Through the Geographic Information Systems - Cartographic Specialist program you can become a proficient GIS practitioner, visual designer and communicator - creating a variety of customized maps and other products for the many users of geographic information.

Program Highlights
Cartography - known as the art and science of making maps, has come a long way since the efforts of early mapmakers who worked with pen and ink. While cartography still relies on many of the traditional principles, mapmaking now requires incorporating the best of modern research and technology. Geographic Information Systems (GIS) allows today's "cartographer" to store geographic data in an organized way, to allow for quick access, correlation, and analysis. This system also facilitates the development of cartographic displays. By using GIS, cartographers are able to collect, store, and combine data about a given area, subject, or region being researched. GIS helps planners working on environmental, public health, municipal planning, and natural resource projects (to name a few uses) monitor change, predict trends and manage resources using current relevant data.

The GIS Cartographic Specialist program is an advanced post-graduate program, building on your existing, related skills.

» Fleming's leadership in this field has been recognized by industry, government and business through their support in establishing the Geomatics Institute at Fleming.
» These strong partnerships offer students access to the latest software packages and data resources as well as unprecedented learning and employment opportunities.
» Most GIS programs focus on geographic analysis and application - but the Fleming Cartographic Specialist program is based on a dual approach which is truly unique.
» You will become a proficient GIS practitioner, as well as a visual designer and communicator - using GIS data and software to create a wide variety of customized maps and other products for users of geographic information.
Please note: This program is 10 months duration.

Not sure which of our two GIS Ontario College Graduate Certificate programs is right for you?
The common first semester in the GIS Cartographic Specialist and GIS Applications Specialist programs gives you a
good overview and understanding of the technologies and diverse skills particular to careers in these fields. Subject
to enrolment capacity, you can choose which area of specialized study you will pursue in semester two. In addition
to acquiring a hands-on, firm foundation using Cartography, digital mapping and GIS technology skills and tools,
you will have many opportunities to build on your teamwork, team building, project management, problem-solving
and critical thinking skills. Since employers are seeking these broad-based transferrable skills, this experience
working in technology teams will give you an edge in the workplace.

This three-semester (10-month) program starts in September with a 15-week semester ending in December,
continues in January with another 15-week semester ending in April, and concludes with a seven-week semester
starting in May and ending in June.

Why Choose Fleming
Graduates of Fleming's cartographic programs have earned a reputation for excellence through their achievements
in the workplace, and through cartographic and GIS competitions. Over the years, they have captured 80 American
Congress on Surveying and Mapping awards in annual competitions (student category), as well as numerous
awards from the Canadian Cartographic Association and the Canadian Institute of Geomatics.

Success Stories
Meghan Miller
Graduate Meghan Miller is featured in a January 2012 article of GoGeomatics with an interview describing her
experience in the program and her career path since graduation. Meghan now works for Canadian Cartographic
Corporation (CCC).

Adam Thom
Adam Thom, 2010 program graduate, won the Arthur Robinson Award for Best Printed Map at the 2011
Cartography and Geographic Information Society (CaGIS) Map Design Competition. The award is sponsored by the
National Geographic Society and Avenza-MAPublisher.

Nicole Benishek
Student Nicole Benishek won the Gold Medal for "Best Interactive Online Map" in the Canadian Cartographic
Association 2010 Online Mapping Contest.

Work Experience
You'll spend a significant part of your time in the program doing experiential work - putting theory into practice. A
cooporative GIS project in the final semester involves cross-disciplinary teams from the GIS Cartographic Specialist
and Applications Specialist programs working together on a project for a business, government, or industry client.

Is this You?
While not prerequisites, there are a few skills and abilities that will help you to succeed in this program. These
include:

» good creative thinking skills
» strong oral and written communication skills
» self-discipline
» excellent time management skills
» analytical skills
» computing skills

Career Opportunities
Canadian Business recently published an article on "Canada's Best Jobs" ranking Mapping Technologist as number 9 on the top 100 jobs list. The article states:

"The explosion of big data and the growing need for location-aware hardware and software has led to a boom in the field of mapping," and concludes that this field is "...poised for growth, with the highest projected demand among the top 20 jobs—predictions suggest there will be 1.59 jobs for every qualified worker by 2022." The median salary is listed as $68,400, and salaries are anticipated to increase with growing demand for skilled employees.

With your GIS-Cartographic Specialist certificate, you will be able to pursue a variety of exciting, responsible positions within GIS and digital mapping environments, such as:

» provincial and federal government mapping agencies
» municipal utility, engineering, and planning departments
» private sector mapping, planning, consulting, utility, and natural resource firms

Related Programs

Trent University
You can obtain a Trent University Honours Bachelor of Science or Bachelor of Arts Degree in either Geography or Environmental Science/Studies and a Geographical Information Systems Ontario College Graduate Certificate in four years, with the third year spent studying at Fleming College. In other words, get both qualifications in four years - instead of five. For details, see Trent/Fleming Joint Degree, Geographical Information Systems Special Emphasis.

School of Military Mapping, Mapping and Charting Establishment of the Canadian Armed Forces
If you are a graduate of the Geomatics Technician program from the School of Military Mapping, Mapping and Charting Establishment of the Canadian Armed Forces, at the QL5 Level, you are eligible to apply for advance standing into the second semester of the three-semester Geographic Information Systems - Applications Specialist or Geographic Information Systems - Cartographic Specialist graduate certificate programs. For complete details see Transfer Credit Articulation Agreement.

Additional Costs
Plan to spend about $1000 for books and supplies.

Health Requirements
If you have significant difficulty perceiving distinctions between colours you will experience greater challenges in
map-making.

Minimum Admission Requirements
Students applying to Geographic Information Systems - Cartographic Specialist must meet the following requirements:

» Undergraduate degree or Ontario College diploma in a related field or equivalent

Applicants who do not meet the requirements listed above who possess a combination of education and relevant experience may be considered on an individual basis.

Recommended (but not required for admission)

Since GIS is a field of study that makes extensive use of computer hardware and software technology, students entering the GIS-Cartographic Specialist program must be familiar with computers.

Vocational Learning Outcomes

» Demonstrate how cognitive factors in map structure conform with the specific requirements of geometrical and symbolic map characteristics.
» Combine logical and semiotic perspectives on how maps represent reality with emphasis on visual-cognitive processes.
» Synthesize the various stages involved in the abstraction of reality into an organized whole to facilitate communication.
» Conceptualize and convey the importance of map design as an efficient and accurate method of information transfer between the map author and the map user.
» Describe and apply fundamental techniques used to retain a high degree of positional and attribute accuracy while capturing, structuring and displaying geographic data.
» Acquire, interpret, and integrate data from various sources and with different formats and coordinate systems to solve spatial problems.
» Explore, identify and analyze spatial problems, develop solutions and validate results.
» Create maps and visual displays based on recognized design principles that communicate geographic information effectively.
» Communicate complex, technical ideas and information to a given audience using a variety of media.
» Apply database systems to enable the efficient query and analysis of spatial and non-spatial data.
» Handle tools and equipment appropriately, in compliance with industry safety and operating standards, ensuring optimum health and safety of self, team and the environment.
» Work effectively in a collaborative work environment, demonstrating effective teamwork, interpersonal and communication skills.
» Practice to a professional standard, through ethical behaviour, continuous learning and participation in professional organizations.
» Proficiently employ standard software packages used in the GIS and cartographic industries.
» Plan and manage projects, and develop workflows to accomplish specific objectives and tasks.
» Take a challenging computational problem, break it down to its component parts, and solve the problem in an elegant and efficient manner.
» Employ the internet to access various data sources, to publish cartographic products, and distribute GIS data and functionality to a wide audience.
# Courses and Descriptions

## SEMESTER 1

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<tr>
<th>Course</th>
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<tr>
<td>GIS Database Principles</td>
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<td>Geodesy</td>
<td>GEOM 104</td>
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<tr>
<td>Geo visualization I</td>
<td>GEOM 102</td>
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<td>Problem Solving and Programming</td>
<td>GEOM 67</td>
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<td>Remote Sensing and Image Analysis</td>
<td>GEOM 66</td>
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<td>Spatial Analysis I</td>
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<td>Survey Camp</td>
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<td>Surveying and CAD Mapping</td>
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<td>Web Design and Programming</td>
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## SEMESTER 2

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<td>Environmental Modeling</td>
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<tr>
<td>GIS Collaborative Project Planning</td>
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<td>Geo Visualization II</td>
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<td>Municipal Mapping and GIS</td>
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<td>Web Communication</td>
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<td>Web GIS Development</td>
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<tr>
<td>Geo Visualization III</td>
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