Western Illinois University, School of Graduate Studies

Request for Post-Baccalaureate Certificate Program

Environmental GIS

College: Arts & Sciences                      Date: 3/30/07

Department responsible for the certificate program: Biological Sciences/Geography

Name of department chairperson: Richard V. Anderson/Christopher J. Sutton

Name of certificate program: Environmental GIS

Proposed date of first offering: Fall 2007

Proposed locations(s) of offering: X Macomb  X WIU-QC

Signatures required:

Department Curriculum Committee (if appropriate) Date: _________

Department Chairperson Date: _________

College Curriculum Committee (if appropriate) Date: _________

College Dean Date: _________

Graduate Council Date: _________

Academic Vice President Date: _________

President Date: _________
1. **Statement of educational objectives of the program.**

This interdisciplinary, skill-based program is designed to provide students with an understanding of how environmental data is collected, what is being reported, and how to analyze what is reported. It provides training in basic concepts at all levels of ecology from populations to landscapes and the interaction between the physical and biotic environment. The course will focus on the applications of the geographic information system (GIS) to analyze and interpret ecological data. GIS is the leading technique used in ecosystem analysis since it provides a method of integrating the physical and topographic information in a landscape with characteristics of the biotic components of the environment. It provides a method of interpreting spatial information in relation to land use. Thus it forms a template for management and restoration decisions which increase the probability of more effective land use and success in environmental restoration efforts.

2. **Statement of demonstrated need for the certificate program (market demand and/or student needs to be served).**

In the environmental field today there are few jobs beyond the technician level that do not require a background in GIS. Thus employees in areas of urban planning, industrial or urban facility and site development, agricultural management, resource development, environmental consulting companies, landscaping companies, state and federal agencies (for example Illinois Department of Natural Resources, Illinois Environmental Protection Agency, US Army Corps of Engineers, US Fish and Wildlife Service) all require their mid-level employees be familiar with the use and application of GIS to their particular missions. On-line programs and workshops in GIS focus on the mechanics of the use of GIS software. This program integrates training in GIS with training in the ecological techniques used to collect environmental data used interpretively by GIS. Thus students in this program will be better qualified to use ecological information and GIS technology for effective planning land use and restoration. Examples might include floodplain and mine land reclamation, wetland and drainage restoration, energy development such as wind-farms, natural disaster recovery programs in both urban and ecological preserves, and natural lands management.

3. **Listing of programs offered by other Illinois colleges and universities that are similar to the proposed certificate program.**

This is a unique program combining both environmental techniques and GIS at a post-baccalaureate level. There are several undergraduate programs which offer GIS training and one in Illinois, Elmhurst College, offers a certificate. Most institutions of higher education in Illinois have a GIS laboratory, usually associated with the geography department and Eastern Illinois University has an Applied Environmental Geographic Information System (AEGIS) laboratory but does not offer a certificate or degree. Approximately 17 universities outside of Illinois offer a MS or MA in GIS and another 33 offer certificates in GIS. These programs are not specifically directed at environmental issues. In Illinois there are 3 institutions which offer a MA or MS in Geography and Environmental Studies/Resources; Northeastern Illinois University, SIU – Carbondale, and U of I – Chicago but none have environmental GIS certificates.
4. **Listing of courses and credit hour requirements for the certificate program. Include course
descriptions of approved courses as well as new course proposals for any new courses to be
included in the certificate program.**

<table>
<thead>
<tr>
<th>Required Courses</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geog/Biol 426G</td>
<td></td>
</tr>
<tr>
<td>or Biol/Geog 459G – select one</td>
<td>3</td>
</tr>
<tr>
<td>Biol 584</td>
<td>3</td>
</tr>
<tr>
<td>Geog 508</td>
<td>3</td>
</tr>
<tr>
<td>Geog 509</td>
<td>3</td>
</tr>
<tr>
<td><strong>Required Hrs.</strong></td>
<td><strong>12</strong></td>
</tr>
</tbody>
</table>

Select 2 courses (1 from Biology and 1 from Geography) (6 hrs.) from the following courses:

**Biology**
- Biol 452G - 3
- Bot 451G - 3
- Zool 451G - 3

**Geography**
- Geog 403G - 3
- Geog 510 - 3

| Required hrs. | 6 |

**Total Required for Certificate** 18

**Courses:**

**Biol 584** – Advanced Ecological Techniques. Instruction on the applications of techniques and analytical methods to the evaluation and restoration of terrestrial and aquatic communities, including data analysis specific to those techniques. Includes field experience.

**Biol 452G** - Biological Applications of GIS. This course deals with biological problems examined using data acquisition and analytical methods from geographic information systems (GIS) and global positioning systems (GPS).

**Biol/Geog 459G** - Biogeography. Study of the geographical distributions of organisms, the evolutionary and ecological processes underlying the patterns of distribution, and the role of biogeography in biological conservation.


**Geog 508** – GIS and Cartographic Design. An introduction to basic cartographic principles and the application of geographic information system (GIS) tools. Students will learn theory and techniques that will be applied to project(s) associated to their discipline.

**Geog 509** - Fundamentals of GIS Analysis. An introduction to geographic information system (GIS) analysis tools. Student will learn theory and techniques that will be applied to project(s) associated to their discipline.

**Geog 510** – Environmental Impact Analysis. An examination and application of methodologies and techniques in assessing physical, economic, and social effects of development.

**Geog/Biol 426G** – Conservation and Management of Natural Resources. Problems in the conservation and management of natural resources, including soil, water, rangeland, forest, wildlife, air, and energy resources. Special attention to resource problems of the United States.

5. **Statement of how the proposed course sequence associated with the certificate will meet state educational objectives.**

The proposed post-baccalaureate certificate program will help meet several of the educational goals expressed in *The Illinois Commitment*.

Policy Area 1: Economic Growth. The proposed program will focus on transferable skills developed through multidisciplinary learning offered to students in the program. It will produce a pool of employees that will be broadly educated across areas of environmental data acquisition, interpretation, and the use and application of GIS in development of solutions to landscape management problems. It will help provide a technologically based labor force, a vital prerequisite to regional economic growth.

Policy Area 3: Access and Diversity. This program will be offered at both the Macomb WIU and Quad Cities WIU-RC campuses, thus it will be available to a wide variety of both traditional and nontraditional students from diverse social and economic backgrounds in the Quad Cities and tri-state areas. Course scheduling and method of delivery will be developed to meet the needs of the program. Since WIU is a public institution it provides an affordable opportunity (Policy Area 2) for all Illinois residence.

Policy Area 4: High Quality. The quality and rigor of this program is maintained through the quality of individual departmental offerings and requires the same level of performance by students in the program as required of departmental majors. Moreover the core courses will add to the cohesion of this interdisciplinary program by producing course products that require integration of information. Learning outcomes will be assessed through academic work products and follow-up alumni surveys.
6. **Description of the relationship between the proposed certificate program and existing degree programs at the University. How will projected enrollments in this program support, or be supported by, other programs within the University?**

Both Geography and Biology have graduate programs leading to MA and MS degree respectively. These programs are broad based academic programs that focus on general requirements of the disciplines and on research methods. The proposed certificate is a skill based program focusing on particular techniques and technology associated with environmental and landscape issues. In both Departments the courses in the certificate could be used as the elective component of the respective programs leading to a master degree in those Departments. There are no other similar programs at WIU.

7. **Description of any special features of the certificate program.**

The development of GIS skills which use biotic (plant and animal population and community information) and abiotic (nutrient levels, moisture, temperature, soil type, etc.) environmental data to solve environmental management problems is the focus of this certificate program and a special feature as noted in item 3 above.

8. **Statement indicating whether the inclusion of this certificate program in the department’s curriculum will necessitate the hiring of new faculty or if it can be taught by existing staff. In the latter case, indicate how a teaching load is to be redistributed to accommodate the new offering.**

Courses for this certificate will be taught by existing staff who are currently teaching courses included in the certificate. The anticipated additional enrollment as a result of students in the certificate program is not expected to exceed enrollment capabilities of these courses.

9. **Description of any special space requirements such as laboratories, clinics, or other special facilities needed to permit effective teaching of the certificate program.**

The courses that are included in this certificate are currently being taught and no additional space or facilities will be needed for the certificate program.

10. **Listing of journals or other library resource needed to permit effective teaching of the certificate program.**

Professional scientific journals or access through interlibrary loan to these professional journals, current books on ecological techniques, environmental topics, and applications of GIS, films or videos that illustrate the biota of particular habitats or ecological principles will be used in the course. Additional resources will be purchased with the Department's annual library purchase budget.
11. **Description of any special equipment that will be necessary to permit effective delivery of the certificate program.**

The courses are currently being taught and all necessary equipment is available. There is currently a site license for the necessary GIS software, maintenance of that site license will be required in the certificate program.