

## **Course Descriptions**

### **GEO 308/GEO 608 GIS Applications I**

Students are introduced to vector-based geographical information system (GIS). Topics include overviews of geospatial technologies, spatial analysis, GIS data, system operation, the interpretation of results, and professional practices. The course comprises a weekly lecture and laboratory. Students are evaluated with tests, laboratory assignments, and on the basis of a substantial project. Prerequisite: one of the following: ESP/GEO 108, GEO 208, GEO 305, GEY 202, GEY 204, GEO/GEY 340 or permission of instructor. Credits: 4 (3 as GEO 608)

### **GEO 408/GEO 618 GIS Applications II**

Students explore the use of geographic information systems (GIS) in research and professional environments. Building upon knowledge and skills developed in GEO 308, students design and execute a substantial project. Project design focuses on generating hypotheses, planning time lines and individual work assignments, and identifying technical and data resources. Project execution is undertaken using a variety of raster, vector, and graphical user interface (GUI) software, as appropriate. Prerequisite: GEO 308 or permission of instructor. Cr: 4 (3 as GEO 618)

### **GEO 458/GEO 658 Research Applications in GIS**

An advanced workshop in geographic information systems in which students undertake an original GIS research project. The objective of the course is to generate a product which meets professional standards for publication or presentation at a professional meeting, allowing students to build resumes and gain exposure to a professional audience. Prerequisite: GEO 308. Cr: 3

### **GEO 305/GEO 605 Remote Sensing**

Theory and techniques of image processing and analysis for remotely sensed digital data acquired from airplane and satellite platforms. Topics include image enhancement and classifications, spectral analysis, and landscape change detection techniques. Practical applications of natural and built landscapes are considered using remotely sensed datasets and techniques. Prerequisites: GEO 108 or equivalent or permission of instructor. Cr: 3

### **GEO 448 GIS Internship**

Students work with a public agency, private firm, municipality, non-profit organization, or researcher using geospatial technology to complete a clearly defined project. At the course's conclusion, students submit a portfolio including a log, samples of the work completed, and an evaluation from the on-site supervisor. Prerequisite: GEO 305 or GEO 308 and instructor permission. Cr:3

### **CPD 625 Community Planning Analysis and Land Use Modeling**

Introduction to estimating and projecting the demand for land, housing, and public space for long-range land use planning; developing future growth scenarios at the town and regional scale; and using GIS tools such as buildout calculators and planning support systems to organize and visualize these analyses. Prerequisites: GIS course and CPD 660 or CPD 661 or instructor permission. Cr: 3

### **GEO 340/GEY 340 Digital Mapping**

Students are exposed to the latest digital survey gear and integrated techniques with applications in geoscience, geography, and environmental science. Instrumentation includes both static and real-time kinematic GPS and autolock servo-driven electronic total station. Detailed precision survey data are combined with geo-referenced maps and imagery in GIS software. Prerequisites: introductory course in GEY, GEO, or ESP, and additional 200-level course in any of the above areas. Cr: 4

### **COS 141 Visual Basic I**

Visual Basic is used to introduce students to the fundamental skills of problem solving and programming. The class includes both classroom presentation and instructor-guided laboratory sessions. Small to medium size programming projects are completed. Prerequisite: a working knowledge of the Windows operating system. Cr: 3

### **COS 160 Structured Problem Solving: Java**

An introduction to the use of digital computers for problem solving, employing the Java programming language as a vehicle. Content includes elementary control structures and data representation methods provided by Java and the top-down programming methodology. Course requirements include a substantial number of programming projects. This course must be taken concurrently with COS 170. Prerequisite: successful completion of the USM mathematics proficiency requirement. Cr: 3

### **COS 170 Structured Programming Laboratory**

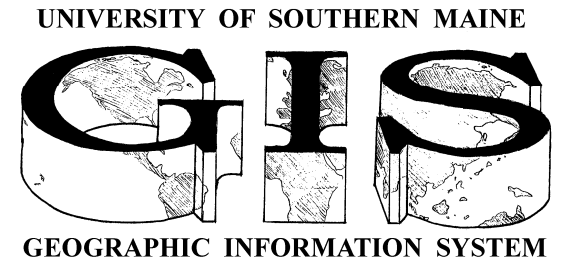
Computational experiments will be designed to teach students how to construct reliable software using Java. Topics to be covered include: Windows system, conditional program flow, iteration, procedures and functions, and symbolic debugging. This course must be taken concurrently with COS 160. Cr: 1

### **ITT 282 Computer-Aided Design**

An introduction to computer-aided design systems and their relationship to design, drafting, production, and documentation processes. Emphasis is on understanding and utilizing computer-aided design (CAD) hardware and software. The course focuses on basic 2D and 3D functions as they generally apply to computer-aided design applications. Lecture and lab. Prerequisites: computer proficiency and interpretation of technical drawings. Prerequisite: ITT 181 or instructor permission. Cr: 3

### **ITT 384 Advanced Computer-Aided Design**

An advanced computer-aided design course focusing on three-dimensional modeling, image rendering, and animation. Emphasis is on understanding and utilizing current and emerging computer-aided and design hardware and software to present designs, products, and processes effectively. The course emphasizes basic concepts of three-dimensional model creation and use. Prerequisite: ITT 282 or instructor permission. Cr: 3



## **Certificate in Applied GIS**

**Department of Geography-  
Anthropology**

**302, 303, 304 Bailey Hall  
Gorham, ME 04038**

**(207) 780-5063**

<http://www.usm.maine.edu/gis>

## Overview

The Certificate in Applied Geographic Information Systems (GIS) is designed to provide students and members of the professional community with GIS skills. At all levels of the program, training focuses on the application of GIS skills in the workplace and in research environments.

All courses will be taught at USM. Select courses may be transferred from other UMaine System Campuses. Students may be matriculated or non-matriculated. Students may successfully complete all courses with a grade of C- or better. Geography-Anthropology majors may use only one course in the Certificate towards their major requirements.

## Who benefits from the Certificate?

- Undergraduates and graduates in USM degree programs interested in developing GIS applications in their fields
- Individuals holding degrees who are interested in developing GIS skills to apply to their own areas of expertise
- Professionals interested in retooling for a career change.

## Who do I contact?

To register for the GIS Certificate Program or for more information on the program, courses, or GIS in general:

GIS Lab, 302 Bailey Hall, Gorham, ME 04038  
<http://www.usm.maine.edu/gis>  
[gislab@usm.maine.edu](mailto:gislab@usm.maine.edu)  
(207) 780-5063

For more information on registering for classes, costs, and payment:

Registrar, 113 Corthell Hall, Gorham, ME 04038  
<http://www.usm.maine.edu/reg/>  
[usmregi@usm.maine.edu](mailto:usmregi@usm.maine.edu)  
(207) 780-5230

## What courses do I need to take?

The Certificate consists of three required courses and two electives, totaling a minimum of 17 undergraduate credits or 15 graduate credits.

The required courses are available for both undergraduate and graduate credit and must be taken in consecutive order. Electives may be taken before, concurrent with, or after the required courses.

### **Required Courses:**

<b>GIS Applications I and Laboratory</b>	GEO308, GEO608
<b>GIS Applications II</b>	GEO408, GEO618
<b>Research Applications in GIS</b>	GEO458, GEO658

### **Electives:**

<b>Community Planning Analysis and Land Use Modeling</b>	CPD 625
<b>Visual Basic I</b>	COS 141
<b>Structured Problem Solving: Java **</b>	COS 160
<b>Structured Programmed: Java **</b>	COS 170
<b>Remote Sensing</b>	GEO 305, GEO 605
<b>Digital Mapping</b>	GEO 340, GEY 340
<b>GIS Internship</b>	GEO 448
<b>Computer Aided Design</b>	ITT 282
<b>Advanced Computer Aided Design</b>	ITT 384

\*\* must be taken together

## How long does it take to earn a GIS Certificate?

Since the three required courses must be taken in consecutive order, the minimum time for completion is three semesters. In most situations, it takes 2 years, or four semesters.

## How much does it cost?

### **Tuition \* (per credit hour)**

	In-State	Out-of-State
Undergraduate	\$231	\$638
Graduate	\$347	\$985

### **Unified Fee \***

Per credit hour	\$26
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### **Student Activity Fee \***

1.0 – 5.5 credit hours	\$18
6.0 - 11.5 credit hours	\$35
12.0 or more credit hours	\$52
Lewiston Auburn College	\$1.50/credit hour
Bath-Brunswick Center	\$1.50/credit hour
Saco-Sanford Center	\$1.50/credit hour

### **Transportation Fee \***

0.5 - 5.5 credit hours	\$50
6.0 - 11.5 credit hours	\$75
12.0 or more credit hours	\$100

### **Student Health Fee \***

6.0 or more credit hours	\$80
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### **Course Fees \***

To defray the costs associated with some courses, additional fees ranging from \$50 to \$100 are assessed. These fees are associated with courses requiring additional instructional resources.

\* Fees listed are based on the 2009-2010 Academic Year

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