

# ASTRONOMY AND ASTROPHYSICS

**Department Website:** <https://www.smu.ca/astronomy-physics/>

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Astronomy courses are offered by the Department of Astronomy and Physics

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

## Degree Programs in Astrophysics

Because all modern-day astronomers are also physicists, no undergraduate degree in astronomy alone is offered. Instead, the Department offers three programs in astrophysics; a major, an honours and a minor. The astrophysics major program is designed for those who want a solid foundation in modern physics and astronomy, but who are not necessarily planning to continue their education beyond the B.Sc. The astrophysics honours program is designed for those who intend to continue on to graduate school, and involves the preparation of an honours thesis (Research Thesis (PHYS 4790)) under the supervision of a faculty advisor in their fourth year. As listed below, these two programs are identical through the second year meaning students need not commit to the honours program until the third year of study. Note also, as listed, these programs conform to the requirements of the Science faculty (<https://smu-ca-public.courseleaf.com/undergraduate/faculties/faculty-science/>).

## 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 Astrophysics

The requirements for the degree of Bachelor of Science with Major apply as listed in this Academic Calendar under the heading *Faculty of Science, Bachelor of Science - Major*. The specific list of the fifty-seven (57) credit hours (specifically eighteen (18) credit hours in ASTR and thirty-nine (39) credit hours in PHYS) required to satisfy 6 (d) are contained in the following list of required Science courses for the program:

Code	Title	Credit Hours
ASTR 1100	Introduction to Astrophysics	3
ASTR 2100	Foundations of Astrophysics	3
ASTR 2400	Properties of Stars	3
ASTR 3400	Interstellar Matter and Stellar Evolution	3
ASTR 3500	Galaxies and Cosmology	3
ASTR 4200	Observational Astronomy	3
or ASTR 4600	High-Energy Astrophysics	
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 nine credits in PHYS of the following:		9
PHYS 3210	Computational Methods in Physics	
PHYS 3300	Classical Mechanics	
PHYS 3510	Statistical Mechanics	
PHYS 3600	Experimental Physics I	
PHYS 4200	Mathematical Methods in Physics II	
PHYS 4380	Fluid Dynamics	
PHYS 4390	General Relativity	
PHYS 4410	Electrodynamics	
PHYS 4500	Quantum Mechanics II	
PHYS 4510	Subatomic Physics	
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 credits of Science Electives (not in the major subject area)		6

## Honours in Astrophysics

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 (<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 courses that make up the total seventy-eight (78) credit hours required in the honours subject (specifically twenty-one (21) credit hours in Astronomy and fifty-seven (57) credit hours in Physics) are included in the following list of required Science courses for the program Introduction to Astrophysics (ASTR 1100).

Code	Title	Credit Hours
ASTR 2100	Foundations of Astrophysics	3
ASTR 2400	Properties of Stars	3
ASTR 3400	Interstellar Matter and Stellar Evolution	3
ASTR 3500	Galaxies and Cosmology	3
ASTR 4200	Observational Astronomy	3
ASTR 4600	High-Energy Astrophysics	3
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
Select three credit hours in PHYS at the 4000 level		3
PHYS 4410	Electrodynamics	3
PHYS 4500	Quantum Mechanics 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 6 additional credits of Science Electives (not in the honours subject)		6

## Minor in Astrophysics

The requirements for a Minor in Astrophysics are the same as those listed for *Bachelor of Science – Major and Minor* of this Academic Calendar. The following Science courses are required for the Astrophysics Minor. A total of thirty (30) credit hours in the minor subject are required, specifically twelve (12) credit hours in Astronomy and eighteen (18) in Physics as follows:

Code	Title	Credit Hours
ASTR 1100	Introduction to Astrophysics	3
PHYS 1210	University Physics I	3
PHYS 1211	University Physics II	3
PHYS 1500	Introduction to Modern Physics	3
ASTR 2100	Foundations of Astrophysics	3
ASTR 2400	Properties of Stars	3
PHYS 2302	Mechanics I	3
Select three credits in ASTR at the 3000 level		3
Select six credits in PHYS at the 2000 or 3000 level		6
<b>Total Credit Hours</b>		<b>30</b>