



Senate Committee on Academic Development

Report to Senate – Meeting of April 23, 2009

Proposal to introduce a Certificate Program in Geographic Information Science in the Faculty of Arts and Science

Introduction

The proposal to introduce a Certificate Program in Geographic Information Science in the Faculty of Arts and Science was reviewed by the Senate Committee on Academic Development (SCAD) at its meeting of February 25, 2009 and April 1, 2009. P. Treitz, Associate Head and Associate Professor in the Department of Geography, and B. Donald, Chair of Undergraduate Studies in the Department of Geography attended the SCAD meeting to speak to the proposal and answer questions from members of SCAD. Members of SCAD were also provided with the Program Approval Submission Form, which outlines the major components of the proposal. A copy of the proposal is attached to this report.

Analysis and Discussion

The following should be noted:

- this proposed program is a core of the discipline and will offer a suite of computer and spatial analytical skills that are relevant to the current workforce;
- this specialization will offer a rigorous curriculum and there will not be a separate admission requirement;
- the Department would like to offer this certificate to non-degree students and will explore the potential of offering this program in the summer to members of the community and industry;
- non-departmental students would be welcome to participate in this proposed certificate program but they would be required to identify their interest in GIS early to ensure they can enroll in the specific courses necessary to complete the certificate;
- students have expressed an interest in this type of program and other universities, including York University, University of Waterloo and University of Western Ontario, already have established programs of this nature;
- there is a market for these specific skills and government agencies and the public sector have clearly indicated they are looking for graduates with skills in geographic information science.

Conclusions/Recommendation

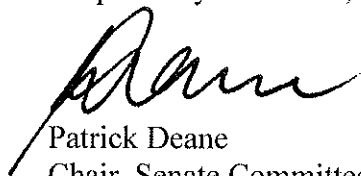
Recommendation:

On academic grounds, SCAD recommends that Senate approve the establishment of the Certificate Program in Geographic Information Science in the Faculty of Arts and Science as a pilot project, subject to review in three years, and to commence in September 2009.

SCAD also recommends that the Senate policy on Certificate Programs at Queen's University, including rules and procedures, be re-evaluated by SCAD, and that this begin as immediate business of SCAD.

SCAD further recommends that additional proposed certificate programs not go forward to SCAD until such time as the certificate policy has been reviewed and the framework clarified.

Respectfully submitted,



Patrick Deane
Chair, Senate Committee on Academic Development

Committee Members:

Members

C. Baker
J. Coates
P. Deane (Chair)
M. Hoidas
M. Lombardi
D. McKeown
K. O'Brien (Secretary)
P. Oosthuizen
M. Roberts
D. Stockley
M. Whitehead



Senate Budget Review Committee

Report to Senate – March 12, 2009

I. Proposal to establish a Certificate Program in Geographic Information Science.

Introduction

On March 5, 2009, the Senate Budget Review Committee (SBRC) met to discuss the Proposal to establish a Certificate Program in Geographic Information Science.

Analysis and Discussion

Budget cutbacks have lead to Geographic Information Science (GIS) no longer be offered as a medial. Dr. Treitz still feels there is a strong demand for students with knowledge and skills in geographic information science. There a number of comparable programs at other universities across the country that are highly subscribed. Offering a certificate program will recognize students having taken a concentration of these courses. The certificate will consist of courses that already exist and are currently offered in Geography or GIS. The tracking of student progress through the program will be done within the Geography department and the committee was told this function could be done with existing administrative resources and no additional resources would be required to run the program.

Conclusions/Recommendation

Members of the committee saw no major resource implications with the proposed program and voted unanimously to recommend to Senate that they approve the Proposal to Establish the Certificate Program in Geographic Information Science.

Respectfully submitted,



J. Medves,
Chair, Senate Budget Review Committee

Committee Members:

H. Averno
K. Brock
F. Davis
D. Hallett
J. Helland
D. Janiec
M. Koichopolos
M. Lombardi
J. Medves (Chair)
G. Willmott
I. Young

all approved 09.01.06

Senate Committee on Academic Development
and
Senate Budget Review Committee

Program Approval Submission 2008-09

This form is to be used when seeking approval for all new or substantially revised programs of study leading to a degree, diploma or certificate

FACULTY/SCHOOL: FACULTY OF ARTS AND SCIENCE

PROPOSED NEW PROGRAM: CERTIFICATE IN GEOGRAPHIC INFORMATION SCIENCE

PROPOSED IMPLEMENTATION DATE: SEPTEMBER 1, 2009

DATE OF FACULTY BOARD APPROVAL: January 16, 2009

SUBMISSION CONTACT

NAME: Dr. Paul Treitz, Department of Geography, Queen's University

TELEPHONE: 533-6448

EMAIL: paul.treitz@queensu.ca

SIGNATURE OF THE DEAN: *Karen Katerjff* DATE: 29 Nov 2008

Please note that program proposals must receive the approval of Faculty Board prior to being submitted to the Senate Office for referral to the Senate Committee on Academic Development (SCAD) and the Senate Budget Review Committee (SBRC), which will then make their recommendations to Senate.

The criteria requested in PART A should be regarded as the minimum criteria for the assessment of academic programs. Any unit planning a new program should show how not only the criteria listed below but also, where appropriate, those required by the Undergraduate Program Review Audit Committee and those of the Ministry of Training, Colleges & Universities have been taken into account. For further information, please refer to the Senate Policy "Policies and Procedures for Establishing New Undergraduate Programs" (<http://www.queensu.ca/secretariat/senate/policies/newprog/index.html>)

PART A

1. OBJECTIVES:

Please summarize the rationale for introducing this program. The program should be consistent with the Queen's mission, the academic plans of the unit including its teaching and research strengths, the relation of the unit with other academic units and the standards, educational goals and learning objectives of the degree. Explain how this program will achieve the expected academic quality. Please identify the Faculty, School or Department, which will be administratively responsible for the academic aspects of this program such as supervision of graduate students, curriculum development and the Internal Academic Review Process.

Due to a reduction in operating budgets for Geography (GPHY) and the Geographic Information Science (GISCI) Program, we have been forced to scale back our course offerings in geographic information science. This is a function of a lack of resources for additional sessional and adjunct teaching. As a result, we will no longer be able to offer GISCI medials with Geography, Biology or Geology. We are now only able to offer a BA MIN and a BSC GEN. However, to enhance the profile of geographic information science throughout the university, we are proposing to offer the students at Queen's, the opportunity to graduate with a **Certificate in Geographic Information Science**. The advantage of the Certificate is that many of the courses that make up the Certificate in *Geographic Information Science can also be counted towards the students major, either as core courses or electives.

Background

"Geographic information science" is a term, originally coined by Dr. Michael Goodchild to describe the "science behind the systems" referring to the sciences of cartography, geodesy, statistics, error and uncertainty, photogrammetry and remote sensing, cognition of geographic information, etc. that form the basis of geographic information systems.^{1,2} Montello and Freundsuh describe geographic information science as a "multi-disciplinary field that is concerned with the collection, storage, processing, analysis, and depiction and communication of digital information about spatio-temporal and thematic attributes of the earth, and the objects and events found there".³

There is potential for the Certificate in Geographic Information Science to boost enrollments in Geography. In fact, this has been demonstrated over the past three years with the GISCI Program. As reported in Nature, "the US Department of Labor identified geotechnology as one of the three most important emerging and evolving fields, along with nanotechnology and biotechnology".⁴ There is undoubtedly a market for graduates with expertise in this field. However, this Certificate is not meant to simply provide students with the technical skills required for working with spatial data in a computerized environment. Doug Richardson, executive director of the Association of American Geographers (AAG) stresses that, although technical skills are important, there is a deeper need to understand the underlying geographic concepts.⁴ We feel that the introduction of the Certificate in Geographic Information Science will encourage more students to major in Geography.

¹ Goodchild, M.F., 1992. Geographical information science. *International Journal of Geographical Information Systems*, 6(1):31-45.

² Goodchild, M.F., 2004. Preface, In *A Research Agenda for Geographic Information Science*, University Consortium for Geographic Information Science, Edited by R.B. McMaster, and E.L. Uery, CRC Press, New York.

³ Montello, D.R., and S. Freundsuh, 2004. Cognition of Geographic Information, In *A Research Agenda for Geographic Information Science*, University Consortium for Geographic Information Science, Edited by R.B. McMaster, and E.L. Uery, CRC Press, New York, pp. 61-91.

⁴ Gewin, V., 2004. Mapping Opportunities, *Nature*, 427(22):376-377.

2. **ADMISSION REQUIREMENTS:**

The admission requirements (preparation and achievement) should be appropriate for the learning objectives of the program and the institution to ensure the appropriate quality of student applicants. In no case should admission requirements be lower than the published minimum standards for the University. Indicators of student demand including applications, registrations, projected enrolment levels, and of the quality of students must be considered. Where admission is competitive, actual admission requirements may be higher than the published minimum standards. Information about anticipated enrolments should also be included.

Given that students will already be enrolled in a degree program, there are no separate admission requirements for the Certificate in Geographic Information Science. The progress of students in Geography will be tracked by the Department to determine if and when students have taken sufficient courses to satisfy the course requirements for the Certificate Program. We will also advertise the Certificate Program in our introductory courses as well as in the courses related to the program so that students taking those courses are aware of the opportunity to obtain the Certificate. The Department of Geography will develop an on-line form so that students within and outside of geography are able to track their progress in meeting the requirements of the Certificate in Geographic Information Science. They will be asked to notify the Department of their intentions to pursue the Certificate in Geographic Information Science. We will continue to seek additional venues to advertise and raise the profile of the Certificate in Geographic Information Science across campus.

3. **CURRICULUM:**

Provide a detailed overview of the proposed program, along with the proposed *Calendar* description. Details such as course requirements (core, supporting, recommended, optional courses), prerequisites, problems students may encounter and new courses being proposed for the program should be included. The structure and curriculum of the program should be appropriate for its learning objectives.

Geographic information science is concerned with the fundamental issues of collecting, processing and analysing spatial data. There is a growing appreciation in research and industry that analyzing and managing spatial information is central to problem-solving in the social, natural, and physical sciences. For the student, the techniques and concepts of geographic information science provides new viewpoints for critical analysis and presentation in their chosen field. They also provide an important stepping stone for further career opportunities in government, business, and research.

The Certificate recognizes the efforts and accomplishments of students that have taken a suite of courses (i.e., 5.0 credits) within the sub-discipline of geographic information science. Details of Certificate requirements are provided in Appendix 1. The schedule of course offerings necessary to deliver courses in eligible for the Certificate over the next four years is provided in Appendix 2.

Students must pass all courses relating to the Certificate with an average of at least 65 per cent, and must have completed their degree program requirements in order to receive the certificate.

4. **TEACHING:**

Briefly explain how the intended mode of delivery (including, where applicable, distance or on-line delivery) and standards of instruction for this program are appropriate to meet the program's learning objectives.

The Certificate will consist of courses that are currently offered in Geography and Geographic Information Science (GIS). In addition to standard lectures, seminars and tutorials, there is a heavy reliance on hands-on computer lab instruction with specialized software. Currently courses

of this nature are taught in M-C E208 and E223. Typically students are assessed based on lab assignments, projects, mid-terms and quizzes, as well as final written exams. The Certificate in Geographic Information Science is based on a more streamlined suite of courses in GPHY and GISCI, reflecting the fiscal realities under which we are now operating.

5. EVALUATION OF STUDENT PROGRESS:

Briefly explain the intended method of evaluation of student progress and how it is appropriate for this program.

Students are now able to obtain recognition for courses taken in geographic information science. Initially the program will be evaluated based on the growth in enrollments in the courses of the program. Also, the student evaluations of the courses will serve to modify and improve individual courses, and also the fit of courses within the overall program.

6. EQUITY:

This program's planning, development and implementation should be consistent with the equity goals of the University and must avoid direct, indirect and systemic discrimination.

This program will be consistent with equity goals of the University.

7. HUMAN RESOURCES:

Please demonstrate that the number, quality and academic expertise of the faculty in the area of the proposed program are sufficient to meet the demands of the program. Where appropriate, the availability of support staff, teaching and laboratory assistants should be indicated. (Additional details should be provided on the Resource Implications Checklist in **PART B** of this form).

Currently, there are three full-time tenure-stream and adjunct faculty (i.e., Dr. Gerry Barber, Dr. Dongmei Chen, Dr. Paul Treitz) teaching geographic information science in the Department of Geography at Queen's.

The current complement of administrative staff in the Department of Geography is sufficient to absorb the additional undergraduate enrollments and management of the lab facilities.

8. PHYSICAL AND INFORMATION RESOURCES:

Please provide a summary of available or required program-specific resources, such as: classroom requirements, laboratories, information technology services and facilities, and library facilities and information resources (including unique and special collections). (Additional details should be provided on the Resource Implications Checklist in **PART B** of this form).

As Geography has done in the past, the larger second year courses will be taught in M-C E208, a facility managed by ITS.

In addition, greater demand will be placed on M-C E223, a computing facility that has become the responsibility of the Department of Geography. This facility will be maintained and managed by the Department of Geography.

Since geographic information science has been part of the Geography curriculum at Queen's for many years, there are good library resources available.

9. FINANCIAL RESOURCES:

There should be evidence of sufficient resources to introduce and maintain the program for a reasonable period of time. This should include consideration of any additional funds from internal sources and from government or other external sources as well as possible financial impact of the

programs on other programs, within and outside the unit. (Additional details should be provided on the Resource Implications Checklist in **PART B** of this form).

There are sufficient resources available in the Department of Geography to offer the Certificate in Geographic Information Science. No additional resources are required, over and above the normal operating needs of the Geography Department to offer its current courses in geographic information science.

10. SOCIETAL CONTEXT (STUDENT DEMAND, SOCIETAL NEED, DUPLICATION):

Please provide a summary of how this program is expected to meet student demand and societal need. Evidence of student demand could include: projected enrollment levels, application statistics, origin of student demand (domestic and international), and duration of projected demand. Evidence of review and comment by appropriate student organizations should be provided. Please explain how the program will fulfill a societal need in specifically identified fields (academic, public and /or private sector) and consider the probable availability of positions on graduation, the likelihood of attracting out of province or international students and the equity implications of the program, In the case of a professional program, discuss its congruence with the regulatory requirements of the profession. Please cite similar programs offered by other institutions and provide evidence of additional societal need and/or student demand as well as indicate innovative and distinguished aspects of the program.

As reported in Nature, "the US Department of Labor identified geotechnology as one of the three most important emerging and evolving fields, along with nanotechnology and biotechnology" (Nature Vol. 42 (2); p. 376). There is undoubtedly a market for graduates with expertise in the spatial sciences. We feel that the Certificate in Geographic Information Science will provide Queen's students with the appropriate suite of knowledge and skills for careers in the spatial sciences. This certificate formally recognizes a student's education and training in this sub-discipline.

11. LEARNING AND PROGRAM OUTCOMES:

While the aim of a university education is to produce educated individuals who possess good judgment and the capacity for critical thought, it is also important to consider specific indicators of learning and program outcomes, such as a graduation rate, length of studies, job placement, external scholarships, awards of graduating students, results of professional certification or licensing examinations, etc. Please discuss the anticipated outcomes of this program.

There is strong and sustained demand for students with knowledge and skills in geographic information science. There are a number of comparable programs at other universities across the country that are highly subscribed (i.e., Waterloo, Calgary, University of Quebec at Montreal, Victoria). A Certificate in Geographic Information Science will recognize students that have taken a concentration of courses in Geographic Information Science, who can then market that concentration to industry and government.

12. OTHER ISSUES:

Please describe any additional special considerations with respect to this program.

PART B - RESOURCE IMPLICATIONS

1. SUMMARY OF RESOURCES REQUIRED

If you are unsure of the resource implications for any of the following, please consult with someone in the affected department or unit.

Please summarize the *additional* resources needed to implement the program:

- a) FACULTY _____
(number of half courses)
- b) STAFF _____
(number or fraction of FTEs)
- c) TEACHING ASSISTANTS _____
(number of student-courses)

d) PHYSICAL FACILITIES:

Please describe the space resource implications of the proposal in terms of the following (include both size (in terms of # of students) and frequency (number of hours per week required))

- 1. Classrooms **None** _____
- 2. Laboratories **None** _____
- 3. Offices **None** _____

For number d) 3 above, please reallocation or reconfiguration of space is required. If so, appropriate approval must be appended.

e) INFORMATION FACILITIES

Please indicate the ITS resource implications for the proposal in terms of requirement for

- 1. Hardware **None** _____
- 2. Software / Internet **None** _____
- 3. Audio-Visual **None** _____
- 4. Telecommunications **None** _____

f) LIBRARY SERVICES

Please indicate which of following new library resources will be needed:

- journals
- print monographs
- audio visual material
- historical documents
- electronic databases
- statistical / geospatial data

Indicate the likelihood of the program having an impact on Library staffing?

None _____

g)UNIVERSITY REGISTRAR

Please indicate the resource implications for the proposal in terms of requirement for

1. Scholarships / Bursaries **None** _____
2. Registration / SIS Programming **None** _____
3. Timetable **None** _____
4. Admission (Graduate / Undergraduate) **None** _____
5. Convocation **None** _____

h)OTHER UNIVERSITY SERVICES

Please indicate the resource implications for the proposal in terms of requirement for

1. Financial Services **None** _____
2. Human Resources **None** _____
3. Advancement **None** _____
4. Student Services **None** _____
5. Residences **None** _____
6. Other _____

2. NEW EXPENDITURES

What **new** funds will be needed for each of the following? One-time \$ are monies that will only be required once for startup. Base \$ are funds that will continue to be needed year after year. Please attach some backup to show how the numbers were calculated.

e.g. Staff - Base \$60,000 (1.5 FTE @ \$40,000))

	ONE TIME \$	BASE BUDGET \$
FACULTY		
STAFF		
TEACHING ASSISTANTS		
STUDENT ASSISTANCE (Grad)		
OTHER NON-SALARY		
TOTAL		

3. FUNDING SOURCES

Please show the source of the **additional and/or re-allocated funds** needed for the proposal. What amount will be re-allocated from within the department's budget, from within the faculty's budget, from within the University's budget and how much will come from tuition or other sources. One-time \$ are monies that will only be required once for startup. Base \$ are funds that will continue to be needed year after year. The total costs in section 2 (Cost Breakdown) must match the total costs in section 3 (funding sources)

	ONE TIME \$	BASE BUDGET \$
DEPARTMENT BUDGET		
FACULTY BUDGET		
UNIVERSITY BUDGET		
TUITION REVENUE		
OTHER SOURCES		
TOTAL		

If other sources are used, please list the sources and indicate if the funds have been applied for and if they have been secured.

4. IMPACT ON ENROLMENT

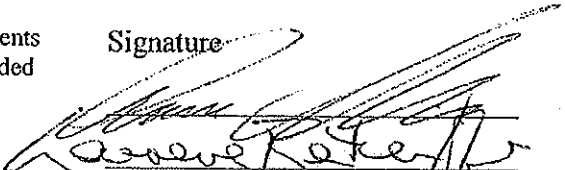
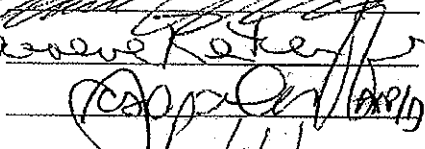
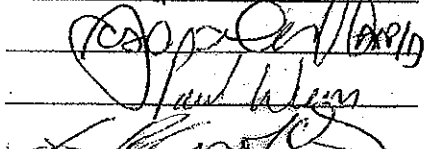
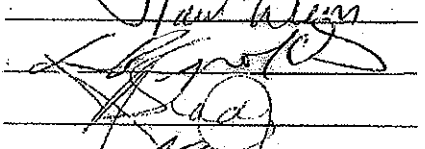
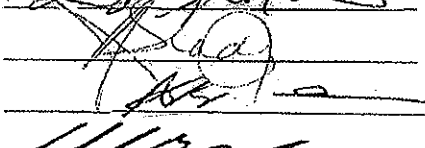
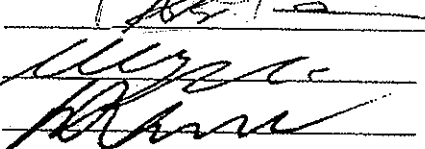
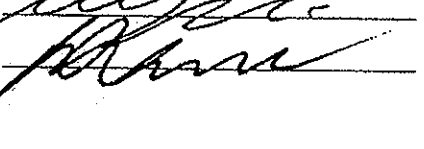


- a) How many students are expected in the program? 40-60
- b) How many new students will the program attract to Queen's University? 30
(i.e. students in the program that are not transfers from existing programs currently being offered at Queen's)
- c) How many students must be accommodated by other departments / units? None
(Please indicate which departments / units will be affected and how.)

5. NET IMPACT OF THE PROPOSAL

Please summarize any other resource or funding implications of the proposal. N/A

6. SIGN-OFF

Following Faculty Board approval, signatures from the following individuals listed below must be obtained to verify that they have reviewed this proposal. Supplementary comments may be appended and so indicated by checking the box beside the appropriate signature.

Title	Comments Appended	Signature
Department Head		
Dean or Associate Dean		
Dean of Student Affairs		
University Librarian		
Director, Information Technology Services		
University Registrar		
Associate VP (Operations & Facilities)		
Vice-Principal (Operations & Finance)		
Vice-Principal (Academic)		

Appendix 1 – Certificate in Geographic Information Science (GISC)

Proposed Courses for BA Minor, BSc General and Certificate
Computer Science, Math
CISC-101* Elements of Computing Science OR CISC 121* Introduction to Computing Science I 0.5 Math Credit
Geographic Information Systems
GISC-201*/0.5 Geographic Information Science
GISC-202*/0.5 Data Collection, Management and Analysis
GISC-301*/0.5 Spatial Analysis
GISC-302*/0.5 Environmental Modeling
GISC-303*/0.5 Application Design and Customization in GIS
GISC-390*/0.5 Special Topics in Geographic Information Science
Cartographic Design and Visualization
GPHY-344*/0.5 Cartographic Design and Visualization
GPHY-325*/0.5 Maps and Society
Statistics
GPHY-247*/0.5 Introduction to Quantitative Methods in Geography
GPHY-347*/0.5 Multivariate and Spatial Statistics
Remote Sensing
GPHY-242*/0.5 Remote Sensing I: Image Interpretation and Measurement
GPHY-342*/0.5 Remote Sensing II: Digital Image Processing

Courses Required for the GISC Certificate (5.0 credits)

Required (3.0 credits): GISC 201*, GPHY 242*, GPHY 247* (or equivalent), GISC 301*, two of GISC 202*, GISC* 302*, GPHY 344*.
Electives (2.0 credit): CISC 101* or CISC 121* or 0.5 Math Credit, GISC 302*, GISC 303*, GPHY 325*, GPHY 342*, GPHY 347*, GISC 390*.

Note: Students may do a senior honours project or thesis (i.e., GPHY 501* or GPHY 502* or GPHY 503) with a faculty member on a GISC topic upon approval of the Undergraduate Committee. This half or full credit may be counted toward the GISC Certificate upon the approval of the undergraduate committee.

Appendix 2

Timetable Scenario

Curriculum	2009-2010	2010-2011	2011-2012	2012-2013
GIS				
GIS-201*/0.5 Geographic Information Science	Barber / Chen	Barber / Chen	Barber / Chen	Barber / Chen
GIS-202*/0.5 Data Collection, Management and Analysis		Barber		Barber
GIS-301*/0.5 Spatial Analysis	Barber	Barber	Barber	Barber
GIS-302*/0.5 Environmental Modeling	Chen	Chen	Chen	
GIS-303*/0.5 Application Design and Customization in GIS		Chen		Chen
GIS-390*/0.5 Special Topics in Geographic Information Science				
Cartography, Map Design and Visualization				
GPHY-344*/0.5 Cartographic Design and Visualization	Chen	Chen	Chen	Chen
GPHY-325*/0.5 Maps and Society		Godlewska		Godlewska
Statistics				
GPHY 247*/0.5 Introduction to Quantitative Methods in Geography	Barber	Barber	Barber	Barber
GPHY-347*/0.5 Multivariate and Spatial Statistics	Barber		Barber	
Remote Sensing				
GPHY-242*/0.5 Remote Sensing I: Image Interpretation and Measurement		Treitz	Treitz	Treitz
GPHY-342*/0.5 Remote Sensing II: Digital Image Processing		Treitz		Treitz



Wednesday, 25 March 2009

Dr. Patrick Deane
Vice-Principal (Academic)
Queen's University
Kingston, Ontario K7L 3N6

DEPARTMENT OF GEOGRAPHY
Mackintosh-Corry Hall, Room D201
Queen's University
Kingston, Ontario, Canada K7L 3N6
Tel 613 533-6030
Fax 613 533-6122

Dear Dr. Deane:

Thank you for your letter dated March 4, 2009 regarding the discussions at Senate Committee on Academic Development (SCAD) related to the proposed Certificate in Geographic Information Science (GISC). Our subsequent meeting to discuss the Certificate on March 13 was extremely useful. The purpose of this letter is to provide additional information as per our discussions related to the Certificate as well as address some of the issues raised during the meeting of the SCAD.

The proposed Certificate in Geographic Information Science is in direct response to the challenge by Principal Williams for Departments to be innovative in their approach to program delivery. As you are aware, for the past three years the Department of Geography has offered degree programs (BSc medial, BSc General and BA Minor) in Geographic Information Science (GISC). Due to budget cuts to the 2008-2009 budget, the Faculty of Arts and Science eliminated funding to the GISC degree programs. Our initial response was to eliminate the medial programs since we no longer had base budget funds to hire the additional Sessional Faculty necessary to teach the full suite of courses required for the GISC medial programs. However, with our three full-time faculty members, we were still able to offer the BSc General and BA Minor degree programs in GISC. Subsequently, in response to the most recent policy of Faculty of Arts and Science, we suspended (i.e., eliminated) our BSc General and BA Minor degree programs in GISC (since they have fewer than 25 enrollments). These programs are only three years old and have shown growth each year. Unfortunately, we have not yet reached the level of 25 enrollments, a level determined by the Faculty of Arts and Science as necessary to warrant continuation of these programs. In response, we feel it is critical to our Department, and to our discipline, that we replace these degree programs with the Certificate in Geographic Information Science. The Certificate will serve both BSc and BA students in the Geography program, but will also be available to students in cognate departments (e.g., Biology, Geology, and Environmental Science). These departments have been involved in the degree programs in GISC since their inception.

Geographic Information Science represents a sub-discipline in Geography that provides a unique set of computer and spatial analytical skills that are in demand in the workforce (both private and public sectors). The Certificate in GISC will allow the Department of Geography to provide recognition to students who acquire an appropriate number of courses (breadth and depth) in

GISC. This will provide students graduating from Queen's with additional credentials that will be recognized by agencies and industries seeking expertise in GISC. This program will allow our students to compete with students at other universities who have similar concentrations in GISC (e.g., Western (see attached), Waterloo, Calgary, York, etc.). I have also attached a description of a similar certificate program at York University (i.e., Geographic Information Systems and Remote Sensing Certificate). Similar to York, the proposed Certificate recognizes a concentration within a larger discipline and allows credits in GISC to be counted towards the overall degree, with the value-added of a Certificate in a very marketable set of skills/knowledge. With the loss of the degree programs in GISC at Queen's, this represents the best way to recognize this sub-discipline without adding additional administrative costs. The tracking of students in the Certificate would be the responsibility of the Department. Hence, there would be no overhead cost to the Faculty of Arts and Science.

Based on your letter, it appears that SCAD was very positive in terms of how the Certificate could serve students in Geography and that there was potential to be more free standing and more accessible to students outside Geography. Due to the loss of the degree programs in GISC, our preference is to proceed with the Certificate in GISC as proposed in 2009-2010 in order to meet the needs of students already enrolled at Queen's. However, based on the recommendations from SCAD, we agree that this should represent Phase I of our overall strategy. It is in this form that the proposed Certificate has passed through our Department, the Faculty of Arts and Science Curriculum Committee and the Senate Budget Review Committee. It has met with a positive response at each level. We also agree with SCAD that this Certificate offers potential for a free-standing Certificate, available to members of the greater Kingston community. In Phase II, we would like to develop and advertise the Certificate for non-Queen's students that already have a university degree, but seek to enhance their knowledge and training in GISC. This would be somewhat similar to the York model (see attached).

I look forward to responding to any questions you, or the committee may have regarding the Certificate in Geographic Information Science. Please do not hesitate to contact me if you have further queries.

Sincerely



Dr. Paul Treitz
Associate Professor and Associate Head



[Courses & Programs](#)
[Admission Requirements](#)
[Transfer Credit](#)
[Tuition](#)
[Financial Support](#)
[Student Life](#)
[York Libraries](#)
[Student Services](#)
[Sports](#)
[Activities & Clubs](#)



Geographic Information Systems and Remote Sensing Certificate

This is a new and expanding field!

Certificates are designed to allow you to complete a coherent grouping of degree-credit courses at university level as either part of or independent from a full degree program. The number of courses required for any given certificate varies upon the subject area and specialization.

A Geographic Information System (GIS) is a computer system capable of assembling, storing, manipulating, and displaying information identified according to locations. For example, surveyors may use GIS to maintain and manage field surveys and cartographers may use GIS to create digital maps. Most consumers encounter GIS in market research - the next time a retailer asks for your postal code they're compiling data to see if they have a large enough geographic/demographic base to support a new store.

The aim of York's Geographic Information Systems Certificate program is to provide you with applied skills in the areas of computer cartography, statistical analysis, geographic information systems, remote sensing and satellite image processing to complement the theoretical and conceptual learning of your Bachelor's degree.

Who can take it?

This certificate is open to the following applicants:

1. current York students, or
2. non-York students who already hold a university degree.

How to apply

The application process depends on the type of applicant you are:

1. If you are a current York student, contact your Academic Adviser.
2. If you are a non-York student and already have a university degree, you must ensure first that you meet the [minimum requirements for admission](#) to the University by applying through the Office of Admissions. You would then also submit an application to one of the following three faculties:
 - Faculty of Liberal Arts & Professional Studies, Department of Geography, North 430 Ross Building, 416-736-5107
 - Faculty of Science, Department of Earth & Atmospheric Science, 102 Petrie Science Building, 416-736-5245
 - Faculty of Environmental Studies, 109 Health, Nursing and Environmental Studies Building, 416-736-5252

Quick Facts

Offered By:
 Faculty of Science and Engineering
 Faculty of Environmental Studies
 Faculty of Liberal Arts & Professional Studies

Degree/Certification:
 Certificate

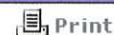
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Academic Calendar 2009

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Admission Requirements

Completion of first year requirements, including 1.0 course from [Geography 1100](#), [1300A/B](#), [1400F/G](#), [1500F/G](#), the former 020E, and 3.0 courses from the Faculty of Science, not including [Astronomy 1021](#); [Biology 1225](#), [1290B](#), the former 026; [Calculus 1201A/B](#); the former [Chemistry 021](#); [Computer Science 1032A/B](#); and [Physics 1021](#). Students must have an average of at least 70% in the following 2.0 courses plus 1.0 additional course, with no mark in these principal courses below 60%.

1.0 course from [Geography 1100](#), [1300A/B](#), [1400F/G](#), [1500F/G](#), the former 020E.

1.0 course from: [Applied Mathematics 1413](#), [Calculus 1000A/B](#), [1301A/B](#) or [1501A/B](#); [Computer Science 1025A/B](#), [1026A/B](#); [Linear Algebra 1600A/B](#); the former [Mathematics 030](#).

Module

10.0 courses:

2.5 courses: [Geography 2122A/B](#), [2210A/B](#), [2220A/B](#), [2230A/B](#) (or the former 307A/B), [Geography 2240A/B](#).

1.0 course from: [Geography 2310A/B](#), [2320A/B](#), [2330A/B](#), [2410A/B](#), [2420A/B](#), [2430A/B](#), [2450F/G](#), [2460F/G](#), [3250A/B](#), the former [2250A/B](#), [2340A/B](#).

2.0 courses normally taken in third year: [Geography 3000Y](#), [3210A/B](#), [3211A/B](#), [3222A/B](#).

1.5 courses from: [Earth Sciences 3323A/B](#), [3350Y](#), [Geography 3221A/B](#), [3223A/B](#), [3231A/B](#), [3260A/B](#), [3321A/B](#), [3421A/B](#).

1.0 course: [Geography 3241A/B](#), [4000A/B](#).

2.0 additional courses in Geography at the 3000 level or above. (Students wishing to pursue graduate studies are encouraged to take [Geography 4900E](#)).

Notes:

- To qualify for the BSc degree 11.0 Science and/or Science-equivalent courses are required.
- The following Geography courses have "Science-equivalent" status and count towards the 11.0 Faculty of Science course requirement for this module: [Geography 2122A/B](#), [2131A/B](#), [2210A/B](#), [2220A/B](#), [2230A/B](#), [2240A/B](#), [2310A/B](#), [2320A/B](#), [2330A/B](#), [3210A/B](#), [3211A/B](#), [3221A/B](#), [3222A/B](#), [3223A/B](#), [3231A/B](#), [3241A/B](#), [3260A/B](#), [3311A/B](#), [3312A/B](#), [3321A/B](#), [3331A/B](#), [3332A/B](#), [3333A/B](#), [3334A/B](#), [3341A/B](#), [3342A/B](#), [3350A/B](#), [3351A/B](#), [3352A/B](#), the former [Geography 2340A/B](#), [307a/b](#).

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