

## **Approval: 9<sup>th</sup> Senate Meeting**

**Course Number:** CE 508

**Course Name:** Photogeology and Photogrammetry

**Credits:** 2-0-2-3

**Pre-requisite:** None

**Intended for:** B.Tech. 3<sup>rd</sup> year/M.S./M.Tech./Ph.D.

**Distribution:** Discipline Elective

**Semester:** Odd/Even

**Preamble:** Understanding the landforms around us gives the sense of spatial variability which can be related to various spheres of science from chemical to physical. It deals with the study of earth features and extraction of information using aerial photography. It is the basic course on which advanced courses of remote sensing & geo-informatics are based. Hence a course on photogeology and photogrammetry is important to understand how the earth features appears on aerial photos as well as on satellite image.

**Course Outline:** This course is basic course where student learns about geomorphic, geologic and structural features that are around us. These features will be interpreted & delineated using various interpretation elements. The concept of scale and resolution will enable the students to understand its significance and importance in various applications. The effect of relief, vertical exaggeration and parallax errors which comes in stereoscopy will also be taught in this course. Students will do exercises and hands on application of aerial photography for mapping various features. That's why this course is designed for 2-0-2 format where one lab of minimum 2 hours is required to practice the topics learnt in theory class.

### **Course Modules:**

1. Basic concepts of Geomorphology, Overview of landscape evolution models, Cycle of erosion, Mountains and relief, river basin, drainage network & types  
**(4 contact hours)**
2. Geomorphic landforms, erosional & depositional: Fluvial, Glacial, Aeolian, Coastal and Karst landforms.  
**(6 contact hours)**
3. Overview of Indian geomorphology.  
**(2 contact hours)**
4. Photogrammetry introduction, types of aerial photograph, Geometry, Scale and resolution its applications.  
**(5 contact hours)**
5. Principles of stereoscopy, lens and mirror stereoscopes, image parallax, relief displacement, vertical exaggeration, distortion. Measurement of relief displacement and estimation of height of an object.  
**(10 contact hours)**

6. Airphoto interpretation & mapping: Identification of various rock types and landforms. Delineation and mapping of various geomorphic features (Fluvial, Glacial, Aeolian, Coastal), rock types (Igneous, Sedimentary and Unconsolidated sediments) and structural features (Fold, Faults, Joints, Lineaments, Synclines & Anticlines). **(12 contact hours)**
7. Introduction to satellite image processing, geoinformatics, DEM. **(3 contact hours)**

**Text Books:**

- a) A L. Bloom, 'Geomorphology: A systematic Analysis of Late Cenozoic Landforms - 3<sup>rd</sup> Ed.', Pearson Education, Inc., USA, 2004.
- b) V S. Kale, and A. Gupta, 'Introduction to Geomorphology'. Orient Longman Ltd., India, 2001.
- c) Victor, C. Miller, 'Photogeology'. McGraw Hill Book Co., New York, 1961
- d) P R. Wolf and B A. Dewitt, 'Elements of Photogrammetry: With Applications in GIS', McGraw Hill Science, New York, 2014.
- e) T.M. Lillesand and R.W. Kiefer,' Remote Sensing and Image Interpretation - 6th Ed.', John Wiley & Sons, New York, 2007.

**Reference Books:**

- a) J R. Jensen, 'Remote Sensing of the Environment an Earth Resource Perspective', Pearson Education. Delhi, 2003.
- b) Julien, P.Y., 'River Mechanics'. Cambridge University Press, USA, 2002.
- c) G R Davis, SR Reynolds, CF Kluth, 'Structural Geology of Rocks and Region - 3<sup>rd</sup> Ed.', John Wiley, USA, 2012.
- d) M P. Billings, 'Structural Geology - 4<sup>th</sup> Ed', Prentice-Hall, New York, 1987.