

## **GEOGRAPHY 4231 - REMOTE SENSING (W15)**

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Instructor: Dr. Bradley A. Wilson  
Office: RC-2006A  
Office hours: Mon & Wed 11:30 - 12:45  
Tue & Thu 10 - 11:15  
Fri 11 - 12:45

Text: Jensen, 2005, Introductory Digital Image Processing

Required Readings: (2 assigned readings in Main Library on 2-hour reserve)

Grading:	Term Paper Abstract	5%	(abstract + 5 ref's due <b>Jan 28<sup>th</sup></b> )
Grading:	Term Paper	25%	(paper due <b>March 30<sup>th</sup></b> )
	*Midterm Exam #1	15%	( <b>Feb 25<sup>th</sup></b> )
	*Midterm Exam #2	25%	( <b>Mar 23<sup>rd</sup></b> )
	*Radar Exam	10%	( <b>Apr 1<sup>st</sup></b> )
	Lab Exercises (5)	20%	(% varies, see next page)

Late penalties on all due material: 10% per day.

\*You must obtain a minimum average grade of 50% on the exams. If your exam average is not above 50% on these three exams, the lab and term paper marks will be dropped and your final mark will be based on the exams only.

\*If you miss an **exam** for any reason other than those deemed acceptable in Lakehead University calendar, then you will be given the opportunity of a essay-based makeup exam that is significantly longer and more difficult.

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### **Course Description:**

This course will introduce the basic concepts of remote sensing, including digital image acquisition, correction, and information extraction. Basics on digital image processing will also be covered. The lab portion of this course includes many commonly used digital image processing tasks and utilization of PCI Geomatica software. A term paper will be written by the student allowing for the opportunity to increase their knowledge on a specific application of remote sensing technology.

### **Student Responsibilities:**

- please attend all classes and arrive on time
- read text or reading before class, make a list of questions and bring them to class, make sure to ask me about them...others will want clarification on these things too!
- please ask questions, all concepts must be clearly understood in order to progress to more advanced topics, please take action if you are confused about any aspect

<b>Week</b>	<b>Topics</b>	<b>Readings</b>
1	Introduction to Remote Sensing	Chap. 1
2	Digital image acquisition systems Term Paper Discussion	Chap. 2 (sensors: ETM+, MSS, SPOT 5 HRVIR, Hyperion)
3	The Remote Sensing Project <i>(Lab #1: Image Recognition <u>3%</u>)</i>	Chapter 6 (pp. 191-222)
<b><u>**Term Paper abstract and 5 ref's due Jan 28<sup>th</sup></u></b>		
4	Geometric / radiometric corrections <i>(Lab #2: Image to Image Registration <u>3%</u>)</i>	Chap. 7
5	Contrast enhancements <i>(Lab #3: Image to Map Registration <u>5%</u>)</i>	Chap. 4
6	Image transformations <i>(Lab #3 cont.)</i>	Chap. 8 (pp. 255-274)
Reading Week – Feb. 16-20		
7	Image transformations & Midterm Review <b><u>Midterm Exam #1 (Feb 25<sup>th</sup>)</u></b>	Chap. 8 (pp. 255-274)
8	Digital image classification <i>(Lab #4: Transforms and Image processing <u>4%</u>)</i>	Chap. 9 (pp. 337-399) & Chap. 13
9	Ancillary/supplemental data <i>(Lab #5: Classification <u>5%</u>)</i>	Chap. 9 (pp. 399-401) & library: <b>Hutchinson, 1982</b>
10	Change Detection & Midterm Review <i>(Lab #5 cont.)</i>	Chap. 12
11	<b><u>Midterm Exam #2 (Mar 23<sup>rd</sup>)</u></b> Principles of imaging radars	library: <b>Lillesand and Keifer, 1994</b>
12	Principles of imaging radars (cont.) <b><u>Radar Exam #3 (April 1)</u></b>	
<b><u>**Term paper due March 30<sup>th</sup></u></b>		