**17CE4XO3 – REMOTE SENSING & GIS**

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| **Course Category** | Professional Elective | **Credits** | 3 |
| **Course Type** | Theory | **Lecture - Tutorial - Practical** | 3 - 0 - 0 |
| **Prerequisite** | None | **Sessional Evaluation** | 40 |
| **Semester End Exam Evaluation** | 60 |
| **Total Marks** | 100 |

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| **Course Objectives** | 1. To introduce the basic principles of Remote Sensing and GIS techniques. 2. To learn about various types of sensors and platforms. 3. To learn concepts of visual and digital image analyses. 4. To understand the principles of spatial analysis. 5. To understand the elements of GIS. 6. To learn the applications of RS and GIS to Civil Engineering. | |
| **Course Outcomes** | CO1 | Understand remote sensing terms and concepts of the physical applications of such a system. |
| CO2 | Understand the different technical aspects of a remote sensing network with special emphasis on India remote sensing technology. |
| CO3 | Compare different types of data obtained from a remote sensing network with tools specifically designed for the purpose. |
| CO4 | Understand about various methods of corrections applied to data to ensure maximum credibility and accountability to the data collected. |
| CO5 | Understand the basic concepts of Geographical Information System |
| CO6 | Apply RS and GIS in various fields on water resources engineering. |
| **Course**  **Content** | **UNIT – I**  **FUNDAMENTALS:** Definition – History – Physics of remote sensing – Electromagnetic radiation – Interaction of electromagnetic radiation with atmosphere, earth surface features – Vegetation, soil and water – Spectral signature – Atmospheric windows.  **UNIT – II**  **REMOTE SENSING SYSTEM:** Introduction – Platforms – Types – Satellites – Indian remote sensing satellites.  **SENSORS:** Introduction – Types – Characteristics of sensors – IFOV – Indian remote sensing sensors – LISS – WIFS – PAN.  **UNIT – III**  **VISUAL DATA ANALYSIS:** Introduction – Types of data products – Image interpretation techniques – Detection, recognition, analysis, classification, deduction and idealization – Elements of image interpretation – Keys.  **UNIT – IV**  **IMAGE PROCESSING:** Introduction – Overview – Preprocessing – Radiometric Correction – Geometric correction – Rectification – Enhancement techniques – Contrast stretch – Edge enhancement – Filtering techniques – Classification techniques – Supervised and unsupervised classification.  **UNIT – V**  **GEOGRAPHICAL INFORMATION SYSTEM:** Basic Principles – Definition – Components – Data structures – Raster and vector formats – Functioning of GIS – Data Input – Data manipulation – Data retrieval – Data analysis – Data display – Data base management systems.  **UNIT – VI**  **RS AND GIS APPLICATIONS GENERAL:** Land cover and land use – Agriculture – Forestry – Geology – Geomorphology – Urban applications.  **APPLICATION TO HYDROLOGY AND WATER RESOURCES:** Flood zoning and mapping – Groundwater prospects and potential recharge zones – Watershed management. | |
| **Textbooks**  **and**  **References** | **TEXTBOOKS:**   1. Bhatta B (2008), “Remote sensing and GIS”, Oxford University Press 2. Remote Sensing and its Applications’ by Narayan LRA, Universities Press, 2012. 3. Introduction to Geographic Information System – Kang – Tsurg Charg. Tata McGraw Hill Education Private Limited. 4. Remote sensing and Geographical Information System – by M. Anji Reddy JNTU Hyderabad 2001, B.S. Publications.   **REFERENCES:**   1. Basics of remote sensing & GIS by A. Kumar, Laxmi publications. 2. Remote sensing of the environment – An earth resources perspective – 2ndedition – by john R.Jensen, Pearson Education. 3. Principals of Geo physical Information system – Peter A Burragh and Rachael McDonnnell, Oxford Publications 2004. | |