

## DSGN116 Syllabus

<b>Instructor:</b>	Paul J. Bauer
<b>Office:</b>	B021
<b>Phone:</b>	(406) 247-3051
<b>Voice mail:</b>	(406) 247-3051
<b>Fax:</b>	(406) 652-1729
<b>E-mail:</b>	pbauer@msubillings.edu
<b>Office hours:</b>	As posted

*Prerequisites: DRFT109, DRFT110*

Alternative learning opportunities including independent study and distance delivery experience exist by obtaining the permission of the instructor.

**Students With Disabilities:** Disability-related information is deemed medical information under Title V of the Rehabilitation Act of 1973 and is considered confidential. Students with disabilities, whether physical, learning or psychological, who believe that they may need accommodations in this class are encouraged to contact Disability Support Services as soon as possible to ensure that such accommodations are implemented in a timely fashion. Please contact DSS to verify your eligibility for any classroom accommodations and for academic assistance related to your disability by calling 657-2283. The DSS contact person at the College of Technology is in room A071 and available Monday-Friday, 9 a.m.-2 p.m. Tutoring services for students are available in the Academic Support Center, A035, Monday through Friday, 8 a.m.-5 p.m.

### **I. COURSE DESCRIPTION**

Occupationally-related issues are studied using Geographic Information Systems (GIS) concepts and cartographic principles integrated with computer-aided design/drafting (CAD).

### **II. TASK INVENTORY**

- A. Define concepts and principles associated with GIS
- B. Define GIS functions and methods of Modeling
- C. Collect and analyze Spatial data and add attributes
- D. Collect and evaluate Raster and Vector file structure

- E. Define Topology and analyze its use in GIS
- F. Collect data from various sources and study data entry methodology
- G. Analyze basic data inventory methods
- H. Define and analyze Basic and Advanced analysis
- I. Study site suitability options and application planning
- J. Study data issues and GIS problems

### **III. PERFORMANCE OBJECTIVES**

Upon completion of this course, students will be able to do the following:

1. Understand what GIS is and apply GIS principles.
2. Understand GIS Modeling concepts
3. Understand spatial data, attributes and the use of a relational database.
4. Identify and manipulate raster and vector data
5. Describe topology and the importance in a GIS
6. Understand the various forms of data acquisition and data entry methods
7. Understand the process of inventory management
8. Describe basic and advanced analysis techniques
9. Understand and describe site suitability and application planning
10. Understand and identify common problems and data issues.

### **III B. CONTENT OUTLINE**

- 1.) GIS and the Information Age
  - a. Introduction
  - b. Information and Change
  - c .Why GIS?

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d .What is GIS?

e .GIS Principles

### 2.) What Does GIS Do?

a. Introduction

b. Preview of GIS Functions

c. Modeling

d. The Nature of GIS

### 3.) Spatial Data

a. Introduction

b. Spatial Data

c. The GIS Database

d. Attributes

e. Data Manipulation Options

f. The GIS Relational Database

g. The Database Approach

### 4.) Raster and Vector Data

a. Introduction

b. Descriptions: Raster and Vector

c. Raster Data

d. Vector Data

e. Raster Versus Vector

f. Raster to Vector

g. Raster and Vector Pros and Cons

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### 5.) Topology

- a. Introduction
- b. Topology and Spatial Relationships
- c. Intelligent Structure
- d. Database Links
- e. Topology and Relational Query
- f. Multiple Connectivity
- g. Topology's Advantages

### 6.) Data Entry

- a. Introduction
- b. GIS Data Acquisition
- c. Remote Sensing
- d. General Reference to Thematic Data
- e. Manual Digitizing
- f. Editing Digitized Data: Problems
- g. Automatic Digitizing
- h. Georeferencing
- i. Digitized File Conversion
- j. Database Construction
- k. GIS and the GPS
- l. Data Output

### 7.) Inventory Operations

- a. Introduction

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- b. List Operations
- c. Database Capabilities
- d. Linking
- e. Graphic Selection Query
- f. Boolean Queries
- g. Measurement
- h. Statistical Reports
- i. Coverage Modification
- j. Graphics Update and Modification
- k. Spatial Deletes
- l. Dissolve
- m. Recode
- n. Taking Stock

### 8.) Basic Analysis

- a. Introduction
- b. Database Recode
- c. Thematics to General Reference
- d. Overlay
- e. Map Algebra and Overlay
- f. Overlay Codes: Planned Results
- g. Overlay Using Weights
- h. Matrix: Add
- i. Matrix Recode Overlay

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- j. Vector Overlay
  - k. Overlay Options
  - l. Clip and Mask
  - m. Scalar Image
  - n. Mosaic with Rotate
  - o. Analysis Method
  - p. Buffers
  - q. Spatial Analysis
  - r. Statistical Reporting and Graphing
  - s. Initial Operations in Brief
- 9.) Advanced Analysis
- a. Introduction
  - b. Proximity Analysis
  - c. Graphics Operations
  - d. Terrain Analysis
  - e. Network Operations
- 10.) Site Suitability and Models
- a. Introduction
  - b. Overlay
  - c. Models
  - d. Application Planning
  - e. Site Suitability and Models Recap
- 11.) Data Issues and Problems

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- a. Introduction
- b. Raster Problems
- c. Second-generation Data
- d. Scale
- e. Edge Matching
- f. Area and Scale Coverage
- g. Data Problems
- h. Data Issues

### **IV. GRADING PROCEDURES**

This course will be graded as follows:

33% assigned tasks

33% tests and lab tests

33% written final test

The following grading standard will be used:

Percentage	Letter Grade	Numerical
95-100	A	(4)
85-94	B	(3)
75-84	C	(2)
65-74	D	(1)
0-64	F	(0)

Late tests or retakes = 66% of grade received

Two week limit on late tests and retakes

The regular attendance of class is considered integral to the academic and technical skills development of students. It is the responsibility of the student to make arrangements with the instructor should extenuating circumstances apply.

## V. STUDENT REFERENCES

(Current textbook/supplies as directed by instructor at start of each semester – list on file in the bookstore)

Recommended Reference:

Library materials  
Classroom materials

## VI. CONTACT HOURS & CREDITS

LECTURE LAB TOTAL HOURS CREDITS

26   6   32   2

## VII. ASSISTANCE

The primary source of assistance is, of course, the instructor. While my primary duties are in the classroom, I also participate in a variety of activities on campus and this often requires me to be in my office or outside of the program area during lab times. Students should not hesitate to bring questions into the office during lab time. If I am involved in counseling or a meeting of some sort, please be patient and be assured that I will address your question as soon as possible.

My priority of response to communication is 1) Email - Always up and functioning on my desktop. This is probably the quickest way to receive an answer. 2) Phone – It's Ok to leave messages but it is difficult to reach me by phone. 3) Written – Notes and reminders are ok, however, written messages are generally not given high priority and are often stacked in forgotten piles which are discarded at the end of each academic year.

Students should also utilize each other as a resource for classroom situations and study groups. This is how information is often shared on the job and often leads to an overall interpretation of information. Of course, this does not apply during testing!

## VIII. METHODOLOGIES AND LEARNING STYLES

The class will generally follow a process of guided exploration of a topic or software, assignment of a task or lab exercise that familiarizes the student with the topic and testing of the students' familiarity with the material.

New information will be distributed using the network. Testing and turning in assignments will also be done using the local area network.

I believe that students should be active participants in their learning. Students that participate in the lecture\demonstration components of the course should have little difficulty mastering the material. Many topics will be covered in this course and the student has a responsibility to explore the subject beyond what is covered in class. It is hoped that this methodology of exploration remains with the student beyond the end of the course and becomes a keystone of a technological curiosity.

## **IX. SAFETY**

While the Drafting Lab areas may be low-risk areas by comparison, safety is always a prime concern. Electrical and lifting hazards are the most obvious concerns and situations should be treated accordingly. Any safety issue should be brought to the attention of the instructor immediately.

Material Safety Data Sheets (MSDS) are posted in the classrooms. All students shall conduct themselves in a safe manner. Students traveling into other labs must abide by posted restrictions including (but not limited to) safety glasses. Classrooms are equipped with first aid stations; a fire extinguisher is located in the hallway.

In case of alarm, students are required to evacuate the building per the evacuation chart located near the door of each classroom. Students should also be alert to situations of violence, extreme weather, etc.

## **X. STUDENT CONDUCT**

Students must read and be familiar with the Code of Conduct as published in the Student Handbook, policies and procedures as outlined in campus publications, MSU-Billings and Drafting Program policies.

Students in this (or any) program of study should be especially aware of the severe consequences of plagiarism. Students that submit work that is not their own will be dealt with quickly and severely. It will be the recommendation of the faculty to remove such students from the University.

Students that have a concern regarding any inappropriate conduct should bring it to the attention of their instructor, advisor. Inappropriate conduct situations will be reviewed immediately.

## **XI. CELL PHONES AND CHILDREN IN THE CLASSROOM**

Given the disruptive potential posed by cell phones, students are asked to keep cell phones off during class lectures. Use of cell phones during laboratory exercises is permissible, but please be considerate of others around you.

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Children, likewise, represent a disruptive element for the classroom. They also increase the risk of accidents occurring in the laboratory. For those reasons, children should not be brought to either the classroom or the laboratory.