Geomatics

Program Requirements
Course Categories for B.Sc. Geomatics
See Academic Regulations for the Bachelor of Science Degree for a list of courses in these categories.
• Science Continuation
• Experimental Science Electives
• Science Faculty Electives
• Approved Courses Outside the Faculties of Science and Engineering and Design
• Science Geography courses

Geomatics B.A. Honours (20.0 credits)
A. Credits Included in the Major CGPA (10.0 credits)
1. 1.0 credit in:
   GEOG 1010 [0.5] Global Environmental Systems
   GEOG 1020 [0.5] People, Places and Environments
2. 1.5 credits in:
   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:
   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:
   GEOM 4003 [0.5] Remote Sensing of the Environment
   GEOM 4005 [0.5] Directed Studies in Geomatics
   GEOM 4008 [0.5] Applications in Geographic Information Systems
   GEOG 4009 [0.5] Applications in Geographic Information Systems
5. 1.0 credit from:
   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 4408 [0.5] Practicum II
6. 1.0 credit from:
   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
B. Credits not included in the Major CGPA (10.0 credits)
8. 8.0 credits in electives not in Geomatics
9. 2.0 credits in free electives.

Total Credits
20.0
GEOM 4406 [0.5] Practicum I

8. **1.0 credit in:**
   - 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
   - 1.5 approved credits in Computer Science

10. **2.0 credits in** Science Continuation not in GEOM

11. **1.0 credit in** Science Faculty Electives

13. **0.5 credit in:**
   - NSCI 1000 [0.5] Seminar in Science (or approved courses outside the faculties outside the faculties of Science and Engineering and Design)

14. **1.5 credits in** approved courses outside the faculties of Science and Engineering and Design

15. **2.5 credits in** free electives

**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:**
   - GEOM 1004 [0.5] Maps, Satellites and the Geospatial Revolution
   - GEOM 2007 [0.5] Geographic Information Systems

2. **0.5 credit from:**
   - GEOG 2006 [0.5] Introduction to Quantitative Research
   - STAT 2507 [0.5] Introduction to Statistical Modeling I

3. **1.5 credits from:**
   - 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:**
   - 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

**Geomatics (GEOM) Courses**

**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: GEOM 2007.

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.

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 and second-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 4408.
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.

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