The University Of Toledo

New Graduate Course Proposal

*denotes required fields

1. College*:   Coll Nat Sci and Mathematics

   Department*:   Environmental Sciences

2. Contact Person*: Richard Becker   Phone: 530-4571   (xxx-xxxx)   Email:
   richard.becker@utoledo.edu

3. Alpha/Numeric Code (Subject area - number)*: EES   - 5480

4. Proposed title*: GIS Applications in En

   Proposed effective term*: 201340   (e.g. 201140 for 2011 Fall)

5. Is the course cross-listed with another academic unit?   ○ Yes   ◉ No

   Approval of other academic unit (signature and title)

   Is the course offered at more than one level?   ◉ Yes   ○ No

   If yes, an undergraduate course proposal form must also be submitted. If the undergraduate course is new, complete the New Undergraduate Course Proposal; if the undergraduate course is existing, submit an Undergraduate Course Modification Proposal.

6. Credit hours*:   Fixed: 3   or   Variable:
                                to

7. Delivery Mode:

	Primary*	Secondary	Tertiary
a. Activity Type *	Lecture	Regular Lab	--SelectType--
b. Minimum Credit Hours *	3		
Maximum Credit Hours *	3		
c. Weekly Contact Hours *	2	2	

8. Terms offered: ☑ Fall   ☐ Spring   ☐ Summer

Years offered: ⦾ **Every Year**   ⦿ **Alternate Years**

9. Are students permitted to register for more than one section during a term?   ⦿ No   ⦾ Yes

   May the courses be repeated for credit?   ⦿ No ⦾ Yes   Maximum Hours

10. Grading System*:
   - ⦿ Normal Grading (A-F, PS/NC, PR, I)
   - ⦾ Passing Grade/No Credit (A-C, NC)
   - ⦾ Credit/No Credit
   - ⦾ Grade Only (A-F, PR, I)
   - ⦾ Audit Only
   - ⦾ No Grade

11. Prerequisites (must be taken **before**): i.e. C or higher in (BIOE 4500 or BIOE 5500) and C or higher in MATH 4200

   Graduate Standing

   ⦾ PIN (Permisson From Instructor)   ⦾ PDP (Permission From Department)

   Co-requisites (must be taken **together**):

12. Catalog Description* (**75 words Maximum**)

   An applications course focused on using GIS techniques and applications in environmental problems and research.

13. Attach a syllabus and an electronic copy of a complete outline of the major topics covered. Click here for template.

Syllabus:	* C:\Users\rbecker7\Doc	Browse...
Additional Attachment 1:		Browse...
Additional Attachment 2:		Browse...

Course Approval:

Department Curriculum Authority: Date

Department Chairperson: *Timothy G. Fisher*   Date 3/15/13

College Curriculum Authority or Chair: Date 4-8-13

College Dean: Date 4-9-13

Graduate Council: Date 4-30-2013

Dean of Graduate Studies: ate

Office of the Provost :   Date

Submit New Course Proposal

Administrative Use Only

Effective Date: (YYYY/MM/DD)

CIP Code:

Subsidy Taxonomy:

Program Code:

Instructional Level:

Syllabus – EEES 4480/5480
GIS Applications in Environmental Sciences

Instructor:
Dr. Ricky Becker
Phone: 530-4571
e-mail: richard.becker@utoledo.edu
Office: BO3007C
Office Hours: TBA

Class will meet:
1 50 minute lecture session, 1 3 hour lecture/practical lab session

Course Overview:
The purpose of this course is to enable you to use GIS techniques and applications in environmental research. By the end of this course you should understand how to conceptualize spatial environmental data and problems in a GIS framework. You will understand how to incorporate, interpret, and present data using GIS tool, and learn how to apply these to environmental research. You will do this through lectures, structured lab exercises, presentations and a final project. This course is not meant to be an introduction to GIS theory, but is an applications course.

Book: The book I have assigned for this course is Mastering ArcGIS, by Maribeth Price. This book provides step by step hands on examples of practical use of GIS tools.

Additional Readings:
Throughout the semester, I will be assigning reading of case studies both from books and journal articles which we will go through as a class. These will be available through blackboard.

Grading:
Lab Exercises and reports: 70%
Case Study Presentations: 5%
Project/Paper (5480 only): 15%
Class participation: 10%

Assignments:
Each week, you will be conducting a lab exercise which incorporates the concepts which I have covered in the lecture portion of the class. These will usually require the entire lab period, and time outside of lab. You may use the computer lab in BO3051 any time when there is not a class in session. These labs will be based around a specific environmental study, and you will be expected to apply your knowledge from other environmental classes to interpreting the results.

All lab reports are due by the beginning of the following lab session unless otherwise specified.

Case Study Presentations:
You will work with me to identify an appropriate case study from recent literature related to your research. From weeks 4-9, 2-3 students will give 5 minute presentations describing each case study, what GIS techniques were used, and how it might be relevant to your research.

Project:
In addition to the structured labs, graduate students in the class will be conducting a project as a part of this class. The project will make use of the skills you learn throughout the course. You are encouraged to

choose a project related to your research area. If you do not have a project related to your research that is of appropriate scope, I will work with you to develop an appropriate project. Early in the semester (early October) I will ask you to submit a short summary of your planned project. Projects will be presented in class, during the exam period. At the time of your presentation, you will submit a hard copy report and digital copy of you project data

Tentative Schedule:

Week 1:

Generating base maps from existing data
       Introduction to GIS
       Introduction to ESRI software
Lab:

Week 2:
Integrating data from field sampling
       Map projections and Coordinate Systems
       Data Representations
       Raster and Vector Data
       GPS and Survey Data
Lab: Superfund site contaminant data analysis part 1

Week 3:
Integrating data from previous hardcopy sources
       Data Input, (Scanning, Digitizing, Referencing)
       Groundwater Data – issues of a 3rd Dimension
Case Study: Mineral Potential Mapping
Lab: Superfund site contaminant data analysis part 2

Week 4:
Conceptualizing problems in a GIS Model:
       Physical Conceptual Model
       Constructing a GIS Model
       Data and relationships needed for model
       Begin Student Case Study Presentations
Lab: TBD

Week 5:
 Environmental, Geospatial Data Sources
Case Study: Madagascar Deforestation
Lab: TBD

Brief Project Descriptions Due

Week 6
Lab: Coastline Erosion study

Editing and Manipulating Vector Data
Attribute Data

Week 7-8
Lab: Watershed delineation- Implementing part of Mineral Potential Mapping Case Study
Raster Data, Digital Elevation Data vs Topo sheet contour Elevation
3-D analysis

Week 9-10
Lab: Seismic Hazard Study
Spatial analysis
Geostatistics

Week 11-12
Landslide potential study
GIS Models Revisited
Data Presentation
Thematic Maps
Map classification, reclassification
Map Layouts
Metadata

Week 12-13
In Class Presentations, Projects Due