YSB 574E
EARTH INFORMATION SYSTEMS

COURSE DESCRIPTION:

The course will cover the fundamental topics in Geographic Information Systems (GIS) and Remote Sensing (RS) through practical laboratory experience. Topics include data structures and basic functions, methods of data capture and sources of data, the nature and characteristics of spatial data and objects, basic concepts of remote sensing, a review of sensors and their images, emphasis on image interpretation and analysis, and introduction to application areas in multidisciplinary studies. Students will become familiar with the basic types and characteristics of maps, air photos, and remotely-sensed images. Students will also learn some of the many skills required to deal with spatial data, from elementary interpretation, measurement, and representation to more sophisticated analytical applications.

The course will consist of two parts;

Part 1: *GIS:* This part introduces geographic information characteristics (data modelling in GIS), hardware and software components of a GIS and reviews GIS applications.

Part 2: *RS and its integration in GIS:* This part introduces basic concepts of remote sensing, remote sensing data characteristics, Remote sensing systems and programs (sensors and platforms), classification and enhancement of satellite images, digital filters and corrections.

LEARNING OUTCOMES:

Upon completion of this course, students will be able to:

- Understand main concepts that define Geographic Information Systems.
- Identify GIS hardware components.
- Describe the geographic space with concepts and terms commonly used to build operating models in GIS.
- Identify typical operations, products/applications, and differences between database models and between raster and vector systems.
- Photo-interpret basic environmental and socioeconomic variables using imageries.
- Use GIS and its geo-processes and functions.
- Apply some basic techniques to thematic mapping design.
- Describe Remote Sensing concepts, physical fundaments and components and adequately use vocabulary, terminology and nomenclature of the discipline.
- Know about main Remote Sensing Systems and programs (sensors, platforms, etc.) and assess its potential to spatial analysis.
- Use main methods to improve, correct and interpret properly Remote Sensing Images.
- Describe factors responsible for the main land cover behaviour.
- Use GIS and RS softwares to perform different spatial analysis and satellite image digital analysis.
- Prepare documents of medium complexity, consisting of text, maps, graphs and tables to clearly present the design specifications of a data model for GIS application.

ASSESSMENT:

Literature Review and Presentation	**25%**
Lab. Exam	**40%**
Final Exam	**35%**

- **Lab. Exam:** Practical experience is the most important way to learn data modeling in GIS and digital image processing hence completing the lab assignment is essential to succeeding in the class. The lab assignment will consist of exercises designed and provided by the instructor.
- **Literature Review and Presentation:** Review and critique 2 articles (by different authors) in the GIS/RS journal literature which deal with the same topic (e.g., analyzing the same or similar phenomena, or using the same analysis procedure). Each student will give a brief presentation (~20min.) about it to the class.
- **Final Exam:** The exam will consist of both short answer-type and hermeneutical questions.

REQUIRED TEXTBOOKS AND MATERIALS:

To be determined by the instructor.

Instructor: Assoc. Prof. Dr. Orkan ÖZCAN (e-mail: ozcanork@itu.edu.tr)