

ENGG*3340*01: GIS IN ENVIRONMENTAL ENGINEERING

SCHOOL OF ENGINEERING, UNIVERSITY OF GUELPH

FALL 2012

COURSE DESCRIPTION

This course provides basic-level knowledge of Geographic Information System (GIS) principles, techniques and practice in environmental/water resources engineering and natural resources management. In this course students will learn about data sources, visualization, query, analysis, and integration using “ESRI ArcGIS 10” which is a popular desktop GIS and mapping software.

INSTRUCTOR

Jana Levison, PhD, EIT

Assistant Professor, School of Engineering

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<http://www.uoguelph.ca/engineering/jana-levison-phd-eit>

Office hours: You are welcome to visit my office at your convenience and/or send me an email to book an appointment.

TEACHING ASSISTANT

Emma Garden

egarden@uoguelph.ca

Office hours: To be determined

SCHEDULE

Wednesday, 7:00 PM - 9:50 PM, THRN 2313

The classes will generally have an introductory lecture on the topic followed by a tutorial session based on the textbook content. Since practice is of great importance in learning GIS skills, and specific software is required, regular attendance is emphasized.

REQUIRED TEXTBOOK

Maribeth Price. 2011. Mastering ArcGIS 5th Edition. McGraw-Hill, ISBN 978-0077462956.

LEARNING OUTCOMES

- Knowledge of the basic GIS structure and functions;
- Understanding data structuring and application program development;
- Familiarity with data input, display and analysis;
- Learning about various applications of GIS in environmental and water resources engineering as well as natural resource management projects; and
- Developing expertise for effective use of a GIS software package to build geographical information systems.

TOPICS OF STUDY

Date	Topic to be covered (subject to adjustment) * <u>Course deliverables</u>
September 12, 2012	Introduction to GIS Term project introduction
September 19, 2012	Mapping and presenting GIS data * <u>Term project groups must be formed</u> (one student in each formed group to submit a list of group member names using Dropbox on CourseLink)
September 26, 2012	Data Resource Centre introduction Term project work period
October 3, 2012	GIS data and coordinate systems * <u>Term project proposal due</u> (one electronic copy per group submitted using Dropbox on CourseLink)
October 10, 2012	Map overlay and geoprocessing
October 17, 2012	Queries and spatial joins
October 24, 2012	ArcGIS Spatial Analyst
October 31, 2012	ArcGIS 3D Analyst
November 7, 2012	Network analysis
November 14, 2012	Editing
November 21, 2012	* <u>By 5 pm, every group to submit an electronic copy of their presentation file using Dropbox on CourseLink</u> * <u>Term project presentations: groups 1, 2, 3, 4, 5, 6</u>
November 23, 2012	* <u>Term project report due</u> (by noon, one hard copy and one electronic copy [on CD or DVD] of report and associated files submitted to instructor in THRN 2401, plus one electronic copy of report submitted using Dropbox on CourseLink)
November 28, 2012	* <u>Term project presentations: groups 7, 8, 9, 10, 11, 12, 13</u>
November 29, 2012	* <u>Peer/self-evaluation due</u> (each student to submit an electronic copy using Dropbox on CourseLink)
December 11, 2012	* <u>Final exam: 2:30-4:30 (Room TBA)</u>

TERM PROJECT PROPOSAL, REPORT AND PRESENTATION

Students will form groups of 4 and assume the identity of an engineering firm conducting a project for a client. The groups should be formed no later than **September 19, 2012** (one student in each formed group to submit a list of group member names using Dropbox on CourseLink). Each group will create and define their project topic and scope. Summaries of past projects and other GIS example projects (for inspiration, not duplication) are available on CourseLink.

Project proposals (length: 2 pages) are due by **October 3, 2012** (one electronic copy per group submitted using Dropbox on CourseLink). The proposal must include a description of the project and a detailed work plan. Contribution of each member of the group must be identified. Data types and sources to be used must be listed in the proposal.

The main tasks of the term project will include project definition and objectives, background literature review, data collection, analysis, reporting, and presentation. The term project report is due by **noon on November 23, 2012** (one hard copy and one electronic copy [on CD or DVD] of report and associated files submitted to instructor in THRN 2401, plus one electronic copy of report submitted using Dropbox on CourseLink). Evaluation of the term project report will be based on:

- The idea and topic (novel, genuine, applied, essential, clear objectives)
- Cover material (title page, executive summary, table of contents, list of figures, list of tables)
- Introduction (purpose/motivation, background, scope of work, available data)
- Content (provides specific, accurate, precise information)
- Organization (individual paragraphs integrate smoothly into the overall report)
- Writing (grammar, spelling, completeness, clarity, conciseness, and consistency)
- Professional appearance (high quality of text, figures and tables presented)
- Data (use of a variety of sources appropriate to the project)
- Analysis (use of a variety of ArcGIS functions and extensions)
- Results (clarity and accuracy of interpretation and discussion of the results)
- Conclusion (clarity of expression and understanding of concepts)
- Recommendations
- References (complete and properly formatted)

The projects will be presented, using PowerPoint, to the class by all group members. The presentation length is 16 minutes, plus 4 minutes for questions from classmates, the TA and the instructor. The presentation dates are **November 21** (groups 1, 2, 3, 4, 5, and 6) and **November 28** (groups 7, 8, 9, 10, 11, 12, and 13). For fairness, the group numbers, and hence presentation dates, will be assigned randomly. Copies of all presentation files must be submitted using Dropbox on CourseLink by **5 pm on November 21, 2012**.

The project peer/self-evaluation of group performance will be carried out according to instructions to be provided by the instructor. This confidential evaluation is due by **November 29, 2012** (*each student to submit an electronic copy using Dropbox on CourseLink*).

EVALUATION

The final grade will be determined from the results of the project proposal, project presentation, project report, peer/self-evaluation and final exam weighted as follows:

- Term project proposal: 10%
- Term project report: 35%
- Term project presentation: 10%
- Term project peer/self-evaluation: 5%
- Final exam: 40%

Late submissions will be penalized by 20% per day.

COURSELINK

The course material can be accessed on Courselink, and course deliverables will be submitted using the Dropbox function: <https://courselink.uoguelph.ca/shared/login/login.html>

Please Note: The Regulations concerning Academic Misconduct as outlined in the University of Guelph, Undergraduate Calendar for 2012-2013 will be strictly enforced.

Disclaimer: The instructor reserves the right to change any or all of the above in the event of appropriate circumstances, subject to the University of Guelph Academic Regulations.