisites. MATH 144/146 is advised since the Honors calculus courses, MATH 117/118, proceed much more slowly in terms of developing computational skills that we need immediately in first year physics.

PHYS 114 and PHYS 124/126 have no required University-level pre or co-requisites, so you can select any university Math course of interest.



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- **How important is it to have high school calculus prior to starting? (for example AP calculus, Math 31 or equivalent)**

High school Calculus is only required if you have declared Physics as your major in the General degree or are in a Physics Specialization or Honors program. Otherwise, if you are simply taking Physics courses as electives or junior core requirements, grade 12 Math (Math 30-1 or equivalent) is sufficient.

However, calculus will always be helpful in “understanding” what is happening in physics, even algebra-based physics. Calculus is really the mathematical study of change, and almost all of physics (statics excepted) is the study of quantities that change in time.

Even though calculus is not required for PHYS 124/126, most students taking the courses have taken some calculus and feel more confident in the material. Some of the topics in 124/126 (e.g. simple harmonic motion) can only be discussed very qualitatively without calculus.

Calculus is strongly recommended for PHYS 144/146. The few incoming students who don't have a calculus background may feel a bit behind at the beginning of the course until their computational skills involving calculus catch-up, but the good news is, by the end of the course, there is no difference in student performance.