



Proposal #  
(Academic Affairs use only)

AY20-204 Proposal #  
(College use only) LACC Revised & Approved 3-6-2020

# REQUEST FOR A NEW COURSE

University of Central Oklahoma

Course Subject (Prefix), Number, and Title:

Course Subject  
**GEO** | Recommended Number  
**5743**

Course Title (maximum of 30 characters)  
\*Remember when abbreviating names, this is how they will appear on student's transcripts.  
**Environmental GIS**

Course Title: (full title of course if longer than 30 characters)  
**N/A**

For information regarding CIP codes contact your department chair or visit: [http://www.uco.edu/academic-affairs/ir/program\\_inventory.asp](http://www.uco.edu/academic-affairs/ir/program_inventory.asp)  
CIP Code: **45.0702**

For graduate courses, please attach a syllabus for this course. (See syllabus requirement policy 2.2.)

Course description as it will appear in the appropriate catalog.

Course description only Do not include prerequisites or enrollment restrictions, these should be added under questions 6-12.  
(Please use standard American English including full sentences.)

**Environmental GIS offers advanced geographic information systems techniques for environmental/ecology applications including soil degradation, land use/land cover change, terrain modeling, ecosystem inventory, and native land management.**

## History and Geography

Department submitting the proposal

**Dr. Brad Watkins**

[bwatkins8@uco.edu](mailto:bwatkins8@uco.edu)

**5842**

Person to contact with questions

email address

Ext. number

Approved by:

**Katrina Lacher** Digitally signed by Katrina Lacher  
Date: 2020.09.17 10:26:19 -05'00'

**Rozilyn Miller,  
Ph.D.**

Digitally signed by Rozilyn Miller, Ph.D.  
Date: 2020.09.17 13:45:59 -05'00'

Department Chairperson Date

College Curriculum Committee Chair Date  
(Please notify department chair when proposal is forwarded to dean.)

**Dean Catherine Webster** Digitally signed by Dean Catherine Webster  
Date: 2020.09.18 09:20:49 -05'00'

College Dean Date  
(Please notify the department chair when proposal is forwarded to AA.)

Academic Affairs Curriculum or Graduate Council Date

Office of Academic Affairs Date

Effective term for this new course  
(Assigned by the Office of Academic Affairs.)

1. Does this course have an undergraduate / graduate counterpart?  
 Yes  No
2. Is this proposal part of a larger submission package including a program change?  
 Yes  No
3. Does this new course affect a teacher preparation program? (All courses required for any teacher preparation program must have approval from the Council on Teacher Education (CTE) before approval from AACC or Graduate Council.)  
 Yes  No If yes, send copy of proposal to the Education Curriculum Committee Chair, Dr. Darla Fent.  
 CTE Approval (Stamp or initial) \_\_\_\_\_
4. Has this course been previously taught as a common course (4910 seminar, 4960 institute, etc.)?  
 Yes  No If yes, when was the most recent offering? \_\_\_\_\_
5. Does this course affect majors or minors outside the department?  
 Yes  No If yes, provide name(s) of department chair(s) contacted, dates, and results of discussion.  
 \_\_\_\_\_
6. Prerequisite courses:  
 Example 1: MATH 1213 and (MATH 2165 or MATH 2185) and CHEM 1213 Example 3: 8 hours of biology including BIO 1404  
 Example 2: (ACCT 2113 and 2213) and (MGMT 3013 or ISOM 3613)  
**N/A**
7. Co-requisite(s): Which of the above prerequisite courses, if any, may be taken in the same semester as the proposed new course?  
**N/A**
8. Concurrent enrollment: Courses that must be taken the same semester. Example: lab courses.  
**N/A**
9. Will this course have enrollment restrictions?  
 Yes  No If No, go to question 13.
10. Specify which major(s) may or may not take this course. Specifying a major, excludes all other majors from enrolling.  
 Check one: N/A May \_\_\_\_\_ May not \_\_\_\_\_  
 Major Code: \_\_\_\_\_
11. Which of the following student classification(s) may enroll in this course?  
 Check all that apply:
- |                      |                |                                     |
|----------------------|----------------|-------------------------------------|
| Graduate             | (2) 19 + hours | <input checked="" type="checkbox"/> |
| Graduate             | (1) 0-18 hours | <input checked="" type="checkbox"/> |
| Post Baccalaureate * |                | <input type="checkbox"/>            |
| Senior               |                | <input type="checkbox"/>            |
| Junior               |                | <input type="checkbox"/>            |
| Sophomore            |                | <input type="checkbox"/>            |
| Freshman             |                | <input type="checkbox"/>            |
- \* Graduate level courses are not open to Post Baccalaureate students.
12. Check or list other restrictions for this course.
- |                                |       |
|--------------------------------|-------|
| Admission to Graduate Programs | _____ |
| Admission to Nursing Program   | _____ |
| Admission to Teacher Education | _____ |
| Other                          | _____ |

13. **Course objectives:** Objectives should be observable, measurable and include scholarly or creative activities to meet the course level characteristics. Course objectives should also be in line with the course description. (Please refer to instructional objectives documents at: <http://www.uco.edu/academic-affairs/faculty-staff/aacc.asp#FAQ/Helpful%20Hints>.)

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

- **Demonstrate advanced skill-level in GIS techniques**
- **Apply advanced GIS techniques to solve environmental problems**
- **Design original geodatabases that effectively facilitate natural resource management**
- **Demonstrate advanced mapping techniques**
- **Differentiate land use/land cover types via remote sensing techniques**
- **Plan a strategy for managing natural resources using GIS/GPS technology**
- **Demonstrate functional knowledge of and integrate global positioning system data**
- **Develop a research topic and create a conference-quality research poster**

Course Detail Information:

14. Contact Hours (per week)

  3   Lecture hours (in class)

       Lab hours (also studios)

       Other (outside activities)

15. Repeatable course.

  1   Number of times this course can be taken for credit.

16. Schedule type: (select one only)

       Activity P.E. (A)

       Lab only (B)

       Lecture/Lab (C)

**L** **Lecture only (L)**

       Recitation/Lab (R)

       Student Teaching (STU)

       Studio Art/Design (XSU)

17. List existing course(s) for which this course will be a prerequisite. Adding a "new course" as a prerequisite to an existing course will likely cause enrollment problems. (Please submit a prerequisite change form for each course for which this course will serve as a prerequisite.)

**N/A**

18. What resources, technology or equipment must be acquired to teach this course? List items, which must be purchased and estimate cost. (Be specific, e.g., technology software, equipment, computer lab; etc.)

**No additional resources will be required.**

19. The UCO Library has the required library resources available for this new course?

**Yes**  **No** If yes, provide names of Librarian/Faculty Liaisons contacted, dates, and results of discussion.

**Aaron Sterba reported on 11/14/19 that the library has sufficient sources to support the course.**

If no, what additional library resources must be acquired for this new course? List items which must be purchased and estimated cost. (Be specific, e.g., books, magazines, journals, etc.)

**N/A**

20. Names of current faculty qualified to teach this course.

Dr. Brad Watkins

21. Additional faculty (adjunct or full-time) required and specific competencies required to teach this course:

None

22. How will this course be staffed and equipped? Identify the additional costs associated with this new course. If no costs, explain why not.

**Current faculty teach the undergraduate counterpart to this course. No additional funds are required because it is part of the existing course rotation.**

23. Identify the source(s) of funds for any additional costs for the new course. i.e. internal reallocations, special fees from students, etc. If you plan to propose special fees be assessed for this course, be aware there is a separate approval process for special fees.

N/A

24. Projected enrollment for two academic years following approval of new course:

Semester	2024	2023
Fall		10
Spring	10	
Summer		

25. Using State Regents' definition of liberal arts and sciences (quoted below), characterize the course as follows:

         Non-liberal arts and sciences  
  X   Liberal arts and sciences

"The liberal arts and sciences are defined as those traditional fields of study in the humanities; social and behavioral sciences; communications; natural and life sciences, mathematics; and the history, literature, and theory of fine arts (music, art, drama, dance). Courses in these fields whose primary purpose is directed toward specific occupational or professional objectives, or courses in the arts which rely substantially on studio or performance work are not considered to be liberal arts and sciences for the purpose of this policy. Courses required for the General Educational Program are not necessarily synonymous or mutually exclusive with the liberal arts and sciences." State Regents Policy and Procedures, Chapter 2, Section 5, "Degree Requirements" part 1, (2), P. II-2-86

26. Please provide a concise, yet comprehensive, statement that explains the reasons for requesting the new course. Include documentation or assessment information supporting the specific request (if possible). Indicate the expected source of student enrollment (majors, minors, programs etc.)

**The proposed course will meet a need expressed by graduate students in Biology for graduate-level GIS courses.**

27. Which of the six transformative learning tenets does this course incorporate? (check all that apply or only those that apply) This question was a directive from the Provost and is used for informational purposes.

Discipline Knowledge         X          
Leadership         X          
Research, Scholarly and Creative Activities         X          
Service Learning and Civic Engagement           
Global and Cultural Competencies           
Health and Wellness

28. Clearly explain how the characteristics of this course meet or exceed those outlined in Course Level Characteristics. (Copy and paste table from "Course Level Characteristics" document for the appropriate course level of proposed course. Document may be found on: <http://sites.uco.edu/academic-affairs/files/course-level-characteristics-table.doc> .

### 5000 LEVEL COURSES

Course Level Characteristics	Please describe how this course meets this requirement.
1. It is assumed that students in these courses have acquired the ability to use language effectively, to engage in analytical thought and creative processes, and to use information and bibliographic sources with skill.	<b>Students are required to create a research proposal outlining the project scope, study area, methods, and conclusions. The quality must be suitable for presentation at a conference.</b>
2. It is assumed that students in these courses have achieved a significant level of maturity in the discipline, evidenced by a considerable background of knowledge.	<b>Students will complete a literature review putting their research topic into the context of their respective fields of study. Students will complete literature reviews for project proposals and for research posters.</b>
3. These courses should be more than a mere extension of undergraduate courses. Rather, they should be qualitatively different. At a minimum: <ol style="list-style-type: none"> <li>a. Students should be required to undertake original scholarly/creative activity.</li> <li>b. Students should assume greater responsibility for mastering the subject matter.</li> <li>c. Close working relationships should exist between instructors and students.</li> </ol>	<ol style="list-style-type: none"> <li><b>a. Students will develop an original data set for the course.</b></li> <li><b>b. Students will create a research poster suitable for conference presentation.</b></li> <li><b>c. Students will meet with instructor outside of class time bi-weekly to report on progress towards project completion.</b></li> </ol>

**GEO 5743**  
**Environmental GIS**  
Fall 2023  
Department of History and Geography  
College of Liberal Arts

**Meeting Time:** Arranged (CRN XXXXX)  
**Classroom:** LAN 145  
**Professor:** Dr. Brad Watkins  
**Office:** LAN 201C  
**Email:** [bwatkins8@uco.edu](mailto:bwatkins8@uco.edu) (preferred)  
**Phone:** 405-974-5842  
**Skype:** ID Available on request  
**Office Hours:** M-R: 11:00 am – 12:00 pm; T: 2:00 pm – 3:00 pm *or by appointment*

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### **COURSE DESCRIPTION**

Environmental GIS offers advanced geographic information systems techniques for environmental/ecology applications including soil degradation, land use/land cover change, terrain modeling, and ecosystem inventory and native land management.

*No Prerequisites*

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### **OBJECTIVES**

By the end of this course you should:

- Demonstrate advanced skill-level in GIS techniques
  - Apply advanced GIS techniques to solve environmental problems
  - Design geodatabases that effectively facilitate natural resources management
  - Evaluate the success of geodatabase design
  - Create new datasets used to support work on environmental issues
  - Differentiate land use/land cover types via remote sensing techniques
  - Plan a strategy for managing natural resources using GIS/GPS technology
  - Conduct field work using advanced GPS technology
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### **TRANSFORMATIONAL LEARNING OBJECTIVES**

At the University of Central Oklahoma, we are guided by the mission of helping students learn by providing transformative experiences so that they may become productive, creative, ethical and engaged citizens and leaders contributing to the intellectual, cultural, economic and social advancement of the communities they serve. Transformative learning is a holistic process that places students at the center of their own active and reflective learning experiences. A student's major field is central to the learning experience and is a vital part of the "Central Six."

This course addresses two of the university's transformative learning goals.

**Discipline Knowledge** by using geographic information systems to organize and analyze geographic data based upon theories in geography. GIS is a tool used to study spatial relationships.

**Leadership:** Graduate students in cross-listed courses have the opportunity to demonstrate the qualities necessary for success in advanced studies. Thus, graduate students will model this qualities for the undergraduate students in the course.

**Problem Solving (Research, Scholarly and Creative Activities)** by developing research objectives for a semester project that is based upon sound research and ideas, yet can be applied by other GIS practitioners.

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### **ATTENDANCE**

**Attendance is required.** This class meets once per week meaning one class is equivalent to one week.

**After 2 unexcused absences, 10% will be deducted from your grade. An additional 10% will be deducted for each additional unexcused absence. If you miss 4 classes, you will fail the course.**

Two tardies will count as one unexcused absence.

Students who do not attend the first two weeks of class will be administratively dropped from the course.

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## LATE WORK

Late work will not be accepted.

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## CLASSROOM ETIQUETTE

Please respect the learning environment of students and the professor. Do not sleep or do homework in class. Recording lectures is prohibited. Do not use Facebook or any other social networking site in class. Do not surf the Web unless asked by the professor to visit a particular website. You may use your smart phone/cell phone in class to check email, email professor, or to check text messages as long as it is kept to a minimum. You may not make phone calls during class. You must silence your phone during class. It is considered disruptive behavior to engage in any of these prohibited activities.

Turn off or silence all electronic devices during exams and quizzes. If caught using any electronic device during an exam, you will receive no points for that exam and disciplinary action will be considered as outlined in the Code of Student Conduct. I encourage lively discussions during classes, but derogatory comments, negativity, and poor attitudes will not be tolerated and will be considered disruptive behavior. If you engage in these disruptive activities you will be asked to leave the class. If you commit multiple violations of the state policy disciplinary action will be considered as outlined in the Code of Student Conduct.

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## REQUIRED BOOKS

Chang, Kang-Tsung. 2019. *Introduction to Geographic Information Systems*. 9th ed. New York: McGraw-Hill Education.

Mitchell, Andy. 1999. *The ESRI Guide to GIS Analysis Volume 1: Geographic Patterns & Relationships*. Redlands, CA: ESRI Press.

Mitchell, Andy. 2005. *The ESRI Guide to GIS Analysis Volume 2: Spatial Measurements & Statistics*. Redlands, CA: ESRI Press.

Turabian, Kate L. 2018. *A Manual for Writers of Research Papers, Theses, and Dissertations: Chicago Style for Students & Researchers*. 9th ed. Chicago: University of Chicago Press.

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## RECOMMENDED MATERIALS

External Hard Drive

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## COURSE REQUIREMENTS

### Lab Assignments

You will have six lab assignments this semester. You have two weeks to complete each lab. Labs are due at the beginning of class on the due date. You will use ArcGIS 10.1, Trimble Pathfinder Office 4.0, and PowerPoint to complete the labs. You are expected to have an introductory background of ArcGIS Desktop software at the beginning of the semester. The lab assignments will be written according to this. After the first week, we will use the last 75 minutes of class as lab time. You will have few opportunities to work on your lab assignment outside of our scheduled lab times.

### Graduate Meetings

Graduate students will meet with the professor bi-weekly beginning with the second week of the course. During these meetings, students will inform their colleagues and the instructor of the progress made towards the research topic and geodatabase design. Students are required to participate and problem solve during each meeting.

### Project Proposal

The project proposal is designed to provide you with a framework for completing your final project, and it gives the professor an idea of the scope and practicability of the topic. Basically, the proposal will keep your project on track for timely completion. It also is designed to be an "agreement" between you and the professor. The proposal should be five pages in length and include an abstract between 150 and 250 words. Maps, charts, and photographs should be included where necessary but do not count in the page total. You will be given feedback on your proposal that will help you make adjustments to the content and scope of your final project. If asked to resubmit your proposal, you must do so to receive a grade for the proposal. You will submit your project proposal to Turnitin.com via WebCT for grading. **If asked to significantly revise any portion of your proposal, you must turn in a revised proposal in order to receive a project proposal grade AND for the final project to be accepted.** Your final project should be environmental in subject and be grounded in current academic research in geography and/or another closely related field, for example, environmental science or ecology. As such, you must include a list of references cited (no less than ten). More details on the project proposal will be given early in the semester.

### Project Proposal Presentation

You will prepare a ten minute project proposal presentation using PowerPoint during which you will present the framework of your semester project to the class. This will be an opportunity for other students to provide feedback that you can use to modify your Final Project to make it stronger.

### Final Project

You will have a graded final project that will be a culmination of various techniques and approaches you will have been exposed to during the course as well as the development of an original dataset. It must incorporate the appropriate (though not all) concepts/analyses covered in the course. The final project will consist of a research poster (36" x 42") that includes appropriate text, maps, graphs, tables, and/or photographs. Your poster must include no less than fifteen references cited. The results of your project, in addition to being discussed in the text, must be supported by a combination of maps, graphs, tables, and photos. You should demonstrate how you used GIS to conduct analyses of geographic phenomena and/or relationships, how you interpreted your results, how your work contributed to the knowledge and/or current research of a geospatial problem, and ideas for future research related to the topic. The final project should be of a quality worthy of a conference presentation. More details on the final project will be given later in the semester.

The choice of topic is yours, but it **must be approved** by the instructor via the project proposal.

\*Care should be given when producing maps for labs, assignments, and presentations. Strict adherence to cartographic principles must be followed for all maps.

### Final Project Poster Presentation

You are required to prepare a formal poster presentation based on your final project work (see above) consisting of the problem, methods and results of your Final Project. This grade is in addition to the final project grade. We will reserve the last day of class for poster presentations. Each student will be given five minutes to present their findings and highlight the advanced techniques used in the project. The remaining time will be used for student and instructor questions/feedback. More details on the poster presentations will be given later in the semester.

### Field Trip

In addition to regular classroom and lab attendance, you **must** attend the field trip that will be scheduled for November as part of Lab 5. You will use this field trip to "field-check" your land cover interpretations. In addition, you will put your skills to work with global positioning system technology and receive field training that accompanies a formal geography education. The destination is the Selman Living Laboratory in northwestern Oklahoma, six miles west of Alabaster Caverns State Park. The trip takes 3.5 hours one way, so plan to be away for two full days. More details on the field trip will be provided early in the semester. A written assignment requiring an equivalent amount of time will be given to those who cannot attend the field trip.



## GRADING

Assessment	Number	Points Each	Points
Lab Assignments	6	50	300
Graduate Meetings	6	15	90
Field Trip	1	50	50
Project Proposal	1	75	85
Research Poster	1	100	100
Poster Presentation	1	75	75
Midterm Exam	1	100	100
Final Exam	1	200	200
<b>Total Points</b>			<b>1,000</b>

A = 1,000-900 points  
B = 899-800 points  
C = 799-700 points  
D = 699-600 points  
F = 599 and below

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## FINAL PROJECT DUE

Friday, December 2nd, 5:00 pm

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## TURNITIN.COM

UCO subscribes to the Turnitin.com plagiarism prevention service. Students agree that by taking this course, all required assignments may be subject to submission for textual similarity review to Turnitin.com for the detection of plagiarism. All submitted assignments will be included as source documents in the Turnitin.com restricted access reference database for the purpose of detecting plagiarism of such assignments. Use of the Turnitin.com service is subject to the Terms and Conditions of Use posted on the Turnitin.com website. Turnitin.com is just one of various plagiarism prevention tools and methods which may be utilized by your instructor during the terms of the semesters. In the UCO Student Handbook, there is a process for contesting any plagiarism allegations against you.

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## EXPECTATION OF WORK

According to Regents' policy, for each hour in class a student is expected to spend two to three hours studying for the class. You are expected to work on lab assignments during lab times, not during lectures.

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## ACCOMODATIONS

The University of Central Oklahoma complies with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990. Students with disabilities who need special accommodations must make their requests by contacting Disability Support Services, at (405) 974-2516. The DSS Office is located in the Nigh University Center, Room 305. Students should also notify the instructor of special accommodation needs as soon as possible. Per Title IX of the Education Amendments of 1972 ("Title IX"), pregnant and parenting students may request adjustments by contacting the Title IX Coordinator, at (405) 974-3377 or [TitleIX@uco.edu](mailto:TitleIX@uco.edu). The Title IX Office is located in the Lillard Administration Building, Room 114D.

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## SYLLABUS ATTACHMENT

<http://sites.uco.edu/academic-affairs/files/aa-forms/StudentInfoSheet.pdf>

**Lecture Outline** (dates subject to change)

<b>Week</b>	<b>Topic</b>	<b>Reading Assignment</b>
1 (Aug 22)	Course Overview Intro to GIS Review Geodatabases Effective Map Design	Chang Ch 1 WebCT-Reading 1
2 (Aug 29)	Environmental Geography Physical Geography Overview	WebCT- Reading 2 WebCT- Reading 3
3 (Sep 5)	Vector GIS (Buffer, Clip, Dissolve) Creating and Editing Geospatial Data Setting Up Work Environments	Chang Ch 3 WebCT- Reading 4
4 (Sep 12)	Trimble GPS GPS Data Collection Data Dictionaries Post-Processing Data	Chang pp 94-97 D2L- Reading 5
5 (Sep 19)	Remote Sensing Aerial Image Interpretation	D2L- Reading 6 Sccally Ch 5
6 (Sep 26)	Raster GIS Spatial Interpolation PowerPoint Tutorial	Chang Ch 4, 15
7 (Oct 3)	Digital Elevation Models Terrain Mapping and Analysis TINs <b>Project Proposal Due Tuesday, October 4th, 5:00 pm</b>	Chang Ch 13 Sccally Ch 9
8 (Oct 10)	Emergency Response GIS- ALOHA <b>Project Proposal Presentation</b>	D2L- Reading 7 Sccally Ch 2
9 (Oct 17)	Georeferencing Data Monmonier Ch 11  Historical GIS for Land Cover/Land Use Studies BLM Online	D2L- Reading 8
10 (Oct 24)	Woody Plant Encroachment Eastern Redcedar at the Selman Living Lab Rasters (Viewshed, Slope, Aspect)	D2L- Reading 9 D2L- Reading 10
11 (Oct 31)	Hawth's Tools/National Hydrography Dataset and Wetlands Developing a Research Poster <b>Field Trip, Saturday-Sunday, November 5-6th</b>	Sccally Ch 3, 4
12 (Nov 7)	Land Cover/Land Use Mapping Change Detection	D2L- Reading 11 Sccally Ch 7
13 (Nov 14)	Applications for LIDAR Data	D2L- Reading 12
14 (Nov 21)	Viewsheds and Watersheds Line of Sight Analysis	Chang Ch 14
15 (Nov 28)	Final Project Work Time  <b>Final Project Due Friday, December 2nd, 5:00 pm</b>	no reading
16 (Dec 5)	<b>Final Project Poster Presentations</b>	no reading

17 (Dec 12) **FINALS WEEK** no class  
**Lab Outline** (dates subject to change)

Week	Lab	Exercise
2 (Aug 29)	Lab 1: Reviewing ArcMap; Map Design <b>Due: Sep 15th, Beginning of Class</b>	GIS Basics Lab
4 (Sep 12)	Lab 2: Heads-up Digitizing <b>Due: Sep 29th, Beginning of Class</b>	Digitizing Lab
6 (Sep 26)	Lab 3: Project Proposal PowerPoint <b>Due: Oct 13th, Beginning of Class</b>	PowerPoint Lab
8 (Oct 10)	Lab 4: Emergency Response GIS <b>Due: Oct 27th, Beginning of Class</b>	ALOHA Lab
10 (Oct 24)	Lab 5: Selman Living Lab Land Cover <b>Due: Nov 11th, Beginning of Class</b>	Selman Lab
12 (Nov 7)	Lab 6: Prairie Ecosystem Management Monmonier Ch 11 <b>Due: Nov 24th, Beginning of Class</b>	Wichita Mountains Lab