University of Puerto Rico
Mayagüez Campus
College of Engineering
Department of Electrical and Computer Engineering
Graduate Program in Electrical Engineering

Course Syllabus

1. General Information:
Alpha-numeric codification: INEL 6007 Course Title: INTRODUCTION TO REMOTE SENSING Number of credits: 3 Contact Period: 3 hours of lecture per week

2. Course Description:
English: History, principles and applications of remote sensing: electromagnetic radiation, aerial photography, land observation satellite system. airborne and spaceborne sensors, data and image analysis/interpretation, pattern recognition, applications on subsurface sensing.
Spanish: Este curso es una introducción a conceptos básicos, historia, métodos, tópicos y aplicaciones en Sensores Remotos. Se estudiarán principios de radiación electromagnética, fotografía aérea, interpretación de imágenes, sistema de satélites para la observación de la tierra, resolución de imágenes, preprocesamiento y clasificación de imágenes.

3. Pre/Co-requisites and other requirements:
Pre-Requisite Topics: 1.   Probabilities 2.   Linear Algebra 3.   Physics 4.   Calculus 5.   Signals and systems 6.   Basic programming skills in MATLAB 7.   Basic optics

4. Course Objectives:
At the end of the course the student should be able to • Describe different modalities and sensor platforms for active and passive remote sensing in different regions of the electromagnetic spectrum • Describe limitations and degradations of remote sensing platform • Describe all processing stages for remote sensing imagery from acquisition to final information product • Combine different signal and image processing algorithms to enhance and extract information from remote sensing imagery • Apply pattern recognition algorithms for image classification, evaluate their performance and assess the accuracy of the derived thematic maps • Use the internet to search for remote sensing imagery • Use the ENVI or MATLAB environments for remote sensing image analysis

5. Instructional Strategies:

☒conference ☒discussion ☒computation ☒laboratory

☐seminar with formal presentation ☐seminar without formal presentation ☐workshop

☐art workshop ☐practice ☐trip ☐thesis ☐special problems ☐tutoring

☐research ☐other, please specify:

6. Minimum or Required Resources Available:

MATLAB or ENVI/IDL to perform computer analysis of remote sensing imagery and computer aided homework.

7. Course time frame and thematic outline

Outline	Contact Hours
1. History and principles of remote sensing	2
2. Introduction to Radiative Transfer and the physics of remote sensing	6
3. Remote sensing using passive and active modalities	6
4. Information extraction from remote sensing imagery	12
5. Hyperspectral remote sensing and information extraction	12
6. Geographic information systems	3
7. Future trends and research presentations	2
Exams	2
Total hours: (equivalent to contact period)	45

8. Grading System

☒Quantifiable (letters) ☐ Not Quantifiable

9. Evaluation Strategies

	Quantity	Percent
☒ **Exams**	**2**	**40**
☒ **Final Exam**	**1**	**30**
☐ **Short Quizzes**		
☐**Oral Reports**		
☐ **Monographies**		
☐ **Portfolio**		
☒ **Projects**	**1**	**20**
☐**Journals**		
☒**Other, specify: homework**	**1**	**10**
TOTAL:		**100%**

10. Bibliography:

1. M.J. Canty, Image Analysis, Classification and Change Detection in Remote Sensing with Algorithms for ENVI/IDL, CRC Press, 2007.
2. F.D. van der Meer and S.M. de Jong, Remote Sensing Analysis: Including the Spatial Domain, Springer, 2006.
3. L.L. Richardson and E.F. LeDrew, Remote Sensing of Aquatic Coastal Ecosystems Processes, Springer, 2006.
4. J.A. Richards and X. Jia, Remote Sensing Digital Image Analysis, 4th Edition, Springer Verlag, 2005.
5. D.A. Landgrebe, Signal Theory Methods in Multispectral Remote Sensing, John Wiley &

Sons, 2003.
6. F.D. van der Meer and S.M. de Jong, Imaging Spectrometry: Basic Principles and Prospective Applications, Kluwer Academic Publishers, 2003.

11. According to Law 51
Students will identify themselves with the Institution and the instructor of the course for purposes of assessment (exams) accommodations. For more information please call the Student with Disabilities Office which is part of the Dean of Students office (Chemistry Building, room 019) at (787)265-3862 or (787)832-4040 extensions 3250 or 3258.

Person who prepared this description and date of preparation:
Miguel Vélez-Reyes, August 2007