

**NEW YORK CITY COLLEGE OF TECHNOLOGY**  
**The City University of New York**

**DEPARTMENT:** Electrical and Telecommunications Engineering  
Technology

**SUBJECT CODE** TCET4210/TC811 Fundamentals of Microwave  
Remote Sensing

**AND TITLE:**

**COURSE DESCRIPTION:**

This course will cover the concept and applications of microwave remote sensing. Other topics covered are remote sensing platforms, data collection and analysis methods, and types of microwave remote sensing sensors. The combination of Geographic Information System (GIS), and microwave remote sensing provide even more valuable information about the target under study. This and some software packages developed for the analysis of remotely sensed data will be also parts of this course.

**PRE-COREQUISITE:** TCET3222/TC610

**TEXTBOOK:** Introduction to Microwave Remote Sensing  
By Iain Woodhouse,  
University of Edinburgh, Scotland, 2005

**COURSE OBJECTIVES/  
COURSE OUTCOMES:**

Upon the completion of this course, students shall be able to:

1. Explain the principle of microwave remote their sensing based on the behavior of radiowaves in different media (2a).
2. Define remote sensing types and their applications in various fields (2a, 2b).
3. Describe the electromagnetic wave Interaction with particles and explain characteristics of objects under study, based on the analysis of such interactions. (2a, 2f)
4. Analyze the collected data and extract usable information from the digital images obtained in such data. (2a, 2b, 2f).
5. Discuss the joint remote sensing and GIS Data applications in various fields (2a, 2b, 2g).

**TOPICS:**

Topics include fundamentals of remote sensing, remote sensing sensors,  
Microwave remote sensing and sensors, remote sensing platforms and applications

**CLASS HOURS:** 3

**CREDITS:** 3

**PREPARED BY:** Professors M. Razani,  
November 2006

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**GRADING POLICY:** TCET4210/TC811

Homework and class participation 10%  
Exams: 60%  
Final Project 30%

<u>Letter Grade</u>	<u>Numerical Grade Ranges</u>	<u>Quality</u>
A	93-100	4.0
A-	90-92.9	3.7
B+	87-89.9	3.3
B	83-86.9	3.0
B-	80-82.9	2.7
C+	77-79.9	2.3
C	70-76.9	2.0
D	60-69.9	1.0
F	59.9 and below	0.0

**Assessment**

The following assessment techniques are correlated to the course objectives as follows: In addition, each assessment technique incorporates one or more of the following ABET Criterion 2 outcomes (2a, 2b, 2c, 2d, 2f, 2k).

**Course Objectives**

**For the successful completion of this course, the students should be able to:**

1. Explain the principle of microwave remote sensing based on the behavior of radiowaves in different media
2. Define remote sensing types and their applications in various fields.
3. Describe the electromagnetic wave Interaction with particles and explain characteristics of objects under study based on the analysis of such interactions.
4. Analyze the collected data and extract usable information from the digital images obtained in such data.
5. Discuss the joint remote sensing and GIS Data applications in various fields.

**Assessment**

Students will demonstrate their understanding in class assignments and projects

Students will illustrate their learning of the subject throughout the course.

Students will demonstrate comprehension through the correct interpretation of the sample collected data

Students will display competency In the digital image analysis through the assigned projects.

Students will develop the improved level of knowledge from the merged data through class exercises and projects.

### Weekly Schedule

<b>Week</b>	<b>Topic</b>	<b>Homework Assignments</b>
1	<b>Ch. 1: Fundamentals of Remote Sensing</b>	Handout Assignment
2	Ch. 2: Remote Sensing Sensors	Handout Assignment
3	Ch. 2 Cont'd: Remote Sensing Sensors	
4	Ch. 3: Microwave Remote Sensing	Problems 3.1-3.3
5	Ch. 3 Cont'd: Microwave Remote Sensing <b>EXAM 1</b>	
6	Ch. 4: Microwave Sensors	Problems 4.1-4.5
7	Ch. 4 Cont'd: Microwave Sensors	
8	Ch.5: Remote Sensing Platforms	Problems 5.1,5.3,5.7,5.9
9	Ch.5 Cont'd: Remote Sensing Platforms	
10	Ch. 6: Data used in Remote Sensing <b>EXAM 2</b>	Problems 6.1-6.6
11	Ch. 6 Cont'd: Data used in Remote Sensing	
12	Ch.7: Applications of Remote Sensing	Handout Assignment
13	Ch.7 Cont'd: Applications of Remote Sensing	
14	Ch.8: Geographic Information System (GIS) and Remote Sensing	Handout Assignment
15	<b>Final Exam</b>	