



PROCESS A NON-GENERAL EDUCATION ~ CURRICULUM PROPOSAL SCC #03-04- 718

Deadlines

October 3, 2003 to be implemented Fall 2004 ~ February 13, 2004 to be implemented Spring 2005

PROPOSAL TITLE: Geographic Information Systems (GIS) Topics and Applications

Sponsor(s): John Hasse E-Mail: hasse@rowan.edu Ext: 3977

Richard Scott E-Mail: scott@rowan.edu Ext: 3980

DEPARTMENT: Geography and Anthropology

COLLEGE: Liberal Arts and Sciences

If Liberal Arts & Sciences CHECK : History/Humanities Math/Sciences Social/Behavioral Sciences

UNDERGRADUATE GRADUATE

THE ATTACHED **NON-GEN-ED** PROPOSAL IS BEST DESCRIBED BY THE ITEM(s) CHECKED

- New non-gen-ed course
- Short-term non-gen-ed course
- Minor curricular changes (fewer than three) to:
 - Existing non-gen-ed course
 - Non-gen-ed degree requirements
 - Major
 - Minor, specialization, concentration, track, certificate program

THE FOLLOWING SIGNATURES REPRESENT APPROVAL

Department Chair: [Signature] Date: 20 Oct 2003
 Department Curriculum Chair: [Signature] Date: 10-23-03
 Academic Dean: [Signature] Date: 12/11/03

COLLEGE CURRICULUM COMMITTEE

OPEN HEARING Date: 3-25-2004 Approved Not Approved

COLLEGE CURRICULUM CHAIR: _____

Senate Curriculum Chair Signature: [Signature] Date: Senate Announcement 6-29-2004

Comments: _____

EXECUTIVE VICE PRESIDENT/PROVOST Signature: [Signature] Date: 8/30/04

Approved Not Approved

REGISTRAR

Date: 9/7/04 Course Description Received & Approved ~ Hegis Taxonomy & Course #: 2206555

Registrar Signature: [Signature]

NOTIFICATION FORWARD

- SCC Chair
- Academic Dean
- Department Chair
- Registrar
- IR
- CAP
- VP Student Affairs
- Others

Trans. 9/15/04
[Signature]

Course Proposal:

1. Details:

- a) Course Title: **Geographic Information Systems (GIS) Topics and Applications**
- b) Sponsors: Dr. John Hasse x3977 and Dr. Richard Scott x3980
- c) Credit Hours: 3 credit hours
- d) Course Level: Graduate, (2206.5xx)
- e) Prerequisites: Introduction to Mapping and Geographic Information Science (2206.193), prerequisite or co-requisite or permission of instructor.
- f) Suggested Time: One section during spring semesters, offered in conjunction with undergraduate GIS II (2206.415), starting Spring semester, 2005
- g) Curricular Effect: Elective course for graduate students including civil engineering. Since it will be held simultaneously with the undergraduate GIS II (2206.415) there will be no negative curricular effect on the current GIS offerings.
- h) Resources
- Faculty: Existing faculty can teach this course.
 - Library: Library resources are adequate.
 - Equipment: Existing laboratory facilities and equipment will be used for this course.
 - Computers: Computer laboratory access will be required. Rowan's current license for 37 seats of ArcGIS software is adequate.
- i) Library Resources: Library acquisitions are sufficient.

*We don't use
undergrad
prereqs on
grad
courses
Use
PIN -SK*

2. Rationale:

The proposed course is intended to expand the curricular options for graduate students interested in geographic information systems and science (GIS and GISci). GIS is rapidly expanding in development and application across multiple fields and disciplines. Rowan's GIS offerings coordinated over the past decade by Dr. Richard Scott have developed into the top undergraduate GIS certificate program in the region. With the addition of Dr. John Hasse to department of Geography and Anthropology, the capabilities for GIS instruction have expanded.

Recently, there has been a surge of interest in GIS courses requested by graduate students. Since graduate students can only take a limited number of undergraduate credits, they are prevented from taking multiple courses offered in the Rowan GIS sequence. This graduate-level GIS course is designed to provide graduate students the opportunity to broaden their GIS training and application. The course will be offered simultaneously with the undergraduate course GIS II (2206.414) [formerly titled "Advanced GIS"] every spring semester. By offering the course

concurrently with GIS II, the need for additional instructional and computer lab resources for a new course are minimized. While the material and topics of the undergraduate and graduate courses will be coordinated and integrated, the Graduate students will have their own appropriate requirements and systems of evaluation. For example, graduate students will be required to propose and conduct a graduate-level research project and write a substantial research paper.

3. Essence of the Course

a) Objectives:

Upon completion of the course, students will be able to apply advanced GIS skills and techniques to a multitude of problem-solving objectives. The skills and knowledge developed throughout the course include:

- Geospatial Analysis
- Geospatial Data Structures and Models
- Principles of Geospatial Problems Solving
- Geospatial Theory
 - -Tobler's Law
 - -Spatial Autocorrelation
 - -Modifiable Area Unit Problem
 - -Surface Interpolation Approaches
- Geospatial Problem Solving
- Environmental Applications of GIS

The course develops an in-depth knowledge of the inner workings of GIS by exploring a sample of raster and vector mode cartographic data structures, and by examining the workings of computational algorithms used in GIS analysis. Finally, the course treats more advanced analysis techniques. Students learn the workings of GIS through lectures, demonstrations, computer laboratory sessions and a final project developed over the course of the semester.

b) Topical Outline:

The topical outline of the course may vary to some extent depending on the interests of the instructor and the students, and on advances in GIS technology. The topics initially planned include the following:

TOPICS

- Overview and discussion of GI Systems and Science
- Representing Geography, Geo-referencing, Mapping, Spatial data
- Geographic Data, Uncertainty, Generalization, Metadata
- Digital Models for Geographic Data: Raster, Vector, Object-oriented, Geodataset, Topology

- Data Input: Remote Sensing, GPS, CAD-conversion, Data transformations
- Data Capture: Tablet & Heads-up digitizing, Database structure
- Data Manipulation & Analysis: Geoprocessing, and Data Analysis
- Algorithms, Advanced Analysis
- Researching, Developing and Presenting a GIS Project:
- Selected discussion

c) Evaluation and Grading Procedure of Students:

Student grades will be based on individual and/or group examinations, individual homework, a graduate-level research project incorporating a substantial level of geospatial analysis, a written report and project presentations.

d) Course Evaluation:

The proposed course will be assessed based on student evaluations and curriculum review by geography and engineering faculty.

4. Results of Consultations:

The proposed course is derived from an existing undergraduate course entitled “Geographic Information Systems II” (2206.415) [formerly titled "Advanced GIS"], which is part of the current Geography Curriculum approved by the University Senate. Consultations with the Department of Civil Engineering are attached.

Catalog Description:

Geographic Information Systems (GIS) Topics and Applications (2206.5xx) 3 s.h.

Prerequisites: Introduction to Mapping and GIS (2206.193), prerequisite or co-requisite or permission of instructor.

Geographic Information Systems Topics and Applications provides an extended exploration into Geospatial science and analysis at the graduate level. Students develop advanced GIS skills through a project-based approach culminating in a final project and presentation. The course deepens the understanding Raster and vector data structures as well as the ability to work with computational algorithms used in GIS analysis. Students learn through lectures, demonstrations, computer laboratory sessions and an intensive project. Students are evaluated by their performance on examinations and a project paper and presentation.



Civil and Environmental Engineering

To: Drs. John Hasse & Richard Scott, Department of Geography & Anthropology

From: Dr. Joseph Orlins, Civil and Environmental Engineering
Dr. Ralph A. Dusseau, Professor and Chair, Civil and Environmental Engineering

Date: October 2, 2003

Re: Curriculum Proposal for Graduate GIS Course

The Civil and Environmental Engineering Program within the College of Engineering at Rowan University has reviewed the graduate-level course proposal entitled "Geographic Information Systems (GIS) Topics and Applications."

Geographers, planners, engineers, and natural resource specialists use geographic Information Systems. Many students in the Civil and Environmental Engineering program currently take Introduction to GIS (2206.360) as an undergraduate technical elective. When these students enter our MS degree program in Engineering, it is often desirable to increase their knowledge and skills in Geographic Information Systems.

For students in our program with no prior GIS background, they will be able to take Introduction to GIS (2206.360) for graduate credit, and then the new graduate-level course proposed here. This will allow these students with no prior GIS experience to gain an in-depth knowledge over the course of two semesters, and have it count towards their graduate degree.

Thus, the graduate-level course offering in GIS will be beneficial to both sets of students in terms of curricular offerings and in meeting graduation requirements.

The Civil and Environmental Engineering program requested that the Department of Geography and Anthropology develop a graduate-level GIS course such as the one outlined, and thus strongly endorses and supports this course proposal.

Rowan University
CURRICULUM PROPOSAL
LIBRARY RESOURCE FORM

The purpose of this form is to provide a channel of communication between the library and faculty changing and designing new courses/programs. The information will be used to assess the resources available in the library, and to identify resources the library should acquire to support the course/program. The information will also provide rationale for institutional support for library acquisitions.

This form should be completed in a coordinated effort between the course sponsor(s) and the academic department liaison librarian. **THIS FORM MUST BE COMPLETED FOR ALL CURRICULUM PROPOSALS.**

- The sponsor(s) complete parts A & B
 If assistance is required to complete parts A & B, please notify the liaison librarian.
- Forward this form to the librarian who will complete parts C, D & E

This form must be completed and attached to the original curriculum proposal before being approved by the Senate Curriculum Committee

A. College Liberal Arts & Sciences Department Geography and Anthropology
 Proposed by: Dr. John Husse Date: September 30, 2003
 Course Title: GIS Topics and Applications
 Anticipated Date for Course/Program Offering: _____

B. List specific resources that should be acquired to support this course.

Current Holdings are sufficient.

C. Describe the resources available in the library to support this course/program, including reference, monographic, electronic databases, audio-visual materials, etc. A summary statement is sufficient.

Since there have been a number of GIS-related courses developed at Rowan in the past 10 yrs, library acquisitions have occurred over this time. However, since this is a rapidly changing field new resources may be necessary in the future.

D. List key periodicals available in the library to support this course/program.

Annals of the AAAG, Journal of Geographical Systems, International Journal of GI Science.

E. Librarian comments and recommendations:

Name: LIBRARIAN LIAISON Ella N. Strathis Librarian Signature: Ella N. Strathis