

INSTITUTE	FACULTY OF TECHNOLOGY
PROGRAM	BACHELOR OF TECHNOLOGY (CIVIL ENGINEERING)
SEMESTER	6
COURSE TITLE	REMOTE SENSING
COURSE CODE	01CI0616
COURSE CREDITS	3

Objective:

- 1 Disseminate basic concepts and applications of Electromagnetic Spectrum in Remote Sensing, Energy Balance and Data acquisition platforms, sensors and their characteristics
- 2 Introduce students to digital image processing tools and techniques.
- 3 To acquire skills in advance techniques such as microwave remote sensing mapping and monitoring
- 4 Apply the knowledge of remote sensing in various thematic studies

Course Outcomes: After completion of this course, student will be able to:

- 1 Explain remote sensing principles and analyze energy interactions.
- 2 Apply digital image processing and evaluate correction tests.
- 3 Analyze remote sensing techniques and implement them in various applications.
- 4 Design and execute remote sensing projects using combined techniques and assess their effectiveness in real-world problems.

Pre-requisite of course:NA

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
3	0	0	50	30	20	25	25

Contents : Unit	Topics	Contact Hours
1	Fundamental of Remote Sensing Introduction: Remote sensing history, Development, Definition, Concept & Principle., Basic Concepts: Active and Passive Sensor, Different types of platforms, Electro Magnetic Spectrum, Electromagnetic radiation and Its characteristics and Atmospheric Window., Remote Sensing Art or Science Process: Energy: Sources of energy, Energy radiation principle. Energy interaction in the atmosphere, Energy interactions with earth surface feature, Recording energy by sensor transmission, Reception processing, Interpretation & Analysis. Remote Sensing Data Products	15

Contents : Unit	Topics	Contact Hours
2	Digital Image Processing & Interpretation Basic Concept: Introduction of Digital Image and Imaging Sensors, Data formats of Digital Image, Display of Digital Image, Digital Image Processing components and functions, Digital Image Processing -Image Restoration: Radiometric correctios and Random noise correction, Atmospheric correction, Geometric errors and corrections, Distortion evaluated from tracking data, distortion evaluated from ground control Image correction, Digital Image Processing -Image Enhancement: Image Reduction & Magnification, colour compositing, Image filtering, Contrast Enhancement, Digital Image Processing -Image Transformation: Image Arithmetic Transformation, Principal Component Transformation, Tasselled Cap Transformation, Fourier transformation, Image Fusion., Digital Image Processing -Image Classification: Supervised and Unsupervised classification of Image	15
3	Microwave Remote Sensing & Application of Remote sensing Introduction, Passive Microwave remote sensing, Active Microwave Remote sensing, Radar Imaging, Airborne Versus Space borne Radar, Application of Remote Sensing: Introduction, Land cover and Land Use, Agriculture, Forestrt, Geology, Urban application, Hydrology, Mapping, Oceans and Coastal Monitoring, Monitoring of Atmospheric Constituents	12
Total Hours		42

Textbook :

- 1 Fundamentals of Remote Sensing, Joseph, George and Jeganathan, C., Universities press (India) Pvt. Ltd., Hyderabad., 2017
- 2 Remote Sensing and Geographical information System, A.M. Chandra and S.K. Ghosh,, Narosa Publishing House, 2006
- 3 Remote Sensing and image Interpretation, Lilliesand T.M. and Kiefer R.W., John Wiley and Sons, New York, 2004
- 4 Introductory Digital Image Processing A remote sensing perspective, Jensen, J.R, Prentice Hall Seies in GIS , USA., 1996

References:

- 1 Remote Sensing and GIS, Remote Sensing and GIS, Bhatta B, Oxford University Press, New Delhi, 2008

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery
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Remember / Knowledge	Understand	Apply	Analyze	Evaluate	Higher order Thinking / Creative
5.00	10.00	35.00	30.00	15.00	5.00

Instructional Method:

- 1 At the start of course, the course delivery pattern, prerequisite of the subject will be discussed.
- 2 Lectures will be taken in class room with the use of multi-media presentations, white board– mix of both.
- 3 Attendance is compulsory in lectures and laboratory which carries a 5% component of the overall evaluation.
- 4 Minimum two internal exams will be conducted and average of two will be considered as a part of 15% overall evaluation
- 5 Assignments based on course content will be given to the students at the end of each unit/topic and will be evaluated at regular interval. It carries a weightage of 5%.
- 6 Surprise tests/Quizzes will be conducted which carries 5% component of the overall evaluation.

Supplementary Resources:

- 1 <http://rst.gsfc.nasa.gov/>
- 2 <http://eoedu.belspo.be/en/guide/index.htm>