

**Curriculum Renewal**

**Annual Summary Report**

**School of Environmental and Natural Resource Sciences**

**(SENRS)**

**GIS-AS/CS**

Prepared by:

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for Linda Skilton, Dean SENRS

**GIS-AS/CS**

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| **Program:** Geographic Information Systems AS/CS **Coordinator:** Lawrie Keillor-Faulkner**Date:** March 2012 |
| **A. Analysis of Indicators**Note: data is **not** recorded in this section of the template.**Reflect on, and discuss, the following indicators in the context of the curriculum and program:**   |
| * 1. **Industry / Sector Trends**

**1A)** The primary software used by both the GMT and GIS programs, ESRI’s ArcGIS, has released a new version, ArcGIS 10. This is a major rebuild, including support for new mobile functionality, more accessible and streamlined web application deployment and better spatial analysis tools. In addition, customization languages have changed. When Arc 10.1 is released (expected in U.S. in early 2012), ESRI will no longer be supporting VBA, in accordance with Microsoft’s move to discontinue VBA and VB6.**Program Impacts:**1. **PD Training required:** Arc 10 training was arranged, and occurred, in Spring semester, June 2011, for 9 or 10 full and part-time faculty, including GIS, GMT and Forestry faculty. As Arc 10 was not yet loaded on the Frost Campus computers, this distance course used remote computers in California, the ESRI employee/teacher was in Toronto and Fleming faculty attended either in the Geomatics wing in Lindsay, or in their own homes in the Kawartha area. Very cool and enjoyable training.
	1. Arc 10 has proved to be excruciatingly slow which has resulted in student and faculty complaints. We hope the new Operating System (Windows 7) and new computers may speed things up (see 1G).
2. Web curriculum: There will be less emphasis on ArcIMS applications and a move toward ArcServer, AutoCAD MapGuide and mobile applications.
3. **Programming curriculum:**
	1. Currently, the language taught in semester one Problem Solving and Programming is VB.Net, facilitating the transition in second semester to VBA for customization. VBA is required for ArcObjects, ESRI’s customizing library of objects. However, with VBA being phased out, the program will need to consider what programming language to move to.
	2. Currently C# is being asked for in an increasing number of job postings and there is a strong possibility that C# will be the language used in first semester. However, C# is not friendly as an introductory language, especially for those students who struggle with programming (e.g. some of our CS and GMT students in particular). Java is another possibility. More consultation is needed.
	3. Python scripting is becoming increasingly important in ArcGIS. Finding the time and the place to teach this important language is a challenge.

**1B)** ColdFusion for web development is expensive to upgrade and the movement in the industry is toward open source Web GIS Development, namely PHP, or ASP.Net **Program Impacts:** Require faculty development in PHP or ASP.Net, including new curriculum development to replace the ColdFusion curriculum currently being used. **1C)** Move to Open Source RDBMS, including SQL Server, PostgreSQL & Oracle**Program Impacts: Both RDBMS above are Open Source.** PostgreSQL can now work with MS-ASP.Net or PHP. C# is essentially ASP.Net, so an entire transition of programming and database languages is possible for the near future. Oracle while not technically Open Source is a free download for educational purposes. **1D)** Microsoft has developed a number of web designer and developer software packages that are increasingly being requested by employers and in job postings. Thus Visual Studio has access to ASP,NET and C# but not Java (we would require a Java Compiler). Silverlite, as an example, is animation software similar to Flash that is becoming popular. **Program Impacts:** As of July, 2010 we signed a Microsoft **Academic Alliance Agreement**, Version Designer AA, to give the students use of a variety of free software. The agreement cost $1000 and allows us to give students copies of a variety of these developer and designer tools. These include: Visual Studio (Illustrator, Dreamweaver), student choice of Operating systems (Windows 7 Pro, Vista), Visio and Project (for Gantt charts and timelines), Expression (competitor to Adobe). It should be noted that ESRI Canada already supplies our Fleming GIS/GMT students with **free demo software at the ArcInfo level**. Also, AutoDesk gives our students access to a free download of Autocad Map 3D 2012 and next year we also expect PCI Geomatica (Canadian remote sensing software vendor) to supply our students with free demo software. Oracle, while not technically Open Source, is a free download for educational purposes. This access to industry standard software is a huge benefit to our students. This info is being sent to our web master Scott Ramsay to be put on the website. **1E)** Laptop Program was researched and it was decided instead that our best involvement would be by providing specifications for laptops, and providing students with demo versions of available software for installation. **Program Impacts:** Geomatics Technologist, Kevin Rabjohn, was assigned to provide advice to students, has supplied clarification of specs for laptops, and a significant amount of time is required to answer student and parent questions.**1F)** Industry is moving to a new version of AutoCAD Map 3D to 2012.**Program Impacts:** Revision of handouts for Geospatial Techniques, GMT, F&W, Forestry, ERT and GIS will be required. Small initialization batch files must be written and used the first time for each student to set up this software. **1G)** The college will be changing Operating systems (OS) from Windows XP to Windows 7.**Program Impacts:** This change from 32 bit to 64 bit OS may well be an issue in several of our GIS applications (e.g. ArcGIS). (It may also help as well, for e.g. speed up ArcGIS?)* 1. **Advisory Committee** recommendations from the past year that will affect the positioning, nature, or scope of the program.

Recent advisory meetings were held in April and November 2011, and the last advisory committee meeting centred on the tweaks and small changes to the new curriculum (from 12 month to 10 month change in 2009-2010). The next meeting is scheduled for May 2012. Our meetings are lively and well-attended by our knowledgeable and opinionated committee. Faculty would like to request time off to attend these meetings. 1.3 Information / observations generated via faculty and staff professional development, engagement in sectoral and profession associations, and involvement in community and employer networks connected to the field. The jewel in the crown of the GIS Specialist programs is the GIS Co-operative Project undertaken by groups of students during the final two semesters of the academic year (January to June). During the January to April semester, the students choose a project and write their project proposal. Supplied by the GIS industry, municipalities and government clients, Co-op projects are completed during May and June. The Co-op project course is designed to be a learning and working experience for the students where they apply the many skills they have learned. Projects that the students undertake may include data acquisition/pre-processing, database design/processing, spatial and statistical analysis, programming, web technology and cartographic presentation. Also see above. |
| **2. Curriculum Development**2.1 Curriculum changes in the last year such as changes in program positioning, course content, course / program outcomes, and delivery mode. We continue to stay current in industry trends, using industry standard software and methodologies. Currently, we are running through the third year of the new program with extensive curriculum changes. These changes were summarized in the document GIS Program Review, 2008. 2.2 Recent or anticipated initiatives that promote student pathways including high school articulations, program laddering, and university transfer / articulations.Talks are ongoing with Trent University over a new articulation agreement which sees students graduating from the GIS-AS or GIS-CS program and transferring into an **Master’s of Applied Geospatial Analysis (MAGA) program at Trent**. Approval and design of this program is underway at Trent University. Fleming GIS students would receive a full year credit toward a two-year Master’s degree and is proving very attractive to the current graduating class. 2.3 New competitor programs and/or re-positioning of existing programs.* There is always jockeying: we continue to win!
* Most recently: GIS Bachelor of Technology program is now available online starting September 2012. (<http://www.bcit.ca/study/programs/8310btech#overview>).

2.4 New or changing provincial standards, standards for accreditation, credentials, and / or industry or sector certifications over the past year. 2.5 Progress made from the last curriculum renewal initiative. Currently, we are running through the third year of the new program with extensive curriculumchanges. We are currently evaluating the sequencing and delivery of this new curriculum.(see attached GIS Course Outlines document) |
| **3. Student and Graduate Satisfaction**3.1 Key performance indicators # 4, 8, 9, and 11 (see **Appendix C** for a description of these). |
| **4. Employment Trends** 4.1 New or changing employment trends in the industry or sector. Municipal applications and employment continue to grow and employer satisfaction with our GIS Specialist grads is excellent. Many of our students are employed before they leave the program and others find related work within a few months. New software versions: ArcGIS 10, AutoCAD Map 3D 2012, MS Silverlite, Move to Open Source, Manifold, SAGA, Integrated Land and Water Information System (Ilwis), QGIS. For details, see section 1 above. 4.2 Curriculum issues / strengths that have been identified by employers pertaining to graduate job readiness.Employers continue to rank Fleming GIS-AS and CS graduates very highly, as appropriately trained and ready for the workforce. Graduate employment rates remain high and Fleming’s reputation in the GIS industry remains unequalled.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), most recently the ‘Arthur Robinson Award for Best Printed Map’ by Adam Thom (<http://www.cartogis.org/docs/map_competition/map_design_competition2010.pdf>), as well as numerous awards from the Canadian Cartographic Association and the Canadian Institute of Geomatics.  |
| **B. Curriculum Strengths and Challenges** Summarize the curriculum strengths and challenges identified by the team.  |
| **Strengths:*** Our faculty, our techs and our facilities continue to be the **best in Ontario**, and possibly Canada. We graduate more GIS Specialists than any other institution, at a lower tuition rate. Industry and university faculty send us students who want to work in the GIS field for our intense hands-on learning.
* Industry giants ESRI Canada, and California-based ESRI Inc. actively shop for our grads and have developed a scholarship in order to find our best. Ontario Ministry of Natural Resources (MNR) and other ministries and industries look to Fleming first for GIS Technicians. We continue to be the name for GIS in Canada.

**Challenges:*** Development time for new software. While this is still an issue, the new curriculum model, with reduced workloads for most of the faculty, will allow for more time. However, we still have 2 people teaching in the third semester. Ideally, we should give all faculty an opportunity for development during the May/June semester.
* Sue Mantle, long time Geomatics/GIS technologist is also retiring this spring and her presence will be missed, most especially in the Common Semester course Geospatial Techniques. This course usually has at least 500 students and its demanding Guided Learning Hour (GLH) schedule keeps our techs very busy.
* The strongest impact is in the database strand (integral to GIS Application Specialist), in particular the second semester ‘GIS Database Development’ course. Over the last five or six years, this course was taught by a variety of part time faculty, none of which delivered satisfactory results, and all of which resulted in student complaints. Finally now in Winter 2012 semester we have an ESRI Canada employee working as our contract faculty teaching this course for the second time, with better results.
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| **C. Action Plan**Identify priority actions for the next year and the rationale for their inclusion. For each, indicate the project lead, and the proposed timelines for completion.   |
| * Suggestion to hire 1 new GIS full time faculty member
* Need to identify faculty that can teach the third semester courses, so that the current faculty can have an opportunity for program or professional development. Possibilities of having fulltime faculty audit the courses next year, in order to replace the faculty in the following year.
* LKF: Explore articulation agreements with other universities over MGIS programs (e.g. through KOM consultants in Australia, or York U).
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| **D. Deferred Actions**Record any issues that will need to bemonitored, researched, or deferred for future action. |
| * None
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**Common Themes**

1. **Infrastructure Needs**

All programs indicated there is a need to update existing equipment and facilities. Several programs share equipment and with the increased use and demand for these pieces, there is extensive wear and tear on most of the equipment. The cost to repair a lot of the equipment is expensive. Storage space also continues to be an issue.

***Action:***

Continue to advocate for capital equipment and a space plan that includes a designed area to store, sign out, monitor and maintain existing equipment.

1. **Industry Support**

Various members of the Advisory Committees have requested lists of needed equipment to see if they could donate any of their surplus pieces.

***Action:***

Coordinators have to be proactive to make the requests for donations.

1. **Program Quality**

It was identified that some of the protocols and procedures used, and the supporting materials, are outdated. There is the challenge to find time to update curriculum at the same time as moving forward to adopt corporate initiatives such as blending learning. There is also a need to develop new skills around assessment and evaluation, and the use of new technology in the learning environment.

***Action:***

Faculty are making a conscious effort to ensure relevance and currency in their curriculum, but they need professional development to incorporate different learning methods. There needs to be more support for individual assistance to redesign curriculum and its assessment, to embrace the advancement of technology, and to learn how and where to use technology.

1. **Human Resources**

There has been an increased use of contract faculty, primarily due to enrollment growth, which can potentially compromise program content as the faculty may change from semester to semester. There have also been several retirements, whose specialized skill sets needs to be replaced.

***Action:***

Develop a hiring plan to replace the skill sets required as SENRS moves forward to start new programs and update existing ones. Five fulltime faculty and one full time instructor are in the approved plan for 2012/13.

1. **Articulation/Transfer Agreements**

Program coordinators continue to be active in engaging in opportunities to create articulation agreements across colleges and universities. With increased competition for a shrinking student population, and the desire of employers to have graduates with both technical, applied skills as well as advanced learning, the environment is favourable to create more pathways for learning.

***Action:***

Coordinators identify potential articulation opportunities to the Chair, who will make the connections and initiate dialogue to establish agreements. Once established, a clear visual aid for marketing these opportunities to students needs to be created.