

**SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY  
SAULT STE. MARIE, ONTARIO**



**COURSE OUTLINE**

**COURSE TITLE:** Remote Sensing

**CODE NO. :** NET204

**SEMESTER:** 4

**PROGRAM:** Natural Environment Technician/Technologist

**AUTHOR:** Gerard Lavoie

**DATE:** January, 2017

**PREVIOUS OUTLINE DATED:** Jan., 2016

**APPROVED:** Sherri Smith

Jan., 2017

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**Chair**

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**Date**

**TOTAL CREDITS:** 3

**PREREQUISITE(S):** N/A

**HOURS/WEEK:** 3

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*For additional information, please contact Sherri Smith: Chair of Natural Environment, Business & Design;*

*School of Environment & Technology.*

*(705) 759-2554, Ext. 2811*

**I. COURSE DESCRIPTION:**

This course deals with both the quantitative uses of aerial photographs as well as the qualitative uses. Photogrammetric calculations will be studied. Distances, areas, & directions of target objects will be measured on hardcopy aerial photos and also using digital imagery. Tree species identification in both the Great Lakes-St. Lawrence forest region and the boreal forest region will be viewed stereoscopically on-screen. Remote sensing theory, platforms and applications will be discussed in detail.

**II. LEARNING OUTCOMES AND ELEMENTS OF PERFORMANCE:**

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

1. **Account for topographic displacement when determining distances and directions on hardcopy aerial photographs.**

Potential Elements of the Performance:

- Identify the different components that make up an aerial photograph.
  - Identify different types of hardcopy aerial photographs.
  - Identify the equation inputs for topographic displacement and solve vertical displacement problems.
  - Understand the differences between a map, a vertical photograph and a vertical ortho rectified image.
2. **Accurately determine the scale of hardcopy aerial photographs for usage in distance measurements.**

Potential Elements of the Performance:

- Understand and identify reasons for why scale is not constant within one hardcopy photo, and between sets of photos along a flight line.
- Understand and calculate hardcopy photo scale using two differing methods.
- Calculate the distance between two points on an aerial photograph

3. **Accurately determine directions on standard OMNR aerial photographs**

Potential Elements of the Performance:

- Utilize a navigational protractor with aerial photographs and topographical maps
- Establish directions and locations for field usage
- Successfully identify “tie in points” used for access in the field.
- Understand and minimize topographic displacement for use in plot location and field access.

#### **4. Explain the foundations of optical remote sensing**

##### Potential Elements of the Performance:

- Identify and compare satellite sensors and their utility.
- Describe the electromagnetic spectrum
- Describe energy interactions with earth surface features
- Locate different earth surface features on different band combinations using different satellite sensors.
- Describe & Discuss four (4) types of image resolution

#### **5. Demonstrate knowledge and understanding of digital aerial imagery types.**

##### Potential Elements of the Performance:

- Describe the associated characteristics of both frame and scan-line sensors.
- Identify and gain exposure to: Panchromatic, RGB, and NRG band combinations of ortho-imagery.
- Understand and identify relationships between different image band combinations as they interact with features (vegetation, urban, water, barren...).

#### **6. Identify boundaries for non-forested features using OMNR eFRI and ELC specifications.**

##### Potential Elements of the Performance:

- Gain some introductory exposure to Ecosite Land classification parameters
- Understand the automated water classification concept and methods used for quality control.
- Differentiate between non-forested wetland features. Classify non-forested urban features
- Identify & discuss natural vs. purposed disturbances.

#### **7. Identify delineation boundaries of forested stands**

##### Potential Elements of the Performance:

- Differentiate conifer, hardwood and mixed wood stand types.
- Recognize single and multi-tiered stands.
- Identify plantations and natural regeneration
- Identify wetland species (conifer and deciduous).
- Identify upland species (conifer and deciduous).

**III. TOPICS:**

1. Topographic displacement
2. Aerial photo scale
3. Measuring distances and directions
4. Remote sensing fundamentals
5. Digital aerial imagery
6. Earth feature recognition

**IV. REQUIRED RESOURCES/TEXTS/MATERIALS:**

1. Pocket stereoscope
2. Calculator
3. Metric scale (1:500 to 1:2500)
4. Masking tape
5. 1:50 000 NTS topographic map sheet #41 K/9
6. Navigational Protractor
7. Polarized 3d glasses (provided).

**V. EVALUATION PROCESS/GRADING SYSTEM:**

There are 5 assignments making up 35% of the final grade; 2 written tests, worth 25% each, make up 50% of the final grade. A written report worth the remaining 15% will be assigned at or near the beginning of the semester, due near the end of the course. There will be opportunities during the semester to assess the progress of the written report. Regular attendance is absolutely necessary in order to succeed in this course as there is an abundant amount of learning material to cover.

One of the following semester grades will be assigned to each student:

Grade	Definition	Grade Point Equivalent
A+	90 – 100%	4.00
A	80 – 89%	4.00
B	70 – 79%	3.00
C	60 – 69%	2.00
D	50 – 59%	1.00
F	<50%	0.00 (Fail)

CR (Credit)	Credit for diploma requirements has been awarded.
S:	Satisfactory achievement in field /clinical placement or non-graded subject area.
U:	Unsatisfactory achievement in field/clinical placement or non-graded subject area.
X:	A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course.
NR:	Grade not reported to Registrar's office.
W:	Student has withdrawn from the course without academic penalty.

## VI. SPECIAL NOTES:

### Attendance:

Sault College is committed to student success. There is a direct correlation between academic performance and class attendance; therefore, for the benefit of all its constituents, all students are encouraged to attend all of their scheduled learning and evaluation sessions. This implies arriving on time and remaining for the duration of the scheduled session. *<Optional: It is the departmental policy that once the classroom door has been closed, the learning process has begun. Late arrivers will not be granted admission to the room.*

### Course Outline Amendments:

The faculty member reserves the right to change the information contained in this course outline depending on the needs of the learner and the availability of resources.

### 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 postsecondary institutions.

### Prior Learning Assessment:

Students who wish to apply for advance credit transfer (advanced standing) should obtain an Application for Advance Credit from the program coordinator (or the course coordinator regarding a general education transfer request) or academic assistant. Students will be required to provide an unofficial transcript and course outline related to the course in question. Please refer to the Student Key Dates Calendar for the deadline date by which application must be made for advance standing.

Credit for prior learning will also be given upon successful completion of a challenge exam or portfolio. Student Services can provide information regarding the Prior Learning Assessment and Recognition policy or it can be viewed on the student portal.

Substitute course information is available in the Registrar's office.

### Student Portal:

The Sault College portal allows you to view all your student information in one place. **mysaultcollege** gives you personalized access to online resources seven days a week from your home or school computer. Single log-in access allows you to see your personal and financial information timetable, grades, records of achievement, unofficial transcript, and outstanding obligations. In addition announcements, news, academic calendar of events, class cancellations, your learning management system (LMS), and much more is available. Go to <https://my.saultcollege.ca>.

### Communication:

The College considers **Desire2Learn (D2L)** as the primary channel of communication for each course. Regularly checking this software platform is critical as it will keep you directly connected with faculty and current course information. Success in this course may be directly related to your willingness to take advantage of this Learning Management System (LMS) communication tool.

Accessibility Services:

If you are a student with a disability (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with the Accessibility Services office. Call Ext. 2703 or email [studentsupport@saultcollege.ca](mailto:studentsupport@saultcollege.ca) so that support services can be arranged for you.

Audio and Video Recording Devices in the Classroom:

Students who wish to use electronic devices in the classroom will seek permission of the faculty member before proceeding to record instruction. Students with disabilities who require audio or visual recording devices in the classroom as an accommodation will receive approval from their counselor once the Audio and Video Recording Devices in the Classroom Policy has been reviewed by the student. Recorded classroom instruction will be used only for individual academic use and will not be used for any other purpose. Recordings may only be used for individual study of materials presented during class and may not be published or distributed. Intentional misuse of audio and video recordings or intentional misrepresentation when requesting the use of a device for recording shall constitute a violation of this policy and laws protecting intellectual property.

Academic Dishonesty:

Students should refer to the definition of “academic dishonesty” in the *Student Code of Conduct*. Students who engage in academic dishonesty will be issued a sanction under the Student Code of Conduct which could lead to and include expulsion from the course/program. In order to protect students from inadvertent plagiarism, to protect the copyright of the material referenced, and to credit the author of the material, students must use a documentation format for referencing source material.

Tuition Default:

Students who have defaulted on the payment of tuition) as of the first week of November (fall semester courses), first week of March (winter semester courses) or first week of June (summer semester courses) will be removed from placement and clinical activities due to liability issues. This may result in loss of mandatory hours or incomplete course work. Sault College will not be responsible for incomplete hours or outcomes that are not achieved or any other academic requirement not met as of the result of tuition default. Students are encouraged to communicate with Financial Services with regard to the status of their tuition prior to this deadline to ensure that their financial status does not interfere with academic progress.

**VII. COURSE OUTLINE ADDENDUM:**

The provisions contained in the addendum are located on the portal form part of this course outline.