MANGALORE UNIVERSITY

DEPARTMENT OF MARINE GEOLOGY

MGS 455: REMOTE SENSING & PHOTOGRAMMETRY

Course outcome:

CO1: Able to study history, basic concepts of data acquisition and data analysis, electromagnetic spectrum.

CO2: Can describe energy sources and radiation principles, energy interactions in the atmosphere, energy interactions with the earth surface features, spectral reflectance curves.

CO3: Able to do geological interpretation - identification and mapping of litho-units, structural mapping, geohydrological mapping, geomorphologic mapping.

CO4: Able to generate different kinds of thematic maps on various natural resources.

REMOTE SENSING

Unit 1	**Fundamentals of Remote Sensing:** History, basic concepts: Data acquisition and data analysis. Electromagnetic spectrum. Energy sources and radiation principles, energy interactions in the atmosphere, energy interactions with the earth surface features, spectral reflectance curves, spectral reflectance of various natural earth surface features like vegetation, soil and water.	5 hrs
Unit 2	**Earth Resource Satellites:** Introduction, early history of space imaging, POES and GOES series of satellites, platforms (ground, aerial and space) and sensors. Important earth observation satellites like Landsat, SPOT, NOAA, SEASAT, IKONOS, Quick bird, Orb view etc. Spatial, spectral, temporal and radiometric resolutions. Indian Remote sensing programs: IRS satellite missions and their capabilities, INSAT series. Advantages of satellite remote sensing.	5 hrs
Unit 3	**Principles of Thermal and Microwave Remote Sensing:** Introduction, Black body radiation, Temperature Radiations from the earth's surface, Applications of thermal remote sensing. Basic concepts of microwave remote sensing, Real Aperture Radars and Synthetic Aperture Radars, Microwave sensors, Interferometry. Applications of Microwave Remote Sensing. Visual and digital image analysis techniques.	5 hrs
Unit 4	**Remote Sensing Applications:** In Earth Sciences – Geological interpretation- identification and mapping of litho-units, structural mapping, geohydrological mapping and engineering projects, geomorphologic mapping, geoenvironmental studies, mineral exploration, land use and land	5 hrs

	cover classification. In Oceanography - monitoring littoral processes, suspended sediments and shoreline change detection studies. In weather forecasting, meteorological and climatic studies such as cloud drift, precipitation, temperature, tropical cyclone and in understanding earth's radiation budget.	

Photogrammetry

Unit 5	Fundamentals of aerial photography and photogrammetry: History, aerial cameras, aerial films and processing. Types of aerial photos. Fundamentals and geometry of aerial photographs, Scale, Advantages and disadvantages of small-scale and large-scale aerial photographs, relief and tilt displacements, mosaics and types of mosaics, stereoscopic vision and stereoscopes, image displacement due to relief, concepts of stereo-photogrammetry, normal vision, depth perception and vertical exaggeration.	5 hrs
Unit 6	Planning for aerial photographs, flight procedures, planning and execution of photographic flights, radiometric characteristics. Elements of aerial photo interpretation: tone, colour, texture, pattern, shape, size and associated features, geotechnical analysis and convergence of evidence.	5 hrs
Unit 7	Principles and Applications of Aerial Photography: Aerial photo interpretation in resource evaluation – geology, delineation of geological structures, mineral exploration and geomorphology.	5 hrs
Unit 8	Digital photogrametry and interpretation techniques: definition, creation of digital images, automatic measurements and surface modeling, aerial triangulations, digital photogrammetric workstation.	5 hrs

List of References:

1. Manual of Photo Interpretation – American Society of Photogrammetry.
2. Remote Sensing and Image Interpretation – T. M. Lillesand and R. W. Kiefer – John Wiley and Sons.
3. Fundamentals of Photogeology, Geomorphology – Verstappen – TTC Holland.
4. Remote Sensing and Photogrammetry, vol. 1 and vol. 2 – M. L. Jhanwar and T. S. Chouhan – VignanPrakasan, Jaipur.
5. Applied Remote Sensing and Photo Interpretation – T. S. Chouhan and K. N. Joshi – VignanPrakasan, Jaipur.
6. Remote Sensing in Geology – P. S. Siegal and A. R. Gillespie – John Wiley.
7. Remote Sensing and its applications to Geology - Drury, John Wiley & Sons.
8. Remote Sensing – Sabins, John Wiley & Sons.
9. Manual of Remote Sensing; American Association of Photogrammetry and Remote Sensing.
10. Photo geology and Image Interpretation – Shiv N. Pandey – Wiley Eastern, New Delhi.