Agenda Item #16-19
Effective: Fall 2016

Eastern Illinois University

New/Revised Course Proposal Format

(Approved by CAA on 4/3/14 and CGS on 4/15/14, Effective Fall 2014)

Banner/Catalog Information (Coversheet)

1. **____New Course or ___X__Revision of Existing Course**
2. **Course prefix and number:** ____GEG 5810_____
3. **Short title:** _Intro to GIScience_____
4. **Long title:** _Introduction to Geographic Information Science
5. **Hours per week:** __2_ Class _2__ Lab __3_ Credit
6. **Terms:** _ X__ Fall _X__ Spring ___ Summer __X_ On demand
7. **Initial term**: __X__ Fall ___ Spring ___ Summer Year: _2016
8. **Catalog course description:**

A graduate-level introduction to Geographic Information Systems (GIS) and Science (GIScience) emphasizing broad software competency, foundations of spatial information theory, project design and management, and awareness of current trends in GIS research & technology. Hands-on labs will focus on conceptual understanding of how spatial entities and processes are modeled in a GIS environment, and will expose students to both commercial and open source GIS. In addition, students will learn how to identify relevant literature and case studies, plan and develop a project to meet a functional GIS analysis objective, and prepare high-quality written and cartographic output for presentation within the broader GIS community. This course is intended for graduate-level students who have not taken undergraduate GIS coursework.

9. **Course attributes:** none

   General education component: _____

   ___ Cultural diversity ___ Honors ___ Writing centered ___ Writing intensive ___Writing active

10. **Instructional delivery**
    Type of Course:

    ___ Lecture ___ Lab _x __ Lecture/lab combined ___ Independent study/research

    ___ Internship ___ Performance ___ Practicum/clinical ___ Other, specify: _____

    Mode(s) of Delivery:

    __x_ Face to Face __x_ On-line ___ Study Abroad

    __x_ Hybrid, specify approximate amount of on-line and face-to-face instruction_2/3 online 1/3 face

11. Course(s) to be deleted from the catalog once this course is approved. NONE
12. **Equivalent course(s):** ____none_____

    a. Are students allowed to take equivalent course(s) for credit? ___ Yes __x_ No

13. **Prerequisite(s): ____**none**_____**

    a. **Can prerequisite be taken concurrently?** ___ Yes ___ No

    b. **Minimum grade required for the prerequisite course(s)? ___**

    c. **Use Banner coding to enforce prerequisite course(s)?** ___ Yes ___ No

    d. **Who may waive prerequisite(s)?**

    ___ No one ___ Chair ___ Instructor ___ Advisor ___ Other (specify)

14. **Co-requisite(s):** __none_____

15. **Enrollment restrictions** none

    a. **Degrees, colleges, majors, levels, classes which <u>may</u> take the course: _____**

    b. **Degrees, colleges, majors, levels, classes which may <u>not</u> take the course: _____**

16. **Repeat status:** _x_ May not be repeated ___ May be repeated once with credit

17. **Enter the limit, if any, on hours which may be applied to a major or minor:** __n.a.

18. **Grading methods:** _x_ Standard ___ CR/NC __ Audit ___ ABC/NC

19. **Special grading provisions:** none

    ___ Grade for course will <u>not</u> count in a student's grade point average.

    ___ Grade for course will <u>not</u> count in hours toward graduation.

    ___ Grade for course will be removed from GPA if student already has credit for or is registered in: _____

    ___ Credit hours for course will be removed from student's hours toward graduation if student already has credit for or is registered in: _____

20. **Additional costs to students:**
    Supplemental Materials or Software_____none_____

    Course Fee __A $30 course fee has been previously approved by the President's Council. ___

21. **Community college transfer:**

    ___ A community college course may be judged equivalent.

    _x_ A community college may <u>not</u> be judged equivalent.

    Note: Upper division credit (3000+) will <u>not</u> be granted for a community college course, even if the content is judged to be equivalent.

<u>Rationale, Justifications, and Assurances (Part I)</u>

1. ___Course is required for the major(s) of _____PSM in GIScience; MBA with Geographic Information Systems Option_____

   ___Course is required for the minor(s) of _____

   ___Course is required for the certificate program(s) of _Biology GISci Graduate Certificate; Political Science: Certificate in Public Planning

   ___ Course is used as an elective in the MS in Technology – Resource Management

2. **Rationale for proposal** :

The option of online and hybrid offerings takes advantage of the Virtual Desktop initiative, which will allow students to access GIS software and data from anywhere and is intended to attract students into the PSM program. The content of online sections of the course will not differ substantially from face-to-face offerings.

3. **Justifications for (answer N/A if not applicable)**

   Similarity to other courses:

There are no similar courses at the graduate level. GEG 3810: Introduction to Geographic Information Systems is an undergraduate level course that focuses more on GIS skills and techniques and does not include components on project design or awareness of research and industry trends.

   Prerequisites: none

   Co-requisites: none

   Enrollment restrictions:

   Writing active, intensive, centered:

4. **General education assurances (answer N/A if not applicable)**

   General education component:

   Curriculum:

   Instruction:

   Assessment:

5. **Online/Hybrid delivery justification & assurances (answer N/A if not applicable)**

   Online or hybrid delivery justification:

The purpose and rationale for revising this course is to offer it as an online or hybrid option through the School of Continuing Education for students from across the state of Illinois and beyond who desire an asynchronous learning opportunity and for whom the residential campus is not an option. The online course would not be available to on campus students.

   Instruction:

The technology will be used to support student achievement by allowing them to access GIS software and data on an EIU server through a VMWare interface. This will allow for a standardized computing environment for all students with a minimum internet bandwidth. Students will be assigned discussions and group projects to encourage interaction, and will be able to interact with the instructor at times which are convenient for them. The technology will be used to assess student achievement by being the vehicle

through which all student work is conducted. Specific components of the learning management system (LMS) to be utilized include timed quizzes and exams, discussions (for threaded discussions over specific questions), labs and video tutorials, and Email (for answering additional questions students may have). Please note, these labels ("discussions," etc.) may change with another LMS, but the functions will remain the same.

Integrity:

The course syllabus includes a statement about academic dishonesty. Lab activities will be designed such that each individual's submission will be substantially different, for example by requiring students to find their own datasets and apply their own cartographic symbology. Tests and quizzes will be time-restricted, can only be taken once, and must be taken within a limited time frame. Discussions and major course projects require the addition of personal reflection, which discourages plagiarism. Student work can only be submitted through the provided LMS or plagiarism software such as Turnitin.

Interaction:

Instructor-student and student-student interaction will be promoted through Email, web-based discussions, and personal feedback on individual exams and discussions.

Model Syllabus (Part II)

Please include the following information:

1. Course number and title
GEG 5810: Introduction to Geographic Information Science

2. Catalog description
This course provides a graduate-level introduction to Geographic Information Systems (GIS) and Science (GIScience) emphasizing software competency, data and analysis skills and concepts, project design and management, and awareness of current trends in GIS research & technology. Students will learn how to create, manage, visualize, query and analyze spatial data, plan and develop projects to meet a functional GIS analysis objective, and prepare high-quality written and cartographic output for presentation within the broader GIS community. The course is intended for graduate-level students who have not taken a recent undergraduate course in GIS. Course may not be repeated.

3. Learning objectives.

Learning objectives (revised University Learning Goals effective Fall 2014: 1 Depth of content knowledge, 2 Effective critical thinking and problem solving, 3 Effective oral and written communication, 4 Advanced scholarship through research or creative activity)

By the end of this course, students will be able to:

A. Distinguish various conceptual models, data models and data structures used to represent earth features in GIS. (1)
B. Identify primary methods/issues involved in creating/editing geographic data. (1,2)
C. Identify and select appropriate spatial data visualization techniques. (1,3)
D. Design and perform queries against databases containing spatial data. (1)
E. Understand common GIS analysis problem-solving methods and workflows. (1,2)
F. Design and implement a graduate-level GIS research or professional project. (3,4)
G. Discuss current trends in GIS industry and research. (2,3)

4. Course materials.

- Paul Bolstad (2012). GIS Fundamentals: A First Text on Geographic Information Systems (4th Edition)

Supplemental readings include articles, videos and help documentation linked from or uploaded to the LMS D2L.

5. Weekly outline of content.

Week	Topics
1	Getting Started – course overview, about GIS, about GIScience, introduction to EIU's Virtual Desktop, creating your first map project
2	Spatial Data – Useful data sources, providers, landscape of GIS data collection, dissemination and sharing.
3	Spatial Data Models – exploration of how real-world features are represented in GIS at both a conceptual and structural level.
4	Projections & Coordinate Systems – coordinate system components, projection families, selecting a coordinate system, scale, resolution, generalization and positional error.
5	Cartography & Visualization – visual variables, map types, choropleth maps, symbol maps, symbol classification, dot-density maps, cartograms.
6	Spatial Databases – relational database model, normal forms, primary and foreign keys, joins and relates, semantic ontologies.
7	Database Query – SQL simple queries, multiple-table queries, integration of SQL in GIS.
8	Spatial Analysis – Buffer and overlay, clip, spatial join, raster vs. vector analysis
9	Raster Analysis – Resolution and alignment, overlay, local statistics, focal statistics
10	Terrain Analysis – slope, aspect, viewshed analysis
11	Interpolation and Density Mapping – IDW, spline, kriging, kernel density mapping.
12	GIS Modeling – problem solving with GIS, cartographic models, cell-based models, agent-based models
13	GIS Project Case Studies – components of GIS analysis, literature sources, scope and scale of analysis, data quality issues
14	History of GIScience – trends in data collection and research, roles of government, private sector and volunteers, recent advances in analysis techniques.
15	Individual Project Work (private consultation with instructor)
Exam	Individual Project Presentations

6. Assignments and evaluation, including weights for final course grade.

Labs & Tutorials…….....	40%
Quizzes……..……..	30%
Individual project …..……..	20%
Discussion Assignments……. ……..	10%

7. Grading scale: A 90% or more, B 80-89%, C 70-79%, D 60-69%, F less than 60%

8. Correlation of learning objectives to assignments and evaluation.

	Labs & Tutorials 40%	Quizzes 30%	Individual Project 20%	Discussion Assignments 10%
A	X	X		X
B	X	X		X
C	X	X		X
D	X	X		X
E	X	X	X	X
F			X	
G	X	X	X	X

Date approved by the department or school: Nov. 6th, 2015
Date approved by the college curriculum committee: 2/19/16
Date approved by the Honors Council *(if this is an honors course):*
Date approved by CAA: CGS: