

Geomatics

Graduation Requirements

In addition to the requirements listed below, students must satisfy:

1. the University regulations, including the process of Academic Performance Evaluation (see the *Academic Regulations of the University* section of this Calendar),
2. for B.A. programs, the common regulations applying to all B.A. students including those relating to Breadth Requirements (see Academic Regulations for the Bachelor of Arts Degree),
3. for B.Sc. programs the common regulations applying to all B.Sc. students including those relating to Science Continuation and Breadth Requirements (see *Academic Regulations for the Bachelor of Science Degree*).

Students should consult the Department when planning their program and selecting courses.

Course Categories for B.Sc. Geomatics

Science Continuation

See Academic Regulations for the Bachelor of Science Degree for a list of courses in this category.

Experimental Science Electives

See Academic Regulations for the Bachelor of Science Degree for a list of courses in this category.

Science Faculty Electives

See Academic Regulations for the Bachelor of Science Degree for a list of courses in this category.

Approved Arts or Social Sciences Electives

See Academic Regulations for the Bachelor of Science Degree for a list of courses in this category.

Science Geography courses

See Academic Regulations for the Bachelor of Science Degree for a list of courses in this category.

Program Requirements

Geomatics

B.A. Honours (20.0 credits)

A. Credits Included in the Major CGPA (10.0 credits)

1. 1.0 credit in:	1.0
GEOG 1010 [0.5]	Global Environmental Systems
GEOG 1020 [0.5]	People, Places and Environments
2. 1.5 credits in:	1.5
GEOM 1004 [0.5]	Maps, Satellites and the Geospatial Revolution
GEOG 2006 [0.5]	Introduction to Quantitative Research
or STAT 2507 [0.5]	Introduction to Statistical Modeling I
GEOM 2007 [0.5]	Geographic Information Systems
3. 2.5 credits in:	2.5
GEOG 3000 [0.5]	Honours Field Course
or GEOG 3010 [0.5]	Field Methods in Physical Geography

GEOM 3002 [0.5]	Air Photo Interpretation and Remote Sensing	
GEOG 3003 [0.5]	Quantitative Geography	
GEOM 3005 [0.5]	Geospatial Analysis	
GEOM 3007 [0.5]	Cartographic Theory and Design	
4. 1.5 credits from:		1.5
GEOM 4003 [0.5]	Remote Sensing of the Environment	
GEOM 4005 [0.5]	Directed Studies in Geomatics	
GEOM 4008 [0.5]	Advanced Topics in Geographic Information Systems	
GEOM 4009 [0.5]	Applications in Geographic Information Systems	
5. 0.5 credit from:		0.5
GEOM 4406 [0.5]	Practicum I (with placement in a Geomatics-related setting)	
GEOM 4408 [0.5]	Practicum II (with placement in a Geomatics-related setting)	
6. 2.0 credits in GEOG at the 2000-level or higher		2.0
7. 1.0 credit from:		1.0
a) Thesis stream		
GEOM 4909 [1.0]	Honours Research Thesis	
or		
b) Course stream		
1.0 credit in GEOM or GEOG at the 4000-level		
B. Credits not included in the Major CGPA (10.0 credits)		
8. 8.0 credits in electives not in Geomatics		8.0
9. 2.0 credits in free electives.		2.0
Total Credits		20.0

Geomatics

B.Sc. Honours (20.0 credits)

A. Credits Included in the Major CGPA (10.0 credits)

1. 0.5 credit from:	0.5
GEOG 1010 [0.5]	Global Environmental Systems
ERTH 1006 [0.5]	Exploring Planet Earth
2. 2.0 credits from:	2.0
GEOM 1004 [0.5]	Maps, Satellites and the Geospatial Revolution
GEOG 2013 [0.5]	Weather and Water
GEOG 2006 [0.5]	Introduction to Quantitative Research
or STAT 2507 [0.5]	Introduction to Statistical Modeling I
GEOM 2007 [0.5]	Geographic Information Systems
3. 2.5 credits in:	2.5
GEOG 3000 [0.5]	Honours Field Course
or GEOG 3010 [0.5]	Field Methods in Physical Geography
GEOM 3002 [0.5]	Air Photo Interpretation and Remote Sensing
GEOG 3003 [0.5]	Quantitative Geography
GEOM 3005 [0.5]	Geospatial Analysis
GEOM 3007 [0.5]	Cartographic Theory and Design
4. 1.5 credits from:	1.5
GEOM 4003 [0.5]	Remote Sensing of the Environment
GEOM 4005 [0.5]	Directed Studies in Geomatics
GEOM 4008 [0.5]	Advanced Topics in Geographic Information Systems

GEOM 4009 [0.5]	Applications in Geographic Information Systems	
5. 1.0 credit from:		1.0
GEOG 4000 [0.5]	Field Studies	
GEOG 4004 [0.5]	Environmental Impact Assessment	
GEOG 4005 [0.5]	Directed Studies in Geography	
GEOG 4013 [0.5]	Cold Region Hydrology	
GEOG 4017 [0.5]	Global Biogeochemical Cycles	
GEOG 4101 [0.5]	Two Million Years of Environmental Change	
GEOG 4103 [0.5]	Water Resources Engineering	
GEOG 4104 [0.5]	Microclimatology	
GEOG 4108 [0.5]	Permafrost	
GEOM 4406 [0.5]	Practicum I	
GEOM 4408 [0.5]	Practicum II	
6. 1.0 credit from:		1.0
Any of the courses listed in Item 5 above, or:		
GEOG 1010 [0.5]	Global Environmental Systems	
GEOG 2014 [0.5]	The Earth's Surface	
GEOG 3003 [0.5]	Quantitative Geography	
GEOG 3010 [0.5]	Field Methods in Physical Geography	
GEOG 3102 [0.5]	Geomorphology	
GEOG 3103 [0.5]	Watershed Hydrology	
GEOG 3104 [0.5]	Principles of Biogeography	
GEOG 3105 [0.5]	Climate and Atmospheric Change	
GEOG 3108 [0.5]	Soil Properties	
7. 0.5 credit from:		0.5
GEOM 4406 [0.5]	Practicum I	
GEOM 4408 [0.5]	Practicum II	
8. 1.0 credit in:		1.0
GEOM 4906 [1.0]	Honours Research Project	
B. Credits Not Included in the Major CGPA (10.0 credits)		
9. 1.0 credit in	Experimental Science Electives	1.0
10. 1.5 approved credits in	Computer Science	1.5
11. 2.0 credits in	Science Continuation not in GEOM	2.0
12. 1.0 credit in	Science Faculty Electives	1.0
13. 0.5 credit in:		0.5
NSCI 1000 [0.5]	Seminar in Science (or Approved Arts or Social Sciences)	
14. 1.5 credits in	Approved Arts or Social Sciences	1.5
15. 2.5 credits in	free electives	2.5
Total Credits		20.0

Minor in Geomatics (4.0 credits)

Only students pursuing undergraduate programs requiring at least 20.0 credits to graduate may be admitted to the minor in Geomatics.

Requirements

1. 1.0 credit in:		1.0
GEOM 1004 [0.5]	Maps, Satellites and the Geospatial Revolution	
GEOM 2007 [0.5]	Geographic Information Systems	
2. 0.5 credit from:		0.5
GEOG 2006 [0.5]	Introduction to Quantitative Research	
STAT 2507 [0.5]	Introduction to Statistical Modeling I	

3. 1.5 credits from:		1.5
GEOM 3002 [0.5]	Air Photo Interpretation and Remote Sensing	
GEOG 3003 [0.5]	Quantitative Geography	
GEOM 3005 [0.5]	Geospatial Analysis	
GEOM 3007 [0.5]	Cartographic Theory and Design	
4. 1.0 credit from:		1.0
GEOM 4003 [0.5]	Remote Sensing of the Environment	
GEOM 4005 [0.5]	Directed Studies in Geomatics	
GEOM 4008 [0.5]	Advanced Topics in Geographic Information Systems	
GEOM 4009 [0.5]	Applications in Geographic Information Systems	
5. The remaining requirements of the major discipline(s) and degree must be satisfied.		
Total Credits		4.0

Note: Familiarity with computers is assumed. Students with little computer experience may wish to take one of the following courses as part of their program of study:

BUSI 1402 [0.5]	Introduction to Business Information and Communication Technologies
COMP 1001 [0.5]	Introduction to Computational Thinking for Arts and Social Science Students
COMP 1004 [0.5]	Introduction to Computers for the Sciences

Department of Geography and Environmental Studies

Faculty of Arts and Social Sciences

GEOM 1004 [0.5 credit]

Maps, Satellites and the Geospatial Revolution

Introduction to the creation and use of maps using a variety of geospatial tools to better understand and resolve physical, social and environmental problems. Overview of geomatics (cartography and map design, geographic information systems, GPS, remote sensing). Prerequisites additional credit for GEOM 2004 (no longer offered). Lectures and laboratory, four hours a week.

GEOM 2007 [0.5 credit]

Geographic Information Systems

Data in a spatial context; spatial data structures, georeferencing, data query; mapping; creating spatial databases; selected topics in GIS application to environmental, land-use planning and market analysis issues.

Prerequisite(s): GEOM 1004 or EARTH 2406 (may be taken concurrently), or permission of the Department. Familiarity with personal computers is assumed.

Lectures and laboratory, four hours a week.

GEOM 3002 [0.5 credit]**Air Photo Interpretation and Remote Sensing**

Aerial photography and digital remote sensing; visual interpretation of land use, landforms, and surficial materials; introduction to digital image processing and analysis.

Prerequisite(s): GEOM 1004 or third-year standing, or permission of the Department.

Lectures two hours a week, laboratory two hours a week.

GEOM 3005 [0.5 credit]**Geospatial Analysis**

Acquisition, manipulation, and display of spatially referenced information using Geographic Information Systems (GIS). Spatial modeling, site selection, and routing analysis in raster and vector GIS.

Prerequisite(s): GEOM 2007.

Workshop three hours a week.

GEOM 3007 [0.5 credit]**Cartographic Theory and Design**

Principles of and issues in cartography, cartographic communication and map design; practical aspects of cartographic representation using multimedia and online mapping.

Prerequisite(s): GEOM 1004 or GEOM 2007 or permission of the Department.

Lectures and laboratory four hours a week.

GEOM 3999 [0.0 credit]**Co-operative Work Term**

Work term

GEOM 4003 [0.5 credit]**Remote Sensing of the Environment**

Advanced image enhancement; land cover classification for thematic mapping; biophysical modeling; applications in resources, environment, and urban mapping.

Prerequisite(s): GEOM 3002 and Honours standing, or permission of the Department.

Lectures two hours a week, laboratory two hours a week.

GEOM 4005 [0.5 credit]**Directed Studies in Geomatics**

Students pursue their interest in a selected theme in Geomatics on a tutorial basis with a member of the Department.

Prerequisite(s): fourth-year Honours standing in Geomatics and permission of the Department.

GEOM 4008 [0.5 credit]**Advanced Topics in Geographic Information Systems**

Advanced methods and techniques in GIS applications including: positional and attribute error analysis, multiple criteria decision making, interpolation, elevation modeling and ortho-imaging, and spatial pattern measurement.

Prerequisite(s): GEOM 3005 and Honours standing.

Lectures two hours a week, laboratory two hours a week.

GEOM 4009 [0.5 credit]**Applications in Geographic Information Systems**

Project design and customization, application development within a GIS, digital atlas compilation and geomatics education.

Prerequisite(s): GEOM 3005.

Workshop three hours a week.

GEOM 4406 [0.5 credit]**Practicum I**

Experience in an employment environment through field placement. Observation and involvement in issues and research methods used by professional geographers. May be taken for credit in addition to GEOG/GEOM 4408.

Also listed as GEOG 4406.

Prerequisite(s): fourth-year Honours standing in Geomatics or Geography and permission of the Department.

Field placement one day a week.

GEOM 4408 [0.5 credit]**Practicum II**

Experience in an employment environment through field placement. Observation and involvement in issues and research methods used by professional geographers. May be taken for credit in addition to GEOG/GEOM 4406.

Also listed as GEOG 4408.

Prerequisite(s): fourth-year Honours standing in Geomatics or Geography and permission of the Department.

Field placement one day a week.

GEOM 4906 [1.0 credit]**Honours Research Project**

Candidates for B.Sc. with Concentration in Geomatics undertake a research project within their area of specialization. The project is supervised by a member of the department and a written report must be submitted.

The candidate may be examined orally on the report.

Precludes additional credit for GEOG 4904/GEOM 4904 (no longer offered), GEOG 4906, GEOG 4909, GEOM 4909, ENST 4906, and ENST 4907.

Prerequisite(s): fourth-year Honours standing in BSc Geomatics, and an approved research topic and adviser.

Hours to be arranged with faculty adviser.

GEOM 4909 [1.0 credit]**Honours Research Thesis**

Independent design and implementation of a research project leading to the submission of a research thesis.

Students work with an individual faculty adviser. The subject for research is decided upon in consultation with the supervisor.

Precludes additional credit for GEOG 4904 / GEOM 4904 (no longer offered), GEOG 4906, GEOM 4906, GEOG 4909, ENST 4906 and ENST 4907.

Prerequisite(s): fourth-year Honours standing in B.A.

Geomatics, a minimum CGPA of 9.00 in the major or permission of the Department, and an approved research topic and adviser.

Hours to be arranged with faculty adviser.