Programme: M. Sc. (Botany)
Course Code: BOO-226
Title of the Course: Remote Sensing: Techniques and Applications
Number of Credits: 3
Effective from AY: 2020-21

Prerequisites for the course:	Science back ground.	
Objectives:	Thousands of Remote Sensing satellites are circling the globe and continuously sending digital imageries. They have enormous application potential. However, technological advancement in this sphere is not duly supported by the trained human power to process and interpret the data. This introductory course deals with various aspects of Remote Sensing and their applications in forestry, ecology and Environment Impact Assessment.	
Contents:	1. Principles and basic concepts of Remote Sensing: Principles of Electromagnetic Radiation; Interactions with Earth Surface Materials; Atmospheric Effects and atmospheric windows. 2. Characteristics of Remotely Sensed Data: Spatial Resolution, Spectral Resolution, Radiometric Resolution, Temporal Resolution. 3. Remote Sensors: Electro-Optical Sensors, Across-Track Scanning Systems, Linear-Array (Along-Track) Scanning Systems, Thermal IR Sensors, Microwave and Imaging Radar Sensors, Lidar. 4. Digital Image Processing and Analysis: Feature Extraction, Radiometric Corrections, Geometric Corrections, Atmospheric Correction; image enhancement, extraction of information and classification; elements of image interpretation; Image Classification (supervised and unsupervised). Hyperspectral Image Analysis. 5. Contemporary Satellites and Sensors: Overview; Resourcesat-2 (AWiFS, LISS-III, LISS-IV, S-AIS); Landsat 8 [Operational Land Imager (OLI), Thermal InfraRed Sensor (TIRS)]; historical data. 6. Applications in Forestry and Ecology: Principles of image interpretation in forestry and ecology; principles	4 Hours 4 Hours 5 Hours 7 Hours 4 Hours 12 Hours

	of multispectral sensing for vegetation mapping; spectral response of vegetation and factors affecting the spectral response; change detection and monitoring; Environmental Impact Assessment using remote sensing and GIS; quantitative estimation of biomass and other ecological parameters; estimation and measurement of tree and stand height, crown diameter, crown count, crown density etc.; Principles of Remote Sensing in Landuse /Land cover mapping. Estimation of global gross and net productivity from Earth Observing Systems.	
Pedagogy:	Lectures/ tutorials/assignments/self-study	
References/ Readings	Anji Reddy, 2001. Remote Sensing and Geographical Information Systems, BS Publications. Burrough, Peter A. and Rachael A. McDonnell, 1998. Principles of Geographical Information Systems. Oxford University Press. Campbell, James B. 2002. Introduction to remote sensing. Guilford Press, New York. Heywood, I. S. Cornelius and S. Carver, 2006. An Introduction to Geographical Information Systems. Prentice Hall. Jensen, J.R. 2000. Remote Sensing of the Environment: An Earth Resource Perspective. Prentice Hall. George Joseph and C.Jeganathan, 2018. Fundamentals of Remote Sensing. Third Edition. Universities Press (India) Private Limited, Hyderabad, India. 2018. Lillesand, T.M., Ralph W Kiefer, Jonathan W Chipman, 2004. Remote Sensing and Image Interpretation. John Wiley & Sons Rees W. G. 2001. Physical Principles Of Remote Sensing. Cambridge University Press. Richards, John A., Jia, Xiuping, 2006. Remote Sensing Digital Image Analysis: An Introduction (4th ed.). Springer. Sabnis, F. F. 1996. Remote Sensing: Principles and Interpretations. W H Freeman and Company 1996. Weng, Qihao, 2011. An Introduction to Contemporary Remote Sensing. McGraw Hill Professional, 2011.	
Learning Outcomes	Clear understanding of the basics of Remote Sensing (RS). Theoretical base for processing and analysing the RS data. Ability to choose the type of RS data required for a given application. Methodological strength in applying the data in forestry, ecology and EIA.	