

Course Code

GE08

Course Name

Remote Sensing

Instructor

Dr. Mehmet Lütfi Süzen



Professional Career

Dr. Süzen is currently vice chairman of the Geological Engineering Department in Middle East Technical University. He graduated from same department at 1994, and he had his MSc degree on clay mineralogy at 1996 also from the same department. In 1997 he was granted to Netherlands Fellowship Programme and he spent one year at ITC (International Institute for Geo-Information Science and Earth Observation) excelling at Remote Sensing and Geographical Information Systems. He received his PhD degree at 2002 from Geological Engineering department of METU and he started his academic career there. He got Associate Professor Title at December 2006 on Remote Sensing and Geographic Information Systems (GIS).

Since 2002 Dr. Süzen had involved in many industrial projects both as a consultant or as a project manager, whereas he carried out many scientific projects funded by variety of organizations. He designed a number of tailor-made education programs for many different clients considering their needs about Remote Sensing and GIS. He is currently conducting numerous research and development projects and giving consultancy at METU Technopolis about remote sensing, GIS, geostatistics and Multicriteria decision analyses (MCDA) especially applied to environmental and earth related subjects.

Apart from his professional experience, he is teaching Remote Sensing and GIS courses in undergraduate and graduate level. He also supervised many MSc and PhD theses. He is awarded as Educator of the year in METU in 2004-2005 and in 2007- 2008 semesters and also awarded as the Young Researcher Success Award at 2007.

Course Objective and Description

Remote Sensing is a multi-disciplinary technology used in the investigation of economic natural resources, land-use analysis, prediction of natural hazards and monitoring environmental problems. This technology has recently been an important tool in the evaluation of the surface processes as well as mapping and/or classifying the natural/artificial features. It is widely used in mineral / petroleum exploration in different scales, with different platforms and sensors in a complimentary manner to ordinary exploration styles.

Expected Outcomes:

- to have sufficient knowledge to utilize the remote sensing technology in resource exploration, in hazard assessment and in environmental issues
- to understand the fundamentals of Earth observation concept and to grab the possible data types needed for any type of Earth observation project
- to have an interpretative understanding of types of geo-spatial data recorded in the images
- to digest the spectral reflectance curve concept and to learn the limits of current systems
- to have information on introductory digital image processing to handle the remote sensing data

Who Should Attend

Earth scientists and engineers.

Prerequisite

None

Learning Level

Graduate

Duration

5 days

Course Material

Hard copies of the power point presentations

Course Outline

Day One

- Introduction to Remote Sensing
 - o Definition of remote sensing
 - o History of remote sensing
- Review of Electro-Magnetic Spectrum
 - o Nature of electro-magnetic radiation (EMR)
 - o Fundamental properties of EMR
 - o Wave model and particle model of EMR
 - o Source of EMR and its characterization
- Energy-Matter Interactions in the Atmosphere and In the Terrain
 - o Atmospheric effects on EMR (Refraction – Absorption – Scattering)
 - o Atmospheric transmission windows
 - o Interactions between earth and EMR
 - o Spectral characteristics of basic common targets

Day Two

- Image Data Characteristics
 - o Image acquisition
 - o Spatial resolution
 - o Spectral resolution
 - o Radiometric resolution
 - o Temporal resolution
- Orbits, Sensors and Platforms Geometric Aspects of Imagery
- Satellite systems for Earth Observation

Day Three

- Spectral Reflectance Curves and Their Usage.
 - o Spectral Libraries
 - o Physical properties of earth materials reflected in spectral reflectance curves
 - o Selective absorption and absorption features
 - o Electronic v.s vibrational processes
 - o Identifying minerals
 - o Mixtures of spectral signals
- Image Visualization
 - o Digital image formats
 - o Perception of color
 - o Color theory
 - o Forming color in images

Day Four

- Basic Concepts of Spectral Enhancement
 - o Definition of histogram
 - o Contrast enhancements
- Spatial Enhancements
 - o Filters and types
 - o Lineament analyses

Day Five

- Multiband Operations / Indices
 - o Arithmetic operations
 - o Indices
 - o Ratios
 - o Principal components analysis
 - o De correlation stretch
 - Image Classification
 - o Unsupervised classification
 - o Supervised classification
 - o Assessing the accuracy of classification
 - Discussion on Special Topics/Products/Applications
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Antalya, Turkey
 5-9 Apr
 USS 2,950

Istanbul, Turkey
 27 Sep - 1 Oct
 USS 2,950
