



Instructor: Christine Koeller., GISP

Office location: Science Building, Room B329

Office hours: Tuesday 3:00pm to 4:00pm, Thursday 10:00am to 11:00am or by appointment
(e-mail to schedule an appointment)

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Instructor: Tim Krause, PhD

Office location: Science Building, Room B246

Office hours: Monday/Wednesday 10:00am-11:00am Tuesday/Thursday 3:00pm-4:00pm or
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Class meets at the following times: Science Building, Room D326 (SIAL)

- Monday: 16:00-16:50
- Wednesday : 15:00-16:50

Course Description:

This course introduces principle and practical applications of mobile GIS. Mobile project design, development, synchronization, maintenance, and deployment will be covered. We will also explore the use of various global position systems technology.

Course Learning Outcomes:

After successful completion of this course students will be able to:

- Plan, implement and evaluate mobile GIS applications
- Describe components required for mobile application deployment
- Describe how GPS works with non-differential and differential mobile GPS configurations
- Acquire location-based data with a mobile GPS device
- Synchronize, store and display mobile GIS data

Required reading materials

- [Mapping in the Cloud. Michael P. Peterson. The Guilford Press, New York. 2014.](#)
This textbook is available for checkout in the GIS Center located in the Science Building, Room B307A. Contact Diane Stelzer to receive a copy. Your textbook must be returned before the end of the semester in good condition.
- Additional readings will be available on D2L.



Student Evaluation:

The grade you earn in this course will be based on participation, quizzes, exams, and hands-on exercises.

Participation:

- Attendance is **required** in order to participate in class and includes attending the entire class periods each week. You are expected to be prepared to discuss the daily topic, having previously completed any assigned readings and/or homework.
- Student conduct during class and lab times will be part of your evaluation. A positive learning environment will be maintained at all times during this course.
- Attendance will be recorded according to the UWSP attendance policy. More than two unexcused absences will result in a lower participation grade.
- Absences may be excused if you make arrangements with your instructor prior to the start of class.

Examinations: There will be one final examination in this course. The final exam is 100% comprehensive and will cover all topics presented throughout the semester. A combination of multiple-choice, true/false, matching, ordering, problem-solving, short answer and long answer questions may be used. If you miss the exam without prior coordination with the instructor, you will be assigned zero points for that exam.

Quizzes: There will be several required quizzes during this course which will cover the required readings and class topics. Most quizzes will be administered through D2L over a multiple-day window; however, you may also be asked to complete a quiz during class time. It is your responsibility to learn when quizzes are available and due. You will not be allowed to complete quizzes after the due date and time **unless** arranged with an instructor before its due.

Spelling and grammar: This is a university course, written composition along with spelling and grammar will be evaluated as part of your grade.

Hands-on Exercises:

A portion of this course includes hands-on mobile GIS exercises that enforce learning outcomes. You will incorporate what you learn in lectures and readings to the hands-on exercises.

Accessing Exercise Data and Saving your Work

GIS hands-on exercises are primarily conducted on a UWSP network location. Each student is assigned a network folder located within the following server location (**z:\uwsp.edu\files\CLS\GEO\classes2**). Completed exercises should be saved in your student folder on this server. In addition, you will be asked to upload completed exercise materials to the D2L Dropbox for grading. You will find a brief overview of accessing your course folder in D2L under the content section.

Complimentary copies of ArcGIS for Desktop software for educational use are available for student use and expire one calendar year after installation. UWSP does not provide installation support for ArcGIS Educational licenses. Contact your instructor if you would like to receive a student license to ArcGIS for Desktop.



Hands-on Exercise Expectations

- Hands-on exercises vary in length. In general exercises take 2-6 hours to complete which may require time outside of class.
- Written composition along with spelling and grammar will be evaluated as part of your grade.
- Lab computers are to be used **ONLY** for the assignments or approved resources. No other software is permitted to be used during class (e.g. texting, email, Facebook, etc).
- You are highly encouraged to seek instructor support during normal class times and office hours. Alternative arrangement can be made by appointment.
- Instructor assistance is not available during weekends and evenings; you must plan accordingly! Emails received after 3:00pm will be answered the next day of classes.

Exercise Due Dates: Please note that hands-on exercises are typically due at 11:59pm the night prior to your subsequent scheduled lab. Instructor assistance is not available during weekends and evenings, please plan ahead of time to receive assistance.

Penalty for late Exercises: Exercises submitted late are subject to a **10%** deduction of the total points possible earned for each day after the due time/date. You **MUST** notify the instructor via email when a late exercise is ready for grading. Exercises more than one week late will not be graded and a score of zero will be assigned.

Lab Policies: D326 (SIAL) is available for you to work on lab exercises **only** when another course is **not** in progress. The lab schedule is posted on the door. You may check out building and room keys for the semester from the Geography Department Associate, Mary Clare Sorenson, in Science Building, room D332. The doors to the SIAL should remain closed and locked at all times. **You are responsible for ensuring that the door is closed and locked whenever leaving D326.**

Grading scheme: Students will be evaluated during this course based on the following grading scheme:

Item	Total Points Available	Percent of Grade
Final exam	15	15%
Quizzes	20	20%
Hands-on Exercises	30	30%
Midterm Project	25	25%
Participation & Attendance	10	10%
Total	100	100%



<u>Letter Grade</u>	<u>Minimum Percentage Required</u>
A	93
A-	90
B+	87
B	83
B-	80
C+	77
C	73
C-	70
D+	67
D	63
F	<63

Course Management: This course uses Desire2Learn (D2L) for course management and administration. Course information, grades, lecture information, and supplemental reading materials will be accessed and circulated via D2L. Course announcements will be communicated via your UWSP email and/or through the D2L Newsfeed. Check your UWSP email and D2L messages regularly!

Graduate Students: To receive graduate credit (Geography 688), graduate students are required to complete a Mobile GIS-related project that demonstrates a core, mobile GIS-related topic and is related to the student's graduate research. Topics will be agreed upon by the instructor and graduate student prior to February 24. Graduate projects will be presented orally to the class. Your graduate project is worth 10% of your overall course grade.

Classroom policies:

- Mute the sound on all cell phones and electronic devices during class.
- Classes start **promptly** at the assigned time, please show up on time.
- Email and D2L are the preferred methods of communication outside of our scheduled classes.
- Plagiarism and cheating are **NOT** tolerated. UWSP procedures will be followed if students are suspected of plagiarizing materials or cheating (review academic misconduct outlined at: <http://www.uwsp.edu/stuaffairs/Documents/RightsRespons/SRR-2010/rightsChap14.pdf>). At a minimum, any assignment, quiz, exercise, or exam in which cheating or plagiarism is found will result in zero credit/points for that assignment, quiz, exercise, or exam. Additional penalties may apply as outlined in chapter 14 of the UWSP Handbook.

Disability Services:

- If you require unique or special classroom accommodations, please contact me and I will make every effort to accommodate. See <http://www.uwsp.edu/disability/Pages/faculty/accomodations.aspx> for additional information.

Please Note: The instructor maintains the right to change this syllabus and course proceedings as necessary.



UW-Stevens Point Emergency Procedures:

- **Medical Emergency:** In the event of a medical emergency call 9-1-1 or use Red Emergency Phone (if available). Offer assistance if trained and willing to do so. Guide emergency responders to victim.
- **Tornado Warning:** In the event of a tornado warning, proceed to the lowest level interior room without window exposure at [e.g. second floor hallways, SCI A224/225]. See www.uwsp.edu/rmgt/Pages/em/procedures/other/floor-plans.aspx for floor plans showing severe weather shelters on campus. Avoid wide-span structures (gyms, pools or large classrooms).
- **Fire:** In the event of a fire alarm, evacuate the building in a calm manner. Meet at Parking Lot T. Notify instructor or emergency command personnel of any missing individuals. For more information on fire emergency procedures, review the following:
<http://www.uwsp.edu/rmgt/Pages/em/procedures/grounds/fire-explosion.aspx>.
- **Active Shooter/Code React:** Run/Escape, Hide, Fight. If possible, your best option is to run away from the attacker to safety. If trapped hide, lock doors, turn off lights, spread out and remain quiet. Call 9-1-1 when it is safe to do so. Follow instructions of emergency responders. If you are unable to escape, use your best judgment. Review the Active Shooter/CODE REACT procedures on campus at <http://www.uwsp.edu/rmgt/Pages/em/procedures/violence/active-shooter.aspx>.



Course Topics

Topic 1: What is GIS?

Students will be able to...

- 1) Define a Geographic Information System.
- 2) Define and describe fundamental components that comprise a functional GIS.
- 3) Identify practical uses for GIS.
- 4) Define accuracy, precision, resolution, and scale as applied to geospatial data.

Topic 2: GIS Data Models, Attribute Data and Tables

Students will be able to...

- 1) Construct coordinate and attribute data and attribute types (nominal, ordinal, interval, ratio).
- 2) Compare and contrast common spatial data models including Vector and Raster.
- 3) Identify and explain attribute domains.
- 4) Define database and contrast the components and characteristics of a database vs. DBMS.
- 5) List examples of relational databases and explain their uses.
- 6) Explain the procedures to Join and/or Relate two or more data tables.
- 7) Employ the data model abstraction process to create a reality, conceptual, logical, and physical data model for a mobile GIS data collection project.

Topic 3: GPS

Students will be able to...

- 1) Describe the three segments of a Global Positioning System.
- 2) Explain how a GPS measures a position on the earth's surface.
- 3) Compare and classify different errors associated with GPS measurements and subsequent error in data creation.

Topic 4: Web Mapping

Students will be able to...

- 1) Differentiate between web mapping services (WMS) and web feature services (WFS).
- 2) Identify backend databases such as MySQL and PostgreSQL.
- 3) Use Arthur Robinson's Design Control process to create a mobile map.
- 4) Employ the data model abstraction process to create a reality, conceptual, logical, and physical data model for web map design.
- 5) Design and publish web mapping services (WMS) and web feature services (WFS) to ArcServer and ArcGIS Online.
 - a. Include the appropriate feature metadata: Summary, Description, Use and Constraints, Tags, and Credits.
 - b. Describe and employ map caching to published web services.



Topic 5: Mobile-Friendly Web Mapping Applications and Development

Students will be able to...

- 1) Describe and identify GIS applications for mobile viewing of GIS services.
- 2) Use web mapping services (WMS) and web feature services (WFS) into a mobile application.
 - a. Employ the ArcGIS Online Web AppBuilder application to construct mobile-friendly GIS applications.

Topic 6: Mobile Application Data Collection and Development

Students will be able to...

- 1) Describe and identify GIS applications for mobile data collection.
- 2) Employ the data model abstraction process to create a reality, conceptual, logical, and physical data model for a mobile GIS data collection project.
- 3) Construct an Esri file geodatabase with data collection capabilities and attribute domain rules (range and coded values) and publish as a feature layer.
- 4) Describe components of an ArcGIS Online web map with editable feature service/s.
- 5) Utilize the Esri Collector app on a smart phone or tablet to collect feature data.
- 6) Use the AppStudio Wizard to develop a mobile application with the same functionality.
 - a. Compare the differences between the methods.

Topic 7: ArcGIS API for JavaScript and HTML5

- 3) Explore the ArcGIS API for JavaScript Sandbox to write code and display code results immediately.
- 4) Set up an Integrated Development Environment (IDE) for use with the ArcGIS API for Javascript to create a custom theme.

Topic 8: Student Projects

Students will be able to...

- 1) Design a mobile GIS project using design control methods and spatial data model planning abstraction methods.

Topic 9: Explore Open-Source resources for mobile application development

Students will explore the following:

- 1) **Open Data Kit:** <https://opendatakit.org/>
- 2) **PDF Maps:** published by Avenza Systems, Inc. <http://www.avenza.com/pdf-maps>
- 3) **Openstreetmap:** contributing to the open source project.
 - a. Create an Open Street Map account.
 - b. Explore the functionality of the open source mobile application and web application.

These topics are subject to modification at the instructor's discretion and/or the actual class progress.



LAB USE REGULATIONS:

Department of Geography and Geology

**CARTOGRAPHIC/GIS/REMOTE SENSING COMPUTER LABS – Rooms B308/B312 COMPUTER
GEOGRAPHICS LAB - Room B346, SPATIAL INFORMATION ANALYSIS LAB (SIAL) -- Room D326**

1. Geography and Geology computing labs are NOT public computing labs. Computing labs maintained by the Department of Geography and Geology are to be used **exclusively** by students enrolled in geography and geology classes requiring their use or when given special permission by a faculty member of the Department of Geography and Geology.
2. **AUTOMATIC SUSPENSION OF ROOM KEY PRIVILEGES.** The Department of Geography and Geology will monitor computer usage. Students who log on to department computers for friends who do not have permission to use Geography and Geology computing labs will automatically have their room key privileges suspended. Automatic suspension will also occur if students provide their user name and password to friends for the purpose of providing them with access to Geography and Geology computers when permission has not been given by the Department.
3. Doors to the lab rooms must always be shut and locked by the last student to leave the room. For security purposes no room should be left open or unlocked if it is not being occupied.
4. Computers needed for classroom instruction will have priority over individual use. Faculty permission is required for student use of computers during classroom instruction.
5. Students are not allowed to bring friends or guests along with them when using the labs.
6. No food, beverages, or tobacco are permitted in the labs.
7. Headphones are required for any audio applications. The Department does not supply headphones.
8. Students are not allowed to modify hardware and software configurations.
9. Students who break or damage equipment will be responsible for the repair or replacement of such equipment.
10. Courteous behavior is required at all times.
11. **Access to Geography and Geology labs and computer labs after hours is a privilege not a right.** Students checking out keys for the labs (and the Science Building) are responsible for their security. Keys must be checked out through the Geography and Geology Office only with the permission of the instructor. Students who do not return their keys at the end of the semester or academic year will have their grades withheld.
12. Failure to comply with any of these rules will result in suspension of a student's privilege to use the labs. First Violation – Warning Issued; Second Violation – Suspension of Room Key Privileges. Automatic suspension supersedes a first violation warning. A First Violation may result in an immediate suspensions/revocation depending upon the severity of the violation.