

Syllabus

GIS for Natural Resource Management

GIS 250

Grays Harbor College

Meeting Times: **Lecture:** Tuesday, Wednesday, Thursday from 12:00 PM to 12:50 PM.
Lab : Tuesday and Thursday from 1:00 PM to 2:50 PM.

Instructor Name: Narendran Kodandapani, Ph.D.

Office Hours and Location: Wednesday 11 AM to 12 PM in 318 A

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Course Description: The course has been designed with an emphasis on application of GIS for natural resource management. It is assumed that students who enroll into this course would have prior knowledge in both GIS and natural resource management. The course will provide students with specific methods in point pattern analysis and continuous data analysis. The course will also expose students to techniques in aerial photography and digital image processing for assessing natural resources. Detailed case studies demonstrating the application of GIS to natural resources management, such as watershed analysis and radio telemetry studies will be presented. Lectures will be supplemented by visiting guest lectures from practitioners of GIS in natural resource management. This course meets requirements for the Associate of Applied Science Degree in Natural Resources and the Certificates of Completion and Achievement in Geographic Information Systems.

Course Requirements:

Class Participation: 10%
Lab Exercises: 30%
Midterm and Finals: 40%
Research Project : 10%
Weekly Journal: 10%

Class participation: Points will be awarded for active class participation. This includes regular attendance and interaction in the class.

Lab Exercises: All students will be required to complete lab exercises and provide a short summary at the end of each lab week. This should be submitted on the **Tuesday** of each week before lab begins. Quizzes will be conducted as a part of the lab.

Exams: Two exams will be conducted during the course of the quarter. Each will carry 20% of the course evaluation. Exams could be both within class/take home exams.

Research Project: Either individual or group projects relevant to the course should be carried out by each student.

Weekly Journal: A file folder should be purchased and the weekly entry should be filed. A one page summary of the key concepts learnt and skills learnt in the lab should be entered. This should be submitted on the **Tuesday** of each week before lab begins.

Course length: 11 weeks.

Contact Hours: 77

Credit Value: 5 credits

Course Objectives:

- Demonstrate a basic awareness and understanding of GIS applications to natural resource management (*Literacy*).
- Demonstrate an ability to carry out an advanced GIS project with a natural resource management theme (*Disciplinary learning, Social, and Personal Responsibility*).
- Demonstrate an understanding of methods to map, monitor, and assess natural resources in a watershed (*Disciplinary learning*).
- Demonstrate an understanding of the principles of digital image processing applied to natural resource analysis (*Critical Thinking*).
- Demonstrate capacity to apply innovative solutions to natural resource management issues through GIS applications (*Critical Thinking*).
- Demonstrate communication skills in seminar and presentation styles (*Literacy*).
- Develop interpersonal, leadership skills (*Social and Personal Responsibility*).

Course Prerequisites: Principles of GIS II

Required Textbook(s): Remote Sensing Imagery for Natural Resources Monitoring: A Guide for First Time Users. David S. Wilkie and John T. Finn. Columbia University Press.

Supplemental Textbook(s): Supplemental handouts and readings will be handed out throughout the quarter.

Materials and supplies: None

Technology Needed: Access to computer and power point projector will be provided.

Evaluation: Evaluations are based on successfully completing the various requirements listed above.

Grading Policy:

- Maximum of 100%
- A** Grade 93% to 100%
- A-** Grade 90.0% to 92.9%
- B+** Grade 87% to 89.9%
- B** Grade 83% to 86.9%
- B-** Grade 80.0% to 82.9%
- C+** Grade 77% to 79.9%
- C** Grade 73% to 76.9%
- C-** Grade 70.0% to 72.9%
- D+** Grade 67% to 69.9%
- D** Grade 63% to 66.9%
- D-** Grade 60.0% to 62.9%
- F** Grade 59.9% and below

Class Policies

Classroom conduct

Students are required to attend all classes and arrive before class begins. They are expected to remain in class and participate in the entire class proceedings. Interruptions and disruptions during class should be avoided.

Attendance

Attendance is expected for all classes. Points are allotted for active class participation. Extra credit can be obtained for either participating in GIS related meetings and submitting brief reports or from occasional quizzes conducted during class hours. Attendance in class is important as exam questions could be derived from a combination of the textbook, lecture materials, and information provided during the lecture.

Disability Statement:

Any individual who has a documented disability which might interfere with his/her ability to fully participate in this class may be eligible for accommodations. Feel free to contact the instructor of this class as soon as possible or contact the Disability Support Program located on campus in Student Service. Any information regarding disability will be kept confidential.

Assignments/Quizzes

Homework and quizzes will be assigned in the form of in-class and take-home assessments. Assignments will be due on or before the due date. Late submissions will not be allowed. Quizzes will be conducted in class without prior knowledge, hence students will have to ensure attendance and attention in class at all times.

Exams and Paper

Students will be expected to follow the honor code in taking all exams. Students missing exams will lose points and will not be offered makeup exams, exceptions will be considered only under genuine circumstances. Either individual or group research papers will be permitted as research projects. If a group research project is undertaken then all members in the group must contribute to the project as well as the outputs from the research project will be significantly greater.

Outline

Week 1

- Course mechanics
- Spatial data analysis for natural resources
- Introduction to basic statistics

Week 2

- Point Data Analysis
- Basic statistics to assess point patterns.
- Assessing spatial distribution of trees in forests

Week 3

- Continuous data analysis
- Analysis of Environmental phenomena
- Trend surface analysis, interpolation methods

Week 4

- Watershed analysis
- Flow direction, wetness index.
- Guest lecture

Week 5

- Aerial Photography
- Basic principles
- Applications

Week 6

- Satellite data analysis-1
- Principles of remote sensing for natural resources
- Different satellites

Week 7

- Satellite data analysis-2
- Application of remote sensing to natural resources
- Guest lecture

Week 8

- Digital Elevation Models
- Assessing Slope, Aspect, Azimuth
- Guest lecture

Week 9

- Spatial data collection
- Principles of GPS data collection
- Factors to consider in GPS data collection

Week 10

- Different methods of gps data collection.
- Principles of Radio telemetry.
- Guest lecture

Week 11

- Finals
- Group Presentation