

<b>Course No.</b>	<b>CE 205001</b>
<b>Course Title</b>	<b>Remote Sensing</b>
<b>Credits</b>	<b>L T P Cr</b> <b>3 1 0 4</b>
<b>Prerequisites</b>	-
<p><b><u>Course Contents:</u></b></p> <p><b>Introduction to Remote Sensing:</b> Observations about remote sensing; Remote sensing advantages and limitations; The remote sensing process: Remote sensing data collection, Types of resolution, Data processing.</p> <p><b>Digital Remote Sensor Data Collection:</b> Sensor types characteristics; Multispectral Imaging (NASA Landsat 8, Indian Remote Sensing Systems, Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER), QuickBird, WorldView series); Imaging spectrometry (Hyperion Hyperspectral Imager, NASA Airborne Visible/Infrared Imaging Spectrometer (AVIRIS), Moderate Resolution Imaging Spectrometer (MODIS)); Thermal-infrared remote sensing; LiDAR remote sensing; RADAR remote sensing; Digital Image Data Formats.</p> <p><b>Remote Sensing Image Corrections:</b> Radiometric Errors: Scattering, Reflectance, Absorption: Atmospheric windows; Atmospheric Correction: Unnecessary and Necessary Atmospheric Correction; Remote sensing detector error: Random bad pixels (Shot Noise), Line or column drop-outs, Partial line or column drop-outs, Line-start problems, N-line striping; Geometric correction: Geometric error: Internal and External, Types of geometric correction, Image to map rectification, Image to image registration, Ground control points (GCPs), Spatial and Intensity interpolation, Root mean square error (RMSE), Mosaicking.</p> <p><b>Image Enhancement:</b> Contrast enhancement: Linear contrast modification, saturating linear contrast enhancement, Automatic contrast enhancement, Piecewise linear contrast modification; Density slicing; Neighbourhood raster operations: Image smoothing, Edge detection; Vegetation indices; Texture.</p> <p><b>Pattern Recognition:</b> Interpreting Images: Photointerpretation, Quantitative analysis, Fundamentals of quantitative analysis, Sub-classes and Spectral classes; Supervised classification: Minimum distance, Parallelepiped, <i>k</i>-Nearest Neighbour, Unsupervised classification: Clustering (<i>k</i>-Means), Object-based image analysis (OBIA) classification, Accuracy assessment: Error matrix.</p>	
<p><b>Reference / Text Books</b></p> <ol style="list-style-type: none"> <li>1. Jensen, J. R., <i>Introductory digital image processing: A remote sensing perspective</i>, 4<sup>th</sup> ed., Pearson, 2016.</li> <li>2. Richards J.A., <i>Remote Sensing Digital Image Analysis</i>, 5<sup>th</sup> ed., Springer, Berlin Heidelberg, 2013.</li> <li>3. Mather P.M. and Koch M., <i>Computer Processing of Remotely-Sensed Images: An Introduction</i>, 4<sup>th</sup> ed., Wiley-Blackwell, Chichester, UK, 2011.</li> <li>4. Jensen J. R., <i>Remote Sensing of the Environment: An Earth Resource Perspective</i>, 2<sup>nd</sup> ed., Pearson, 2013.</li> </ol>	
Any other Remarks:	