GEOG 377 Introduction to Geographic Information Systems

(Course syllabus, Fall 2014)

Instructor: Chaoyi Chang
Office: Rm460 Science Hall
E-mail: cchang45@wisc.edu
Office Hours: Fri: 1pm – 5pm

Lecture hours & location:
Tue & Thu 4:00 - 5:15pm, Rm180 Science Hall

Lab hours & Location:
Section 301: Mon 9:55am – 11:55am, Rm380 Science Hall
Section 302: Mon 6 - 8pm, Rm380 Science Hall
Section 303: Tue 6 - 8pm, Rm380 Science Hall
Section 304: Fri 9:55am – 11:55am, Rm380 Science Hall

Recommended Text:

Description:
Geographic Information System (GIS) deals with the analysis and management of geographic information. This course offers an introduction to methods of managing and processing geographic information. Emphasis will be placed on the nature of geographic information, data models and structures for geographic information, geographic data input, data manipulation and data storage, spatial analytic and modeling techniques, and error analysis.

The course is made of two components: lectures and labs. In the lectures, the conceptual elements of the above topics will be discussed. The labs are designed in such a way that students will gain first-hand experience in data input, data management, data analyses, and result presentation in a geographical information system.

Students must be clear that this is not a class specifically on any particular GIS software. It is a course on the underlying theory and concepts in GIS. The understanding of these concepts and theories will help you to perform spatial analysis in a GIS system properly and efficiently.
**Goals:**

In general, this is an ice-breaking course into GIS and serves as the foundation course for other advanced courses in GIS. The basic objectives of this course for students are:

1. To understand the basic structures, concepts, and theories of GIS
2. To gain a hand-on experience with a variety of GIS operations

**Pre-requisites:**

Introductory courses in environmental or mapping sciences or instructor consent.

**Computing Environment and Software:**

ArcGIS 10.2 will be used for class assignments to illustrate the practical use of certain geographic information processing concepts and techniques.

**Evaluation:**

To meet the new requirements of graduate school toward graduate program, this class evaluates graduate students and undergraduate students separately. For undergraduate students, the evaluation includes four components listed below, adding up to 100% in total. A grading policy for undergraduate students has been announced in the beginning of the semester. For graduate students, the evaluation includes five components, of which four are listed below. An additional component (5%) as class presentation is listed separately solely for the graduate students. And a separate grading policy for graduate students has been announced in September 16th class.

**Components:**

- Lab exercises ..........................35%
- Exam I .................................30%
- Exam II .................................30%
- Quiz (in class) ......................... 5%

**Class presentation (graduate student only):**

Graduate students need to review a journal article (or multiple articles) that involves GIS concepts, theories, or applications. An article in your discipline is preferred for you to review, for the reason that it would help you to think how to apply GIS in your work in the future.

The presentation will be on December 4th and/or December 9th. To present your reviewed article, you need to prepare five to eight slides in the format of PowerPoint, which would take approximately five to six minutes to present. In your slides, one of them would be how GIS is helpful in the article. Then you will have one or two minutes to answer the questions raised by the audience. All undergraduate students will evaluate the clarity of your presentation. And other graduate students and TAs will evaluate the academic merits of your presentation.

Please keep two important dates in mind. Please send me the article (or articles) that you are going to review to me by November 20th, and please send me your PowerPoint slides by December 3rd. If you have any questions about selecting articles that you would like to review and present, please feel free to email me or come to my office hour.
Grading Policy:

Grades of exercises and exams are based on:

1) Academic merit of your answers to the questions;
2) Conciseness of answers;
3) Organization of your answers.

Other important issues

The two exams will be held on **October 23rd** and **December 16th** respectively during our regular class time, which are not the time listed under learn@uw. We offer a complimentary time for each exam, in case of conflicting schedule. If you cannot take either exam in the regular time, please directly notify me via email in *one week* advance. We are not able to accommodate if you give me a short notice.

In addition, we will have in-class quiz at unannounced time point once in two weeks, starting from the second week. The quiz will be three to five questions only, either in true/false format or multiple choices. By the end of the semester, we will count the highest five scores toward your final grade. However, if you miss any quiz without notice in advance, we will directly deduct 1% from your final grade until all 5% quiz points have been deducted, however well you managed for the other quiz.

Course Overview:

Course Schedule:

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Oct 16th  Review for Exam 1

Oct 21st  Lec 14 GIS Software and WebGIS

Oct 23rd  Exam 1: 75 min

Oct 28th  Lec 15 Data Analysis:
          Measurement & Connectivity

Oct 30th  Lec 16 Data Analysis:
          Interpolation

Nov. 4th   Lec 17 Data Analysis:
          Digital Terrain Analysis

Nov. 6th   Lec 18 Data Analysis:
          Statistical Operations & Point Pattern Analysis

Nov. 11th  Lec 19 Data Analysis:
          Classification

Nov. 13th  Lec 20 Data Analysis:
          GIS-based Modeling and Spatial Overlay (I)

Nov. 18th  Lec 21 Data Analysis:
          GIS-based Modeling and Spatial Overlay (II)

Nov. 20th  Lec 22 Data Analysis: Summary
          Uncertainty

Nov. 25th  Lec 23 Geo-representation & Geo-presentation
          GeoVisualization

Dec. 2nd   Lec 24 Spatial Modeling with GIS:
          Application in Physical Geography

Dec. 4th   Lec 25 Spatial Modeling with GIS:
          Application in Human Geography
Dec. 9th

Lec 26 Establishing a GIS site

Dec. 11th

Review for Exam II

Dec. 16th

Exam II: 75 min

Examinations:

Exam 1: Oct 23rd, Thursday, 4pm – 5:15pm Rm 180 Science Hall

Exam 2: Dec 16th, Tuesday, 4pm – 5:15pm Rm 180 Science Hall