



आपदा न्यूनीकरण एवं प्रबन्धन उत्कृष्टता केन्द्र, भारतीय प्रौद्योगिकी संस्थान रुड़की,

रुड़की – 247667

CENTRE OF EXCELLENCE IN DISASTER MITIGATION & MANAGEMENT, 3rd Floor,
New Building, Opposite Biotechnology Department

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE, ROORKEE – 247667, UTTARAKHAND, INDIA

Tel: 01332-28-6616 (Office), E-mail: coe_dmm@iitr.ernet.in; www.coedmm.org

1. Subject Code : **DMN-501** Course Title : **Geodata Processing Techniques and Models**
2. Contact Hours: **L: 3 T: 0 P: 3**
3. Examination Duration (Hrs.) : **Theory: 3 Practical: 0**
4. Relative Weight : **CWS 15 PRS 25 MTE 20 ETE 40 PRE 0**
5. Credits: **4** 6. Semester: **Autumn** 7. Subject Area: **PCC**
8. Pre-requisite: Nil
9. Objective : To impart knowledge on various geodata processing techniques and models for earth resources mapping and their practices for disaster related studies.
10. Details of Course :

Sl. No.	Particulars	Contact Hours
1	Importance of Geodata processing techniques to disaster related studies, Geodata systems and models	2
2	Coordinate and coordinate systems: Geographical and map projection system, 2D and 3D data transformation; Types of maps, scales, mapsheet numbering systems and uses	3
3	Modern field surveying and GPS surveying data acquisition tools, methods of total station and GPS surveys; Data processing, analysis and presentation techniques	6
4	Aircraft and space based geodata collection tools, photogrammetric and remote sensing models, aerial photogrammetric mapping methods, use of stereo-photogrammetry for creation of 3D earth surface models.	8
5	Remote sensing data acquisition, platforms and sensors, multi and hyperspectral data processing, visual data interpretation for information extraction	4
6	Introduction to digital image processing: Pre-processing, image enhancement, image classification and image change detection techniques	4
7	Digital Geodatabase, spatial and non-spatial data, vector and raster data models, database management system	3
8	Geospatial data modeling; Geographic information systems; Hardware and software components, data transformation, processing and analysis models; Overlay, network and proximity analysis; Data visualization tools and models	6
9	Techniques and tools for digital elevation models and their uses	4
10	Quality assessment of geospatial data	2
	Total	42

List of Practicals

1. Familiarity with different types of Geodata.
2. Familiarisation with various 2D and 3D coordinate transformations and map projection Systems.
3. Control establishment using Total Station traversing
4. Topographical map preparation using Total Station surveys
5. Collection and processing of data using different types of GPS for mapping
6. Determination of scale and flying height of an aerial photograph.
7. Determination of 3D surface models using stereo-photogrammetry
 - a. Introduction to different types of remote sensing data products.
 - b. Use of spectrometer for collection of signatures of different earth objects.
8. Visual analysis of a satellite data.



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9. Demonstration and training on image classification module of ERDAS Imagine. Practice for selection of training areas and their quality assessment using histogram and separability analyses.
10. Demonstration of a GIS software and their salient features. Understanding raster and vector data
11. Scanning and digitization (on screen). Registration of various maps and digitization and editing of features.
12. Database creation and management. Buffering and overlay analysis.
13. DEM creation and visualization

11. Suggested Books:

S No	Name of Authors/Book/Publisher	Year of Publication / Reprint
1	Schofield W and Breach M., Engineering Surveying, 6 th Edition, Butterworth-Heinemam	2007
2	Chandra A.M., Surveying, New Age Publishers	2002
3	Lo, C.P. and Yeung, A.K.W., Concepts and Techniques of Geographical Information System, Prentice Hall India	2002
4	Bossler, J.D., Manual of Geospatial Science and Technology, Taylor and Francis	2001
5	Lillesand, T.L., and Keiffer, R.W., Remote Sensing Image Interpretation, John Wiley and Sons	2000