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. **__X__New Course or ____Revision of Existing Course**
2. **Course prefix and number:** GEO 4810
3. **Short title:** Cartography and Visualization
4. **Long title:** Cartography and Geographic Data Visualization
5. **Hours per week:** 2 Class 2 Lab 3 Credit
6. **Terms:** ___ Fall ___ Spring ___ Summer _x_ On demand
7. **Initial term**: _x_ Fall ___ Spring ___ Summer Year: 2021
8. **Catalog course description:**

   Theory and techniques of map construction and spatial data visualization. Students will learn to interpret, construct and critique reference and thematic maps, including choropleth, symbol and contour maps. Cartographic principles of map scale, projection, composition and generalization will be discussed.

9. **Course attributes:**

   General education component: ____n/a_____

   ___ 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_ Online ___ Study Abroad

    _x_ Hybrid, specify approximate amount of on-line and face-to-face instruction

    75% online 25% F2F

11. Course(s) to be deleted from the catalog once this course is approved.

    GEO 3800 Introduction to Cartography

12. **Equivalent course(s):** GEO 3800 Introduction to Cartography

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

13. **Prerequisite(s):** GEO 3810 or permission of the instructor

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

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

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

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

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

14. **Co-requisite(s):** none

15. **Enrollment restrictions**

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

    b. **Degrees, colleges, majors, levels, classes which may <u>not</u> take the course:** none

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: n/a**

    ___ 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_____

    Course Fee ___No _x_Yes, Explain if yes

    Fees will offset costs of printing and software maintenance.

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.

Rationale, Justifications, and Assurances (Part I)

1. _x_Course is required for the major(s) of __PSM in GIScience____
   ___Course is required for the minor(s) of _____
   ___Course is required for the certificate program(s) of _____
   _x_ Course is used as an elective for Geography Major, Graduate Certificate in GIS&T, GIS Minor
2. **Rationale for proposal** :
   This course is being developed to update and expand GEO 3800: Introduction to Cartography to reflect advances in computer and web-based mapping. The original course (GEO 3800) has been taught for so long that the original course proposal can no longer be found. The new course will recognize and incorporate advances in computer technology, including desktop applications for map production as well as interactive web mapping environments. By requiring GEO 3810: Introduction to GIS as a prerequisite, the course will also be able to cover more advanced material such as statistical maps and bivariate mapping techniques. The course is being moved from the 3000 to the 4000 level to address the more advanced nature of the topics covered as well as support the Professional Science Master's Degree in Geographic Information Science (PSM in GIScience), as lack of a cartography/visualization course has been identified as a major weakness of the PSM degree program.

3. **Justifications for (answer N/A if not applicable)**
   Similarity to other courses:
   The proposed course is similar to GEO 3810: Introduction to GIS but differs in that it focuses on maps as a means of visual communication (as opposed to spatial data management and analysis), and goes into much greater depth on different map forms, map components, visual format, map interpretation, and perception of visual variables such as color and shape.

Prerequisites:	GEO 3810: Introduction to GIS
Co-requisites:	N/A
Enrollment restrictions:	N/A
Writing active, intensive, centered:	N/A

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

General education component:	N/A
Curriculum:	N/A

Instruction: N/A

Assessment: N/A

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

Online or hybrid delivery justification:

The course will be offered online to support the online delivery of the PSM in GIScience. The course will take advantage of the Virtual Desktop allowing students to utilize EIU's GIS software from home through a remote connection. The visual form of maps is conducive to online discussion. The course may be offered hybrid to engage on-campus students while simultaneously supporting the online PSM.

Instruction:

The course will utilize online learning technologies including EIU's learning management system (D2L at the time of this proposal) and videoconferencing technology to provide rigorous instruction, to engage students in discussion and critical evaluation of maps, and to provide real-time help, feedback and troubleshooting.

Integrity:

Lab reports will be subject to plagiarism detection software, and maps will be checked against those created by other students. In my experience no two maps are ever the same and copies are easy to detect. Lab exercises will include some variation in topics from year to year ensuring that students will not be able to copy work from previous years. Furthermore, maps will be created on an EIU administered virtual desktop, allowing the instructor to view the GIS project files used to construct each map if necessary. The final exam will be conducted online with a time limit.

Interaction:

Instructor-student interaction will be facilitated in two ways: (1) The instructor will engage in discussion questions framed around critical map evaluation. (2) Students will be required to present at least one map produced in a lab assignment to the instructor via videoconference over the course of the semester. Student-student interaction will be facilitated by critical map evaluation discussions and by a group project involving critique and improvement of an existing map or geographic data visualization.

Model Syllabus (Part II)

Please include the following information:

1. Course number and title

GEO 4810: Cartography and Geographic Data Visualization

2. Catalog description

Theory and techniques of map construction and spatial data visualization. Students will learn to interpret, construct and critique reference and thematic maps, including choropleth, symbol and contour maps. Cartographic principles of map scale, projection, composition and generalization will be discussed.

3. Learning objectives.

(Text in parentheses indicates corresponding EIU Undergraduate Learning Goals as per https://www.eiu.edu/learninggoals/: CT=Critical Thinking, WCR=Writing and Critical Reading, SL=Speaking and Listening, QR=Quantitative Reasoning, RC=Responsible Citizenship)
[Text in square brackets indicates corresponding EIU Graduate Learning Goals as per https://castle.eiu.edu/eiucgs/documents/05-22GraduateAssessmentPolicy.pdf: DCK = Depth of Content Knowledge, CTPS = Critical Thinking and Problem Solving Skills, OWC = Effective Oral and Written Communication Skills, AS = Evidence of Advanced Scholarship through Research and/or Creative Activity]

A. **Identify map projections**, their distortion properties, and select appropriate projections for representing different areas of the earth's surface (CT 3,5; QR 1,2,3)[DCK,CTPS]
B. **Apply appropriate data processing techniques** to standardize and classifying data on thematic maps (CT 5; QR 2,6)[DCK,CTPS]
C. **Explain the natural visual variables used in maps**, their natural interpretative structure and appropriate pairings with nominal, ordinal, interval and ratio thematic data variables (CT 6; QR 3)[DCK,OWC]
D. **Construct effective thematic choropleth and symbol maps** that employ appropriate graphical techniques to communicate a clear message (CT 1,4; QR 3,5,6) [CTPS,OWC]
E. **Interpret bivariate statistical maps** used to visualize patterns of clustering and hot-spots of business activity, disease, etc. that involve rates per population (CT 1,4; WCR 1; QR 3,5,6)[OWC]
F. **Critically evaluate maps** and the data, visual symbology and mapping form(s) used to convey their intended message. (WCR 5; SL 2,3,4,5,6; QR 4)[OWC,AS]

4. Course materials.

John Krygier and Denis Wood (2016). *Making Maps: A Visual Guide to Map Design for GIS.* Guilford Press (Third Edition).

5. Weekly outline of content.

Week	Topic	Book Chapter	Assignment
1	Map design principles and the responsibility of the cartographer	1	
2	Map purpose, audience and	2	Discussion: Maps in the Wild

	medium		
3	Geographic data types, semantics and data transformation	3	Discussion: Covid-19 Dashboards
4	Tools for constructing maps on paper and for the web	4	Discussion: Story Maps
5	Geodesy and map projections	5	Lab: Projections
6	Coordinate systems and map distortion	5	
7	Map components and visual arrangement	6	Lab: Reference Map
8	Visual contrast and figure-ground relationships	7	
9	Geographic feature simplification and generalization	8	Lab: Choropleth Map
10	Data classification for choropleth and symbol maps	9	
11	Symbols and visual variables	10	Lab: Bivariate Map
12	Dot-density maps, cartograms and bivariate maps	11	
13	Color on Maps	12	Discussion: Map critique
14	Text on Maps	13	
15	Map Improvement Projects		Project Presentations
16	Final Exam		

6. Assignments types and points.

Assignment Type	Undergraduate	Graduate
Labs	50	50
Discussion	10	20
Map Improvement Project	20	30
Final Exam	20	20
Total	100	120

7. Grading scale.

Individual course components will be assigned a letter grade. The overall course grade will be computed as a weighted average using the standard 4.0-point GPA scale.

8. Correlation of learning objectives to assignments and evaluation.

(Text in parentheses indicates corresponding EIU Undergraduate Learning Goals as per https://www.eiu.edu/learninggoals/: CT=Critical Thinking, WCR=Writing and Critical Reading, SL=Speaking and Listening, QR=Quantitative Reasoning, RC=Responsible Citizenship)
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Effective Oral and Written Communication Skills, AS = Evidence of Advanced Scholarship through Research and/or Creative Activity]

	Labs	Discussion	Map Improvement Project	Final Exam
Undergraduate percentage	50%	10%	20%	20%
Graduate percentage	41.7%	16.7%	25%	16.7%
A. Identify map projections (CT 3,5; QR 1,2,3) [DCK,CTPS]	✓	✓	✓	✓
B. Apply appropriate data processing techniques (CT 5; QR 2,6) [DCK,CTPS]	✓		✓	
C. Explain the natural visual variables used in maps (CT 6; QR 3) [DCK,OWC]		✓	✓	✓
D. Construct effective thematic choropleth and symbol maps (CT 1,4; QR 3,5,6) [CTPS,OWC]	✓		✓	
E. Interpret bivariate statistical maps (CT 1,4; WCR 1; QR 3,5,6) [OWC]	✓		✓	✓
F. Critically evaluate maps (WCR 5; SL 2,3,4,5,6; QR 4) [OWC,AS]		✓	✓	

Date approved by the department or school: January 29, 2021
Date approved by the college curriculum committee: February 3, 2021
Date approved by the Honors Council ***(if this is an honors course):***
Date approved by CAA: **CGS:**