

PHYSICS

Department Website: <https://www.smu.ca/astronomy-physics/index.html> (<https://www.smu.ca/astronomy-physics/>)

Department Email: astrophysics@ap.smu.ca

Note: This segment lists undergraduate courses and programs in Physics only. Course and program descriptions for Astronomy and Astrophysics may be found in the Astronomy (ASTR) (<https://smu-ca-public.courseleaf.com/undergraduate/programs/astronomy-astrophysics/>) segment of this *Calendar* while graduate course descriptions and graduate programs in Astronomy may be found in the Graduate Academic Calendar (<https://smu-ca-public.courseleaf.com/graduate/>).

The Department offers three different levels of undergraduate study in physics. These include:

- a physics concentration and minor suitable for general science students who want a basic understanding of the fundamentals of physics;
- a physics major suitable for students who want a solid physics education but who do not necessarily intend to practice physics professionally or go on to graduate school; and
- a physics honours program for those who require a rigorous training in classical and quantum physics who intend to pursue physics professionally or in postgraduate studies.

The major and honours programs are virtually identical through the third year, and students do not need to commit to the honours program until after third year. However, the student must secure a supervisor for the honours thesis (Research Thesis (PHYS 4790)) before applying to the honours program.

In addition to the physics concentration, major, and honours programs, there are double major physics programs with:

- mathematics
- chemistry
- philosophy

at both the major and honours levels consistent with the regulations governing double major and double honours programs in Science and in Arts.

Programs

The Bachelor of Science (B.Sc.) is a well-established, foundational degree. Its specific requirements are listed below alongside general graduation requirements (<https://smu-ca-public.courseleaf.com/undergraduate/faculties/faculty-science/bachelor-science/>).

Major in Physics

The requirements for the degree of Bachelor of Science with Major apply as listed in this *Academic Calendar* under the heading of Faculty of Science, Bachelor of Science – Major (<https://smu-ca-public.courseleaf.com/undergraduate/faculties/faculty-science/bachelor-science--major/>). The specific list of forty-two (42) required credit hours in PHYS used to satisfy 6(d) is contained in the following list of required Science courses for the program:

Code	Title	Credit Hours
PHYS 1210	University Physics I	3
PHYS 1211	University Physics II	3
PHYS 1500	Introduction to Modern Physics	3
PHYS 2302	Mechanics I	3
PHYS 2303	Mechanics II	3
PHYS 2410	Electricity and Magnetism	3
PHYS 2510	Thermodynamics	3
PHYS 3200	Mathematical Methods in Physics I	3
PHYS 3410	Electromagnetism	3
PHYS 3500	Quantum Mechanics I	3
Select 12 credit hours in PHYS at the 3000 level or higher		12
CSCI 1226	Introduction to Computing Science and Programming	3
or CSCI 1227	Computer Programming and Problem Solving	
MATH 1210	Introductory Calculus I	3
MATH 1211	Introductory Calculus II	3
MATH 2311	Intermediate Calculus	3
MATH 2301	Applied Linear Algebra	3
MATH 2303	Differential Equations I	3
Select six additional credit hours of Science Electives (not in the Major subject)		6
Total Credit Hours		66

Double Major in Physics and Other Science

The requirements for the degree of Bachelor of Science with Double Major apply as listed in this *Academic Calendar* under the heading of Faculty of Science, Bachelor of Science – Double Major (<https://smu-ca-public.courseleaf.com/undergraduate/faculties/faculty-science/bachelor-science--double-major/>). The specific list of thirty-six (36) required credit hours in PHYS used to satisfy 7(a) is contained in the following list of required Science courses for the program:

Code	Title	Credit Hours
PHYS 1210	University Physics I	3
PHYS 1211	University Physics II	3
PHYS 1500	Introduction to Modern Physics	3
PHYS 2302	Mechanics I	3
PHYS 2303	Mechanics II	3
PHYS 2410	Electricity and Magnetism	3
PHYS 2510	Thermodynamics	3
PHYS 3200	Mathematical Methods in Physics I	3
PHYS 3410	Electromagnetism	3
PHYS 3500	Quantum Mechanics I	3
Select six credit hours of PHYS at the 3000 level or higher		6
CSCI 1226	Introduction to Computing Science and Programming	3
or CSCI 1227	Computer Programming and Problem Solving	
MATH 1210	Introductory Calculus I	3
MATH 1211	Introductory Calculus II	3
MATH 2311	Intermediate Calculus	3

MATH 2301	Applied Linear Algebra	3
MATH 2303	Differential Equations I	3
Total Credit Hours		54

Concentration in Physics

The requirements for the degree of Bachelor of Science General with Concentration in Physics apply as listed in this *Academic Calendar* under the heading of Faculty of Science, Bachelor of Science – General (with a Concentration) (<https://smu-ca-public.courseleaf.com/undergraduate/faculties/faculty-science/bachelor-science--general-w-concentration/>). The specific list of minimum thirty (30) required credit hours in PHYS used to satisfy 3(d) is contained in the following list of required Science courses:

Code	Title	Credit Hours
PHYS 1210	University Physics I	3
PHYS 1211	University Physics II	3
PHYS 1500	Introduction to Modern Physics	3
PHYS 2302	Mechanics I	3
PHYS 2303	Mechanics II	3
PHYS 2410	Electricity and Magnetism	3
Select twelve additional credit hours from PHYS at the 3000 level or above		12
MATH 1210	Introductory Calculus I	3
MATH 1211	Introductory Calculus II	3
MATH 2311	Intermediate Calculus	3
MATH 2301	Applied Linear Algebra	3
MATH 2303	Differential Equations I	3
Total Credit Hours		45

Honours in Physics

The requirements for the degree of Bachelor of Science with Honours apply as listed in this *Academic Calendar* under the heading of Faculty of Science, Bachelor of Science – Honours and Double Honours (<https://smu-ca-public.courseleaf.com/undergraduate/faculties/faculty-science/bachelor-science--honours-double-honours/>). Students must secure a supervisor for the Honours thesis (Research Thesis (PHYS 4790)) before applying to the Honours program. The specific list of sixty-three (63) required credit hours in PHYS used to satisfy 11(a) is contained in the following list of required Science courses for the program:

Code	Title	Credit Hours
PHYS 1210	University Physics I	3
PHYS 1211	University Physics II	3
PHYS 1500	Introduction to Modern Physics	3
PHYS 2302	Mechanics I	3
PHYS 2303	Mechanics II	3
PHYS 2410	Electricity and Magnetism	3
PHYS 2510	Thermodynamics	3
PHYS 3200	Mathematical Methods in Physics I	3
PHYS 3210	Computational Methods in Physics	3
PHYS 3300	Classical Mechanics	3
PHYS 3410	Electromagnetism	3
PHYS 3500	Quantum Mechanics I	3

PHYS 3510	Statistical Mechanics	3
PHYS 3600	Experimental Physics I	3
PHYS 4410	Electrodynamics	3
PHYS 4500	Quantum Mechanics II	3
Select six credit hours of the following:		6
PHYS 4200	Mathematical Methods in Physics II	
PHYS 4380	Fluid Dynamics	
PHYS 4390	General Relativity	
PHYS 4501	Quantum Mechanics III	
PHYS 4510	Subatomic Physics	
PHYS 4600	Experimental Physics II	3
PHYS 4790	Research Thesis	6
CSCI 1226	Introduction to Computing Science and Programming	3
or CSCI 1227 Computer Programming and Problem Solving		
MATH 1210	Introductory Calculus I	3
MATH 1211	Introductory Calculus II	3
MATH 2311	Intermediate Calculus	3
MATH 2301	Applied Linear Algebra	3
MATH 2303	Differential Equations I	3
Select six credit hours of Science Electives (not in Physics)		6
Total Credit Hours		87

Double Honours in Physics and Other Science

The requirements for the degree of Bachelor of Science with Double Honours apply as listed in this *Academic Calendar* under the heading of Faculty of Science, Bachelor of Science – Honours and Double Honours (<https://smu-ca-public.courseleaf.com/undergraduate/faculties/faculty-science/bachelor-science--honours-double-honours/>). The specific list of Physics courses which satisfies the minimum forty-eight (48) required credit hours in PHYS (if thesis completed in Physics) or the minimum of forty-two (42) required credit hours in PHYS (if thesis completed in another science) is contained in the following list of required Science courses for the program:

Code	Title	Credit Hours
PHYS 1210	University Physics I	3
PHYS 1211	University Physics II	3
PHYS 1500	Introduction to Modern Physics	3
PHYS 2302	Mechanics I	3
PHYS 2303	Mechanics II	3
PHYS 2410	Electricity and Magnetism	3
PHYS 2510	Thermodynamics	3
PHYS 3200	Mathematical Methods in Physics I	3
PHYS 3300	Classical Mechanics	3
PHYS 3410	Electromagnetism	3
PHYS 3500	Quantum Mechanics I	3
PHYS 4410	Electrodynamics	3
PHYS 4500	Quantum Mechanics II	3
Select three credits of the following:		3
PHYS 4200	Mathematical Methods in Physics II	
PHYS 4380	Fluid Dynamics	

PHYS 4390	General Relativity	
PHYS 4501	Quantum Mechanics III	
PHYS 4510	Subatomic Physics	
PHYS 4790	Research Thesis (only if thesis is in PHYS)	6
CSCI 1226	Introduction to Computing Science and Programming	3
or CSCI 1227	Computer Programming and Problem Solving	
MATH 1210	Introductory Calculus I	3
MATH 1211	Introductory Calculus II	3
MATH 2311	Intermediate Calculus	3
MATH 2301	Applied Linear Algebra	3
MATH 2303	Differential Equations I	3
Select six credit hours in Science Electives (not in Physics)		6
Total Credit Hours		72

Minor in Physics

The requirements for a Minor in Physics are the same as those listed for Bachelor of Science – Major and Minor (<https://smu-ca-public.courseleaf.com/undergraduate/faculties/faculty-science/bachelor-science--major-minor/>). The specific list of thirty (30) required credit hours in PHYS courses are below:

Code	Title	Credit Hours
PHYS 1210	University Physics I	3
PHYS 1211	University Physics II	3
PHYS 1500	Introduction to Modern Physics	3
PHYS 2302	Mechanics I	3
PHYS 2303	Mechanics II	3
PHYS 2410	Electricity and Magnetism	3
PHYS 2510	Thermodynamics	3
Select nine credit hours in PHYS at the 3000 level		9
Total Credit Hours		30