

COURSE NAME

COURSE NUMBER

I. COURSE DESCRIPTION:

In order to properly interpret remote sensing data obtained from natural environments, it is necessary to understand the phenomena that occur in nature. The purpose of this course is to prepare the student in recognizing those aspects of geology, limnology, forestry and geobotany, which can lead to changes, in remote sensing data and to discuss their significance in mineral exploration and renewable resources. The use of guest speakers and seminars will be emphasized.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

Upon successful completion of this course the student will demonstrate the ability to:

1) MUNICIPAL APPLICATIONS OF GIS AND REMOTE SENSING TECHNOLOGY

Potential Elements of the Performance:

- describe the use of satellite and airborne digital data for municipal mapping applications
- describe the use of the applications listed above and others in the operation of an urban municipality

2) RESEARCH ON FOREST HEALTH USING REMOTE SENSING TECHNOLOGY

Potential Elements of the Performance:

- describe the use of satellite and airborne digital data for forest health mapping using remote sensing data

3) EXPLAIN AND PERFORM AIRBORNE LASER DATA PROCESSING

Potential Elements of the Performance:

- explain the concepts and applications of airborne laser data (LIDAR)
- interpolate elevations from airborne laser data
- locate and correct data errors
- produce reports and maps based on real datasets

COURSE NAME

COURSE NUMBER

**II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE
(Continued)****4) RESEARCH ON GEOLOGICAL APPLICATIONS (INCLUDING THE USE OF
GEOBOTANY) USING REMOTE SENSING TECHNOLOGY**

Potential Elements of the Performance:

- visually locate geological features on remote sensing imagery
- classify geological features and create polygon maps from the classifications
- describe the use of remote sensing data for geological applications including geobotany

**5) RESEARCH ON HYDROLOGICAL APPLICATIONS AND WATER
POLLUTION MAPPING USING REMOTE SENSING TECHNOLOGY**

Potential Elements of the Performance:

- describe the use of remote sensing data for hydrological applications and water pollution mapping

**6) OPERATE GLOBAL POSITIONING SYSTEMS AND IMPORT DATA INTO
GEOGRAPHICAL INFORMATION SYSTEMS**

Potential Elements of the Performance:

- explain how Global Positioning Systems work
- capture GPS data in the field
- load GPS data onto GIS computers
- differentially correct GPS data for US military scrambling
- integrate GPS data into Arc-Info GIS
- produce GPS-based map products

**7) RESEARCH ON OTHER GIS APPLICATIONS OF REMOTE SENSING
INCLUDING AGRICULTURE AND ICE PATTERN MAPPING**

Potential Elements of the Performance:

- describe the use of remote sensing data for agricultural mapping
- describe the use of remote sensing data for ice pattern mapping

COURSE NAME

COURSE NUMBER

8) ACQUIRE AND COST SATELLITE AND AIRBORNE IMAGE PRODUCTS

Potential Elements of the Performance:

- estimate number of frames required for coverage of a given area
- cost project, including analysis
- fill out order forms
- produce requisition reports for management

III. TOPICS:**1) MUNICIPAL APPLICATIONS OF GIS AND REMOTE SENSING TECHNOLOGY (4 hours)**

- an introduction to the use of high-resolution satellite and airborne data for municipal mapping applications
- municipal use of digital airphotos, high-resolution satellite data, and lower resolution SPOT and IRS data

2) RESEARCH ON FOREST HEALTH USING REMOTE SENSING TECHNOLOGY (4 hours)

- an introduction to forest health mapping using remote sensing imagery
- examples from the Turkey Lakes watershed study area
- practical mapping of forest health

3) EXPLAIN AND PERFORM AIRBORNE LASER DATA PROCESSING (4 hours)

- an introduction to the use of airborne lasers for various mapping purposes including elevation and tree height mapping
- practical airborne laser data processing

4) RESEARCH ON GEOLOGICAL APPLICATIONS (INCLUDING THE USE OF GEOBOTANY) USING REMOTE SENSING TECHNOLOGY (8 hours)

- an introduction to the use of remote sensing imagery for geological mapping
- Practical applications of different types of imagery

5) RESEARCH ON HYDROLOGICAL APPLICATIONS AND WATER POLLUTION MAPPING USING REMOTE SENSING TECHNOLOGY (4 hours)

- an introduction to the use of remote sensing imagery for hydrological mapping
- Special considerations for hydrological mapping

6) OPERATE GLOBAL POSITIONING SYSTEMS AND IMPORT DATA INTO GEOGRAPHICAL INFORMATION SYSTEMS (12 hours)

- an introduction to Global Positioning Systems
- current GPS technology and networks
- field capture of GPS data

COURSE NAMECOURSE NUMBER

- load GPS data onto GIS network computers
 - acquiring differential correction data
 - differentially correcting GPS data
 - overlaying differentially corrected data in a GIS environment
 - GPS map production
- 7) **RESEARCH ON OTHER GIS APPLICATIONS OF REMOTE SENSING INCLUDING AGRICULTURE AND ICE PATTERN MAPPING (4 hours)**
- Radarsat imagery for sea and lake ice mapping
 - bands, angles, and other radar considerations
 - an introduction to the use of remote sensing imagery for agricultural mapping
 - Practical agricultural considerations and mapping
- 8) **SATELLITE IMAGE ORDERING AND COSTING (4 hours)**
- acquiring satellite or airborne imagery
 - estimating number of frames required for full project area coverage
 - project costing and order forms

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

Materials will be distributed by presenters as the course progresses.

V. EVALUATION PROCESS/GRADING SYSTEM:

Practical Assignments	50%
Projects	30%
Seminars	<u>20%</u>
Total	100%

Grading:	A+ = 85% and over consistently
	A = 75-84%
	B = 68-74%
	C = 60-67%
	R = less than 60%

VI. SPECIAL NOTES:Special Needs

If you are a student with special needs (eg. physical limitations, visual impairments, hearing impairments, learning disabilities), you are encouraged to discuss required

COURSE NAME

COURSE NUMBER

accommodations with the instructor and/or contact the Special Needs Office, Room E1204, Ext. 493, 717, 491 so that support services can be arranged for you.

Retention of Course Outlines

It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other post-secondary institutions.

Plagiarism

Students should refer to the definition of "academic dishonesty" in the "Statement of Students Rights and Responsibilities."

Students who engage in "academic dishonesty" will receive an automatic failure for that submission and/or such other penalty, up to and including expulsion from the course, as may be decided by the professor.

In order to protect students from inadvertent plagiarism, to protect the copyright of the material referenced and to credit the author of the material, it is the policy of the department to employ a documentation format for referencing source material.

Course Curriculum Changes

The instructor(s) reserve the right to change course curriculum as necessary.

VII. PRIOR LEARNING ASSESSMENT

Students who wish to apply for advanced credit in the course should consult the instructor. Credit for prior learning will be given upon successful completion of the following:

20%	Final Assignments
30%	Projects
30%	Quizzes
100%	Total
A+ = 95% and over consistently	Grading
A = 75-94%	
B = 58-74%	
C = 40-57%	
D = less than 40%	

SPECIAL NOTES:

If you are a student with special needs (e.g. physical limitations, visual impairment, hearing impairment, learning disabilities), you are encouraged to discuss required learning experiences, learning disabilities, you are encouraged to discuss required