

<b>Course Code</b>	<b>Course Title</b>	<b>Credit Hours</b>
<b>ENS-832</b>	<b>RS &amp; GIS Applications in Environment</b>	<b>3 (2+1)</b>

### **Course Description**

The main objectives of the RS & GIS are to maximize the efficiency of decision making and planning, provide efficient means for data distribution and handling, eradication of the duplicated data, integration of information from many sources.

### **Course Outline**

Review of Basic Remote Sensing, Electromagnetic Spectrum. History and data collection, advantages and limitations of Remote Sensing process. Energy Sources, energy matter interaction in the atmosphere. Aerial photography, history and platforms. Active and Passive remote sensing. Remote sensing of vegetation and landscape. Introduction to Photogrammetry, Satellite Imageries, Image Processing: Image enhancement, Histogram, stretching, color palettes , Contrast enhancement , Linear Stretch , Histogram equalization, Interpretation, visual interpretation, Preparation of thematic maps.

Review of Geographic Information System (GIS). Integration with other technologies and its importance. Data acquisition, analysis and output. Types of data used in GIS. Cartography, map projection and coordinate systems. GIS applications in: Environmental protection and resource conservation, Environmental Impact Assessment (EIA), Agriculture, Forestry, Fishery and wildlife. Introduction to relevant Pakistani Institutions working in GIS.

### **Lab Work**

Review of Image processing and GIS software. Conversion of raster to vector data. Demonstration of GPS operations, Interpretation of satellite images for different application, Ground Truthing. Thematic Maps Generation, Preparation of GIS Maps for different utilities.

### **Recommended Books**

1. Remote Sensing and Image Interpretation. Thomas Lillesand (Author), Ralph W. Kiefer (Author), Jonathan Chipman Wiley; 6 edition (2007) ISBN-10: 0470052457
1. Fundamentals of remote sensing and airphoto interpretation Prentice Hall series in geographic information science Authors Thomas Eugene Avery, Graydon Lennis Berlin Edition 5, 2009 ISBN0023050357
2. Remote Sensing for the Earth Sciences. A. Z. Rancez. John Wiley and Sons. Inc. 1999.
3. A Primer of GIS-fundamentals Geographic and Cartographic Concepts.  
Harvey, F. Guilfoud press New York, 2009.
4. Dynamic Earth Environmental Remote Sensing Observations from shuttle Mission. Lulla, K and L. V. Dess inov. John Wiley and Sons. Inc. 2000.
5. Introduction to GIS. Campbell. Mc Graw Hill Education. 2008.
6. Remote Sensing of the environment: An Earth perspective. Jensen, R. Pearsons Education, Inc. 2000.