GEOG 488/688, WDMD 345 or HTI 345
Mobile GIS Techniques
Syllabus Spring 2018

University of Wisconsin Stevens Point

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Class meets:

- **Science Building, Room D326 (SIAL)**
- Mondays/Wednesdays: 15:30-16:45

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.
Prerequisites for GEOG 443: GEOG 341
Prerequisites for WDMD345/CIS345:

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.
  ISBN-13: 978-1462510412
  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.

Student Evaluation:
The grade you earn in this course will be based on participation, quizzes, assignments, projects, and presentations.

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.
- You are expected to engage and participate in all class discussions and assigned group work.
- Absences may be excused if you make arrangements with your instructor *prior to the start of class*.

Quizzes: There will be required quizzes given during this course which will cover the required readings and lecture topics. Most quizzes are 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 by attending class. *There will be no make-up for missed quizzes.*

Assignments:
A portion of this course includes hands-on mobile GIS assignments that enforce learning outcomes. You will incorporate what you learn in lectures and readings to the hands-on assignments. This is a university course, written composition along with spelling and grammar will be evaluated as part of your grade when completing projects.

Projects: There will be assigned classroom projects that apply techniques learned in lecture and assignments.

Presentations: You will be asked to give individual or group presentations throughout the course. During presentations, you will be asked to demonstrate your knowledge with the project and your ability to present information effectively to a group. A final class presentation will be assigned in lieu of a final examination and will take place during your final exam period.

Accessing Assignment Data and Saving your Work

Hands-on Mobile GIS assignments 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 assignments should be saved in your student folder on this server unless otherwise specified in the assignment instructions. In addition, you will be asked to upload completed assignment materials to the D2L Dropbox for grading. You will find a brief overview of accessing your course folder in D2L under the content section.

Hands-on Assignment Expectations

- Hands-on assignments vary in length. In general assignments 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 arrangements 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.

Assignment Due Dates: Assignment due dates will be announced in class, it is your responsibility to learn what is assigned and when it is due. Instructor assistance is not available during weekends and evenings, please plan ahead of time to receive assistance, extensions will not be given over weekends or holidays.

Penalty for late Assignments: Assignments 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 assignment is ready for grading. Assignments more than one week late will not be graded and a score of zero will be assigned.

Classroom Policies: D326 (SIAL) is available for you to work on classwork and class assignments ***only*** when another course is ***not*** in progress. The room 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 must remain closed and locked at all times.*** **You are responsible for ensuring that the door is closed and locked whenever leaving D326**. Failure to comply will result in a loss of access priviledges.

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

Item	Percent of Grade
Quizzes	20%
Assignments	20%
Projects	30%
Presentations	20%
Participation	10%
Total	**100%**

Note: All assessments are weighted per the grading scheme shown above.

Letter Grade	Minimum Percentage Required
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 Communication: Most course communication including assignment due dates, assigned quizzes, and work instructions will be communicated ***in class***. If you are not able to attend class, it is your responsibility to learn what you missed and make sure your work is turned in on time.

Graduate Students: To receive graduate credit (Geography 643), 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 23. 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.

Disability Services:

- The University of Wisconsin Stevens Point is committed to providing students with disabilities the academic accommodations and auxiliary aids necessary to ensure access to all university services, programs and activities. If you require classroom accommodations, you must notify me of your registration with the Disability and Assistive Technology Center within a reasonable timeframe and I will make every effort to accommodate your request. See http://www.uwsp.edu/disability/Pages/faculty/accomodations.aspx for additional information.
- The **Disability and Assistive Technology Center** is located in 609 Albertson Hall and can be contacted by phone at (**715) 346-3365 (Voice) (715) 346-3362 (TDD only)** or via email at datctr@uwsp.edu.
- UW-Stevens Point will modify academic program requirements as necessary to ensure that

they do not discriminate against qualified applicants or students with disabilities. The modifications should not affect the substance of educational programs or compromise academic standards; nor should they intrude upon academic freedom. Examinations or other procedures used for evaluating students' academic achievements may be adapted. The results of such evaluation must demonstrate the student's achievement in the academic activity, rather than describe his/her disability.

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.

Academic Misconduct: UW-Stevens Point Chapter 14 (link)

There is no tolerance for Academic Misconduct in this course. I expect everyone to work independently to complete assignments, labs, quizzes, and examinations. Academic misconduct is subject to Disciplinary Sanctions as outlined in Chapter 14.04 of the student academic standards and disciplinary procedures.

UWSP 14.03 Academic Misconduct Subject to Disciplinary Action

(1) Academic misconduct is an act in which a student:

(a) Seeks to claim credit for the work or efforts of another without authorization or citation;
(b) Uses unauthorized materials or fabricated data in any academic exercise;
(c) Forges or falsifies academic documents or records;
(d) Intentionally impedes or damages the academic work of others;
(e) Engages in conduct aimed at making false representation of a student's academic performance; or
(f) Assists other students in any of these acts.

(2) Examples of academic misconduct include, but are not limited to: cheating on an examination; collaborating with others in work to be presented, contrary to the stated rules of the course; submitting a paper or assignment as one's own work when a part or all of the paper or assignment is the work of another; submitting a paper or

assignment that contains ideas or research of others without appropriately identifying the sources of those ideas; stealing examinations or course materials; submitting, if contrary to the rules of a course, work previously presented in another course; tampering with the laboratory experiment or computer program of another student; knowingly and intentionally assisting another student in any of the above, including assistance in an arrangement whereby any work, classroom performance, examination or other activity is submitted or performed by a person other than the student under whose name the work is submitted or performed.

UWSP 14.04 Disciplinary Sanctions

1. The following are the disciplinary sanctions that may be imposed for academic misconduct in accordance with the procedures of s. UWSP 14.05, 14.06 or 14.07:
   (a) An oral reprimand;
   (b) A written reprimand presented only to the student;
   (c) An assignment to repeat the work, to be graded on its merits;
   (d) A lower or failing grade on the particular assignment or test;
   (e) A lower grade in the course;
   (f) A failing grade in the course;
   (g) Removal of the student from the course in progress;
   (h) A written reprimand to be included in the student's disciplinary file;
   (i) Disciplinary probation; or
   (j) Suspension or expulsion from the university.

(2) One or more of the disciplinary sanctions listed in sub. (1) may be imposed for an incident of academic misconduct.

Course Topics (in no particular order)

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: What is an Information System?

Students will be able to…

1) Define information system.
2) Identify the components of an information system.
3) Contrast GIS and IS.

Topic 3: Heuristic Reviews
Students will be able to...

1) Describe heuristic reviews and what they're used for.
2) Develop a heuristic review to for mobile GIS applications.

Topic 4: GIS Data Models, Attribute Data and Tables
Students will be able to…

1) Define 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) Employ the data model abstraction process to create a reality, conceptual, logical, and physical data model for a mobile GIS data visualization project.

Topic 5: 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.
4) Employ GPS technologies for mobile, field data collection.

Topic 6: Web Mapping
Students will be able to…

1) Differentiate between web mapping services (WMS) and web feature services (WFS).
2) Use Arthur Robinson's Design Control process to create a mobile map.
3) Employ the data model abstraction process to create a reality, conceptual, logical, and physical data model for a mobile GIS data visualization project.
4) Design and publish web mapping services (WMS) and web feature services (WFS).

a. Include the appropriate feature metadata: Summary, Description, Use and Constraints, Tags, and Credits.
b. Describe and employ map caching to published web services.
c. Describe and employ minimum and maximum map scales for data visualization and feature labeling.

Topic 7: Development of Mobile-Friendly Web Mapping Applications for Data Visualization
Students will be able to…

1) Describe and identify components of mobile-friendly web mapping applications.
2) Develop a mobile-friendly web mapping application for data visualization.
    a. Integrate web mapping services (WMS) into a mobile application.
    b. Configure pop-up boxes.
    c. Integrate media such as audio, video, and photo files.
    d. Employ ArcGIS Online's Web AppBuilder application to construct mobile-friendly GIS applications.

Topic 8: Development of Mobile-Friendly Applications for Data Collection
Students will be able to…

1) Describe and identify the components of GIS applications for mobile data collection.
2) Differentiate between data collection and data visualization mobile applications.
3) Employ the data model abstraction process to create a reality, conceptual, logical, and physical data model for a mobile GIS data collection project.
4) Utilize the Esri Collector app on a smart phone or tablet to collect mobile data.

Topic 9: Native Application Development with AppStudio

5) Utilize AppStudio to develop a native, Android mobile application with location capabilities.

Topic 10: Explore Open-Source tools in mobile GIS
Students may explore the following:

1) **Open Data Kit**: https://opendatakit.org/
2) **QGIS and Geoserver integration with Amazon Web Services.**
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.

The instructors reserve the right to modify, delete, or add course topics based on course progress, student interest, and current trends in Mobile GIS.

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.