University of Wisconsin
Stevens Point

Instructor:	Douglas Miskowiak, GISP. GIS Instructional Administrator.
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Class Schedule:	Section 1. Lecture/Lab. T, Th 2 PM – 3:50 PM In-Person

Course Description: Effectively construct, integrate, design, and implement geodatabases. Examine storage, cataloging, maintenance, and use of geospatial data within practical applications. 2 hours lecture, 2 hours lab per week. Available for graduate credit as GEOG 542.

Course Overview: This intermediate GIS course explores the structure and design of geospatial databases to address societal needs of recording, documenting, analyzing, and sharing information about Earth and its physical, natural, cultural, and human systems. The course examines the database design process to conceptualize and then logically and physically (digitally) represent and inventory the subset of reality that is important for solving an identified problem (e.g. document who owns land, determine the path where water flows and accumulates, determine the best path). Students will explore and dissect professionally endorsed data models that include, but are not limited to: the land/tax parcel, hydrologic networks, utility/transportation networks, raster data model, geo-relational, object-relational, and more. Students will use Esri's ArcGIS Pro and ArcGIS Online as the primary means to create and leverage database creation. Microsoft SQL Server will be used to explore the geo-relational model and use of the Structured Query Language. Students will complete various professional competencies consistent with the GIS Professional Body of Knowledge and complete various professional certifications.

Learning Outcomes: After taking this course, students will be able to…
- Classify the hierarchy of data, information, evidence, knowledge, and wisdom.
- Explain what purpose data serves in society.
- Recognize the differences between a GIS data model and a database.
- Abstract reality into conceptual, logical, and physical forms for database creation.
- Describe the characteristics and uses of the raster data model.
- Compare and contrast raster data formats and circumstances for use.
- Describe the characteristics and uses of the relational data model.
- Utilize the Structured Query Language (SQL) to manage data.
- Describe the characteristics and uses of the object-oriented/object-relational data model.
- Utilize ArcGIS Pro to examine, use, and design a geodatabase for addressing a societal need.
- Explain the benefits of conducting strategic planning for GIS in an organization.
- Conduct a situational assessment to determine a fit for GIS in an organization.
- Conduct a requirements evaluation to determine a fit for GIS in an organization.
- Summarize and utilize the core elements of various professionally sanctioned data models.
- Design and implement a data model to address a societal need.

Course Format: This course is taught face-to-face. Some course materials and content may be delivered asynchronously online, disseminated using Canvas. Lectures, reading materials, lab assignments, examinations, and other learning resources are available via Canvas. *Contact your instructor if you need assistance using Canvas.* The course consists of:

1. Attendance
2. Lectures
3. Online Learning Resources
4. Practice Quizzes
5. GIS Lab Assignments
6. Topical Exams
7. Final Project

1. **Attendance:** Attendance will be managed per the UWSP attendance policy. Attendance in the classroom is **mandatory**. Exceptions can be made for students that must attend in an asynchronous format – contact your instructor in this case. Professionally/academically related participation and engagement among students and between students and the instructor is an important part of the human learning experience. If you are unable to attend the in-person classroom, you are expected to engage with your instructor in another way – such as by asking questions via email. If you don't have any questions, simply engage with a simple "hello." Just let your instructor know that you're a human willing to participate in civil society. Attendance is worth 100 POINTS toward your final grade. Students who miss 5 or more class periods and who fail to communicate attendance with the instructor **will lose all attendance points**.

   Attendance Conduct: Be respectful to your peers and instructor. Attend class on time. Unexcused tardiness will result in a loss of attendance points. Engage with your instructor. Learning is greatly enhanced when students actively engage with their peers and instructor. Be ready to address questions from previous lectures and the current lecture.

2. **Lectures:** Lectures concentrate on sharing professional and authoritative GIS data modeling procedures. Materials gathered by your instructor come from the professional GIS community and are commonly used in professional practice. Lectures provide the foundational body of knowledge important to communicating effectively as a professional and for understanding the concepts behind practical applications. Lectures are conducted in person.

   Lecture Expectations
   - Attend every lecture – attendance will be taken
   - Take your own personal notes to supplement the presentation
   - Ask your instructor questions when you don't understand a topic
   - Engage with your instructor and your peers – share your own perspectives.

3. **Online Learning Resources:** Readings, videos, and other learning resources are made available to students via Canvas. These resources will be organized by lecture topic. No book purchase or rental is required for this course. An online book will be made available on Canvas.

    Online Learning Resources Expectations
    - Read or complete the resources associated with each lecture topic
    - Take your own personal notes to summarize the learning resource
    - Student understanding of online resources will be assessed using examinations

4. **Practice Quizzes:** Practice quizzes will accompany lecture topics and learning resources as an aide to student learning. Practice quizzes are not graded. Students can take a practice quiz an unlimited number of times to help prepare for examinations. Practice quizzes are available via Canvas.

    Practice Quizzes Expectations
    - Complete the practice quiz during the week associated with lecture
    - Take practice quizzes to determine your progress
    - If you're having difficulty answering a question, ask your instructor for help

5. **GIS Lab Assignments:** GIS Lab Assignments will be assigned that require students to learn and practice various GIS data modeling and database design competencies. Students will use ArcGIS Pro and other software/equipment to complete hands-on exercises. Lab assignments are worth 25 – 50 points each, for a total of 500 course points.

    All students have a class folder made available on UWSP servers, often referred to as the Z drive. Students will access data and projects and save their work to their project folders. Your instructor will provide instructions about how to access the student folder.

    GIS Lab Assignment Expectations
    - Lab instructions are provided that guide the student through the exercise
    - Grading rubrics describe how students earn points for their work.
    - GIS Lab Assignments are worth a total of 500 course points
    - Individual assignments vary from 25 to 50 points each
    - Depending upon student skill, each assignment will take 1 to 4 hours to complete
    - Late assignments will not be assessed, except in extreme circumstances. Contact your instructor prior to the due date if you're having difficulty completing an assignment on time.
    - Note due dates!

6. **Topical Exams:** There are two topical examinations, a *mid-term*, covering the first half of the course, and a *final comprehensive exam*. The exams will test your understanding of GIS data models, modeling

concepts, and their application. A combination of multiple-choice, multiple-selection, true/false, matching, and short answer questions should be expected. Topical exams are conducted via Canvas. Topical exams are worth 200 points toward your final grade, 100 points each.

Topical Exam Expectations

- Each exam counts for 10 percent of your final grade.
- Exams are available on Canvas. The exam is timed. Once you begin the exam, you must finish it through to completion.
- Exams are open book and open note.
- **You are not allowed to receive assistance from or give assistance to others in taking the exams. This is considered cheating and UWSP Chapter 14 policies will be pursued.**

7. **Final Project:** Students will complete a final project to show a mastery of learned data modeling and database design competencies. The student will develop and implement a database schema. The final project is worth 200 points or 20 percent of your final grade. As part of the final project the student will:
    - Develop a basic strategic plan, including a situation assessment and requirements evaluation to address: How will GIS and GIS data be used in this organization? Students will focus on implementing data for a single informational product.
    - Develop a conceptual data model of the problem in reality.
    - Develop a logical data model of the problem using an Object-Relational model that considers Features, Objects, Topologies, Relationship Classes, Subtypes, and Domains.
    - Implement a physical data model using ArcGIS Pro. (start to implement a prototype of your model, complete with representative features, objects, and previously listed behaviors)
    - Communicate your data model during a 15 – 20-minute presentation to the class.

Final Project Expectations

- The final project is worth 20 percent of your final grade.
- Final project materials should be well-organized in your Z Drive student folder.
- Engage regularly with your instructor and peers for guidance.
- Use professional and authorized models for guidance.

Evaluation and Grading: One-thousand total points are possible in this course. Students are graded based upon attendance, GIS lab exercises, topical exams, and a final project.

Attendance	= 100 Points (Can't earn if you miss 5 or more class periods and fail to communicate attendance with your instructor)
GIS Lab Exercises	= 500 Points (25 – 50 Points each)
Midterm Topical Exam	= 100 Points
Final Topical Exam	= 100 Points
Final Project	= 200 Points
Total	= 1000 Points

Ranges of percentages, course points and their equivalent letter grades are shown below. By referring to this table you can determine your letter-grade standing at any point in the course.

Percent	1000 Points	100 Points	50 Points	25 Points	Letter Grade
93-100	930	93	46.5	23.25	A
90	900	90	45	22.5	A-
87	870	87	43.5	21.75	B+
83	830	83	41.5	20.75	B
80	800	80	40	20	B-
77	770	77	38.5	19.25	C+
73	730	73	36.5	18.25	C
70	700	70	35	17.5	C-
67	670	67	33.5	16.75	D+
63	630	63	31.5	15.75	D
<63	<630	63	<31.5	<15.75	F