ATMOSPHERIC SCIENCE MAJOR (B.SC.) (62 CREDITS)

Offered by: Atmospheric & Oceanic Sciences (Faculty of Science)
Degree: Bachelor of Science
Program credit weight: 62

Program Description

(60-63 credits)

The B.Sc.; Major in Atmospheric Science provides the fundamentals of atmospheric physics and dynamics along with applications to weather and climate problems. The program includes the choice of a wide selection of topics spanning from atmospheric chemistry, to weather forecasting and climate dynamics. The program may be completed in 60-63 credits.

Degree Requirements — B.Sc.

This program is offered as part of a Bachelor of Science (B.Sc.) degree.

To graduate, students must satisfy both their program requirements and their degree requirements.

- The program requirements (i.e., the specific courses that make up this program) are listed under the Course Tab (above).
- The degree requirements—including the mandatory Foundation program, appropriate degree structure, and any additional components—are outlined on the Degree Requirements page.

Students are responsible for ensuring that this program fits within the overall structure of their degree and that all degree requirements are met. Consult the Degree Planning Guide on the SOUSA website for additional guidance.

Note: For information about Fall 2025 and Winter 2026 course offerings, please check back on May 8, 2025. Until then, the "Terms offered" field will appear blank for most courses while the class schedule is being finalized.

Required Courses (24 credits)

Expand allContract all

Course	Title	Credits
ATOC 214	Introduction: Physics of the Atmosphere.	3
ATOC 312	Rotating Fluid Dynamics.	3
ATOC 315	Thermodynamics and Convection.	3
COMP 208	Computer Programming for Physical Sciences and Engineering .	3
MATH 222	Calculus 3.	3
MATH 223	Linear Algebra.	3
MATH 314	Advanced Calculus.	3
MATH 315	Ordinary Differential Equations.	3

Complementary Courses (36-39 credits)

Note: Students are required to fulfill the core complementary requirements along with one of the four streams listed below. In cases of overlap, each course can only be used once toward the satisfaction of the core complementary courses or the chosen stream.

Core (21-22 credits)

3-6 credits selected from:

Expand allContract all

Course	Title	Credits
ATOC 215	Oceans, Weather and Climate.	3
ATOC 219	Introduction to Atmospheric Chemistry.[1]	3
CHEM 219	Introduction to Atmospheric Chemistry.[1]	3

[1] If chosen, students may take ATOC 219 Introduction to Atmospheric Chemistry. or CHEM 219 Introduction to Atmospheric Chemistry..

3 credits selected from:

Expand allContract all

Course	Title	Credits
ATOC 357	Atmospheric and Oceanic Science Laboratory.	3
PHYS 257	Experimental Methods 1.	3

3 credits selected from:

Expand allContract all

Course	Title	Credits
PHYS 230	Dynamics of Simple Systems.	3
PHYS 251	Honours Classical Mechanics 1.	3

3 credits selected from:

Expand allContract all

Course	Title	Credits
PHYS 232	Heat and Waves.	3
PHYS 253	Thermal Physics.	3

6-10 credits selected from:

Expand allContract all

Course	Title	Credits
CHEM 213	Introductory Physical Chemistry 1: Thermodynamics.	3
CHEM 273	Introductory Physical Chemistry 2: Kinetics and Methods.	3
CHEM 367	Instrumental Analysis 1.	3
CHEM 575	Chemical Kinetics.	3
COMP 551	Applied Machine Learning.	4
MATH 203	Principles of Statistics 1.[1]	3
MATH 317	Numerical Analysis.	3
MATH 319	Partial Differential Equations .	3
MATH 323	Probability.	3

MATH 324	Statistics.[1]	3
PHYS 333	Thermal and Statistical Physics.	3
PHYS 340	Majors Electricity and Magnetism.[2]	3
PHYS 342	Majors Electromagnetic Waves.[3]	3
PHYS 350	Honours Electricity and Magnetism.[2]	3
PHYS 352	Honours Electromagnetic Waves.[3]	3

1 If chosen, students may take either MATH 203 Principles of Statistics 1. or MATH 324 Statistics..

2 If chosen, students may take either PHYS 340 Majors Electricity and Magnetism. or PHYS 350 Honours Electricity and Magnetism..

3 If chosen, students may take either PHYS 342 Majors Electromagnetic Waves. and PHYS 352 Honours Electromagnetic Waves..

Streams

15-17 credits from one of the following streams:

Weather Analysis and Forecasting Stream (16-17 credits)

13 credits from:

Expand allContract all

Course	Title	Credits
ATOC 309	Weather Radars and Satellites.	3
ATOC 521	Cloud Physics.	3
ATOC 540	Synoptic Meteorology 1.	3
ATOC 541	Synoptic Meteorology 2.	3
ATOC 546	Current Weather Discussion.	1

3-4 credits selected from:

Expand allContract all

Course	Title	Credits
ATOC 404	Climate Physics.[1]	3
ATOC 512	Atmospheric and Oceanic Dynamics.	3
ATOC 513	Waves and Stability.	3
ATOC 517	Boundary Layer Meteorology .	3
ATOC 525	Atmospheric Radiation.	3
ATOC 531	Dynamics of Current Climates.	3
ATOC 548	Mesoscale Meteorology.	0-3
ATOC 558	Numerical Methods and Laboratory.	3
ATOC 568	Ocean Physics.	3
ESYS 300	Earth Data Analysis.	3
ESYS 301	Earth System Modelling.	3
GEOG 322	Environmental Hydrology.	3
GEOG 372	Running Water Environments.	3
MATH 555	Fluid Dynamics.[2]	4
PHYS 404	Climate Physics.[1]	3
PHYS 432	Physics of Fluids.[2]	3
PHYS 512	Computational Physics with Applications.	3

1 If chosen, students may take either ATOC 404 Climate Physics. or PHYS 404 Climate Physics..

2 If chosen, students may take either PHYS 432 Physics of Fluids. or MATH 555 Fluid Dynamics..

Climate Science Stream (15 credits)

6 credits from:

Expand allContract all

Course	Title	Credits
ATOC 404	Climate Physics.[1]	3
ATOC 531	Dynamics of Current Climates.	3
PHYS 404	Climate Physics.[1]	3

1 If chosen, students may take either ATOC 404 Climate Physics. or PHYS 404 Climate Physics..

9 credits (at least 6 credits must be ATOC courses) selected from:

Expand allContract all

Course	Title	Credits
ATOC 512	Atmospheric and Oceanic Dynamics.	3
ATOC 513	Waves and Stability.	3
ATOC 519	Advances in Chemistry of Atmosphere.	3
ATOC 521	Cloud Physics.	3
ATOC 525	Atmospheric Radiation.	3
ATOC 540	Synoptic Meteorology 1.	3
ATOC 558	Numerical Methods and Laboratory.	3
ATOC 568	Ocean Physics.	3
EPSC 513	Climate and the Carbon Cycle.	3
ESYS 300	Earth Data Analysis.	3
ESYS 301	Earth System Modelling.	3
GEOG 322	Environmental Hydrology.	3
GEOG 372	Running Water Environments.	3
MATH 323	Probability.	3
PHYS 512	Computational Physics with Applications.	3

Atmospheric Chemistry and Physics Stream (15 credits)

Expand allContract all

Course	Title	Credits
ATOC 309	Weather Radars and Satellites.	3
ATOC 404	Climate Physics.[1]	3
ATOC 517	Boundary Layer Meteorology .	3
ATOC 519	Advances in Chemistry of Atmosphere.	3
ATOC 521	Cloud Physics.	3
CHEM 213	Introductory Physical Chemistry 1: Thermodynamics.	3
CHEM 273	Introductory Physical Chemistry 2: Kinetics and Methods.	3

PHYS 404	Climate Physics.[1]	3
PHYS 512	Computational Physics with Applications.	3

1 If chosen, students may take either ATOC 404 Climate Physics. or PHYS 404 Climate Physics..

General Stream (15-17 credits)

15-17 credits (at least 12 credits must be ATOC courses) selected from:

Expand allContract all

Course	Title	Credits
ATOC 309	Weather Radars and Satellites.	3
ATOC 404	Climate Physics.[1]	3
ATOC 512	Atmospheric and Oceanic Dynamics.	3
ATOC 513	Waves and Stability.	3
ATOC 517	Boundary Layer Meteorology .	3
ATOC 519	Advances in Chemistry of Atmosphere.	3
ATOC 521	Cloud Physics.	3
ATOC 525	Atmospheric Radiation.	3
ATOC 531	Dynamics of Current Climates.	3
ATOC 540	Synoptic Meteorology 1.	3
ATOC 541	Synoptic Meteorology 2.	3
ATOC 546	Current Weather Discussion.	1
ATOC 548	Mesoscale Meteorology.	3
ATOC 558	Numerical Methods and Laboratory.	3
ATOC 568	Ocean Physics.	3
CHEM 367	Instrumental Analysis 1.	3
CHEM 575	Chemical Kinetics.	3
EPSC 513	Climate and the Carbon Cycle.	3
ESYS 300	Earth Data Analysis.	3
ESYS 301	Earth System Modelling.	3
GEOG 322	Environmental Hydrology.	3
GEOG 372	Running Water Environments.	3
MATH 555	Fluid Dynamics.[2]	4
PHYS 404	Climate Physics.[1]	3
PHYS 432	Physics of Fluids.[2]	3
PHYS 512	Computational Physics with Applications.	3

1 If chosen, students may take either ATOC 404 Climate Physics. or PHYS 404 Climate Physics..

2 If chosen, students may take either PHYS 432 Physics of Fluids. or MATH 555 Fluid Dynamics..