THE UNIVERSITY SENATE OF MICHIGAN TECHNOLOGICAL UNIVERSITY

Proposal 23-08

"CERTIFICATE IN GEOGRAPHIC INFORMATION SYSTEMS"
(Undergraduate Certificate)

Voting Units: Academic

Introduction

This proposal recommends establishing an undergraduate certificate entitled "Certificate in Geographic Information Systems". Courses contributing to this certificate are currently offered by the School of Forest Resources and Environmental Science, School of Technology (Surveying Engineering), the Department of Geological and Mining Engineering and Sciences and the Department of Mathematics. Students completing this certificate will have established a set of core competencies in geographic information systems with an emphasis on quantitative analysis.

I. Title of Certificate
Certificate in Geographic Information Systems

II. Catalog Description
A Certificate in Geographic Information Systems(GIS) provides the student with the fundamental skills and knowledge needed to understand and work with geographic information systems and spatial data in a broad range of applications such as natural resource management, environmental engineering, natural hazards mapping, industrial archeology and transportation networks to name a few.

III. Rationale
The US Department of Labor has predicted that jobs utilizing geographic information systems technology in various fields will increase by 20% by 2015. Currently, there is a shortage of qualified personnel to fill these open positions, particularly those with a strong quantitative background. Furthermore, the worldwide market for geographic information systems technologies has enormous potential. Estimated at $5 billion in 2001, the market is expected to have annual revenues of $70 Billion by 2015

This Certificate program is designed, in consultation with employers both government and private, to train students in the theory, knowledge and use of GIS and its utilization in a wide range of applications.

IV. List of Courses (Total Credits required- 16 minimum)
Required Courses (10 Credits)

FW3540- Geographic Information Systems for Natural Resource Management (4 credits) OR
FW5550 Geographic Information Systems for Resource Management (4 credits)

FW4540- Environmental Remote Sensing (3 credits)
OR
GE4250 Fundamentals of Remote Sensing (3credits)
FW4551Digital Cartography and Mapping (3 credits)

Choose 6 or more credits from this list

FW3170 Land Measurements and GPS (1 credit)
FW4170 GPS Field Techniques (1 credit)
FW5560 Digital Image Processing: A Remote Sensing Perspective (4 credits)
GE4150 Natural Hazards (3 credits)

SU2000 Introduction to Surveying and GIS (2 credits)
SU3150 Principles of Geodesy (3 credits)
SU4140 Photogrammetry (3 credits)

Prerequisites for courses listed above

FW5550- senior or graduate student, basic statistics course
FW5560- senior or graduate student, FW4540 or GE4250
SU4140- SU3110 or permission of instructor

V. New Course descriptions

All courses except FW4170 and FW4551 are currently being taught. FW4170 is a new course and will be taught for the first time spring intersession as a Special Topics. This course and FW 4551 are being developed with internal resources in the School of Forest Resources and Environmental Sciences and will enter the binder process this fall.

FW 4551 Course Description

Cartography is the art and science of map making. In this course, the map making process, map projections, finding and compiling spatial data, typography, map symbols, map design, color choice, and map production are covered in a GIS context. The map as a method of communication is emphasized. Raster and vector GIS data are used. Ethical issues involved in the map making process are addressed. You will learn principles for creating appealing maps that effectively communicate information to your audience. By the end of the semester you should be able to produce maps for presentations, theses, reports, web pages, or journal articles.

VI. Library and other Learning Resources

No new library resources will be needed for this certificate..

VII. Computing Access Fee

Students enrolled in this Certificate will be charged the same fees and follow the same policies as those of their home department.

VIII. Faculty Resumes

(see attached) Ann Maclean and Mike Hyslop will be overseeing the program.

IX. Needed equipment

No special equipment is needed for this program

X. Program Costs

No additional costs are anticipated

XI. Space

No additional space is needed

XII. Policies, Regulations, and Rules

There will be no additional policies, regulations, or rules for this program beyond those existing for undergraduate certificates.

XIII. Accreditation Requirements

None

XIV. Internal Status of the proposal

Approved by the School of Forest Resources and Environmental Science

XV. Planned Implementation Date

As soon as approved.

Introduced to Senate: 19 March 2008
Adopted by Senate: 2 April 2008
Approved by Administration: 7 April 2008