

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 First-Year Seminars and Breadth Requirements (see Academic Regulations for the Bachelor of Arts Degree (<http://www.carleton.ca/calendars/2012-13/undergrad/regulations/academicregulationsandrequirementsforthebachelorofarts>)),
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. Geography with Concentration in Geomatics

Geography Science Electives

GEOG 1010 [0.5]	Global Environmental Systems
GEOG 2006 [0.5]	Statistical Methods in Geography
GEOG 2013 [0.5]	Weather and Water
GEOG 2014 [0.5]	The Earth's Surface
GEOG 3000 [0.5]	Honours Field Course
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
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]	Quaternary Geography
GEOG 4103 [0.5]	Water Resources Engineering
GEOG 4104 [0.5]	Microclimatology
GEOG 4108 [0.5]	Permafrost
GEOG 4406 [0.5]	Practicum I
GEOG 4408 [0.5]	Practicum II

Geomatics Science Electives

GEOM 2004 [0.5]	Introduction to Geomatics
GEOM 2007 [0.5]	Geographic Information Systems

GEOM 3002 [0.5]	Air Photo Interpretation and Remote Sensing
GEOM 3005 [0.5]	Geospatial Analysis
GEOM 3007 [0.5]	Cartographic Theory and Design
GEOM 4003 [0.5]	Remote Sensing of the Environment
GEOM 4007 [0.5]	Seminar in Cartography
GEOM 4008 [0.5]	Advanced Topics in Geographic Information Systems
GEOM 4009 [0.5]	Applications in Geographic Information Systems
GEOM 4406 [0.5]	Practicum I
GEOM 4408 [0.5]	Practicum II

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.

Approved Arts or Social Sciences Electives

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)

AB1

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 2004 [0.5]	Introduction to Geomatics	
GEOG 2006 [0.5]	Statistical Methods in Geography	
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. 2.0 credits in:		2.0
GEOM 4003 [0.5]	Remote Sensing of the Environment	
GEOM 4007 [0.5]	Seminar in Cartography	
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. 1.5 credit in GEOG at the 2000-level or higher		1.5

7. 1.0 credit in:	1.0
GEOM 4904 [1.0] Honours Research Workshop (The project must have an emphasis on the nature and/or use of geomatics.)	
GEOM 4909 [1.0] Honours Research Essay (The project must have an emphasis on the nature and/or use of geomatics.)	

B. Credits not included in the Major CGPA (10.0 credits)

8. 8.0 credits in electives not in Geography	8.0
9. 2.0 credits in free electives.	2.0
Total Credits	20.0

Geography with Concentration in Geomatics

B.Sc. Honours (20.0 credits)

4AA

A. Credits included in the Major CGPA (9.0 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
GEOG 2013 [0.5] Weather and Water	
GEOM 2004 [0.5] Introduction to Geomatics	
GEOG 2006 [0.5] Statistical Methods in Geography or STAT 2507 [0.5] Introduction to Statistical Modeling I	
GEOM 2007 [0.5] Geographic Information Systems	
3. 2.0 credits in:	2.0
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. 2.0 credits in:	2.0
GEOM 4003 [0.5] Remote Sensing of the Environment	
GEOM 4007 [0.5] Seminar in Cartography	
GEOM 4008 [0.5] Advanced Topics in Geographic Information Systems	
GEOM 4009 [0.5] Applications in Geographic Information Systems	
5. 0.5 credit in Geography Science Electives at the 4000-level	0.5
6. 1.0 credits in Geography Science Electives	1.0
7. 1.0 credit in:	1.0
GEOM 4906 [1.0] Honours Research Project (The project must have an emphasis on the nature and/or use of geomatics.)	

B. Credits Not Included in the Major CGPA (11.0 credits)

8. 1.0 credit in Experimental Science Electives	1.0
9. 2.0 credits in approved COMP courses	2.0
10. 2.0 credits in Science Continuation, not in GEOG or GEOM	2.0
11. 1.0 credit in Science Faculty Electives	1.0
12. 0.5 credit in:	0.5
NSCI 1000 [0.5] Seminar in Science or approved Arts or Social Sciences	

13. 1.0 credit in Approved Arts or Social Sciences, not in Geography	1.0
---	-----

14. 0.5 credit in Approved Arts or Social Sciences	0.5
---	-----

15. 3.0 credits in free electives.	3.0
---	-----

Total Credits	20.0
----------------------	------

Minor in Geomatics (4.0 credits)

NG

Open to undergraduate Honours students with a CGPA of 6.5 or better.

Requirements

1. 1.5 credit in:	1.5
GEOM 2004 [0.5] Introduction to Geomatics	
GEOM 2007 [0.5] Geographic Information Systems	
GEOM 3005 [0.5] Geospatial Analysis	
2. 0.5 credit from:	0.5
GEOG 2006 [0.5] Statistical Methods in Geography	
STAT 2507 [0.5] Introduction to Statistical Modeling I	
3. 2.0 credits from:	2.0
GEOM 3002 [0.5] Air Photo Interpretation and Remote Sensing	
GEOM 3007 [0.5] Cartographic Theory and Design	
GEOM 4003 [0.5] Remote Sensing of the Environment	
GEOM 4007 [0.5] Seminar in Cartography	
GEOM 4008 [0.5] Advanced Topics in Geographic Information Systems	
GEOM 4009 [0.5] Applications in Geographic Information Systems	
4. 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 Computers for the Arts and Social Sciences	
COMP 1004 [0.5] Introduction to Computers for the Sciences	

Geomatics (GEOM) Courses

Geography and Env.St.

Faculty of Arts & Social Sciences

GEOM 2004 [0.5 credit]

Introduction to Geomatics

Introduction to the fundamentals within the geomatics fields of cartography, remote sensing and geographic information systems, including: history of maps and mapping; map design; data acquisition procedures; digital data display and analysis; and integration of the Geomatics fields.

Precludes additional credit for GEOG 2004.

Prerequisite(s): second year standing, or enrolment in B.A. Honours (Geomatics), B.Sc. (Geomatics concentration), or Geomatics minor.

Workshop, three 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.

Precludes additional credit for GEOG 2007.

Prerequisite(s): GEOM 2004 or GEOG 2004 or EARTH 2406 (may be taken concurrently), or permission of the Department. Familiarity with personal computers is assumed.

Workshop three 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.

Precludes additional credit for GEOG 3002.

Prerequisite(s): GEOM 2004 or GEOG 2004, 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.

Precludes additional credit for GEOG 3005.

Prerequisite(s): GEOM 2007 or GEOG 2007.

Workshop three hours a week.

GEOM 3007 [0.5 credit]

Cartographic Theory and Design

Principles of cartography, cartographic communication and map design; practical work designed to provide experience in solving problems of cartographic representation using geospatial databases.

Precludes additional credit for GEOG 3007.

Prerequisite(s): GEOM 2004 or GEOG 2004, or permission of the Department.

Lectures and laboratory four hours a week.

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.

Precludes additional credit for GEOG 4003.

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

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

GEOM 4007 [0.5 credit]

Seminar in Cartography

Special topics in cartographic communication and design; technical and social issues in contemporary mapping practices; practical aspects of multimedia and web mapping.

Prerequisite(s): GEOM 3007 or GEOG 3007, and Honours standing, or permission of the Department.

Seminar, three hours a week.

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.

Precludes additional credit for GEOG 4008.

Prerequisite(s): GEOM 3005 or GEOG 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.

Precludes additional credit for GEOG 3006.

Prerequisite(s): GEOM 3005 or GEOG 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 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 and permission of the Department. Field placement one day a week.

GEOM 4904 [1.0 credit]**Honours Research Workshop**

Design and implementation of a research project through seminars, workshops and independent work under the supervision of a faculty member. Students are required to submit a major final research report. Precludes additional credit for GEOG 4908 and GEOG/GEOM 4909. (Also listed as GEOG 4904.) Prerequisite(s): fourth-year Honours standing in Geomatics. Workshop/seminar three hours per 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. Also listed as GEOG 4906. Prerequisite(s): fourth-year Honours standing in Geomatics. Hours to be arranged.

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

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. Restricted to students in the fourth year of B.A. (Honours) Geomatics. Precludes additional credit for GEOG/GEOM 4904 and GEOG 4908. (Also listed as GEOG 4909.) Prerequisite(s): fourth-year Honours standing in Geomatics, a Geomatics CGPA of 9.00 or better, an approved research topic, and permission of the Honours supervisor. Hours to be arranged with faculty adviser.

Summer session: some of the courses listed in this Calendar are offered during the summer. Hours and scheduling for summer session courses will differ significantly from those reported in the fall/winter Calendar. To determine the scheduling and hours for summer session classes, consult the class schedule at central.carleton.ca

Not all courses listed are offered in a given year. For an up-to-date statement of course offerings for the current

session and to determine the term of offering, consult the class schedule at central.carleton.ca