Credit distribution, Eligibility and Pre-requisites of the Course

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
DSE-1 **Surveying Techniques (L3, P1)**	**4**	**3**	**0**	**1**	**12th pass with science**	**Studied Earth System Science and Structural Geology or Equivalent**

Learning Objectives

This course on surveying techniques is intended to provide students with basic knowledge and techniques to operate modern surveying instruments. Also, develop skills to carry out topographic mapping and prepare maps.

Learning outcomes

After going through this course, students will have the necessary knowledge about the survey method and various types of mapping skills. They will have a clear understanding of the principles of surveying techniques, how to operate modern surveying instruments, and how to prepare maps.

SYLLABUS OF DSE-11

Theory (45 hours)

UNIT – I (9 Hours)
Detailed Content
Basics of Surveying: Fundamental concepts and principles; Types of surveys; Classes of surveys; Surveying Instrumentation; Units of measurement; Locating position; Errors.in surveying.

UNIT – II (12 Hours)
Detailed Content
Levelling: Theory and Methods: Coordinate system; Geoid; Datum; Curvature and refraction; Categories of levels; Traversing; Differential levelling; sources of error in levelling; Distance measurement; Angles, azimuth and bearings.

UNIT – III (12 Hours)
Detailed Content
Surveying Techniques: Principles and use of – Plane Table survey, Compass survey, Theodolite survey, Total Station survey, Global Positioning System (GPS) survey, UAV survey

UNIT – IV (12 Hours)
Detailed Content
Map Preparation: Introduction to QGIS; Map design; Map layout; Basic map plotting procedures; Plotting contours; Lettering; Cartographic map elements; Sources of error in mapping.

Practical Component- (30 Hours)

1. Plane Table survey
2. Total Station survey
3. Survey using GPS
4. Survey using Drone (if drone is available)
5. Map making

Essential/recommended readings

Surveying – Vol – I – By S.K.Duggal, Tata McGraw Hill Book Co.

Surveying – Vol – II – By S.K. Duggal, Tata McGraw Hill Book Co

Suggestive readings

Surveying – Vol – I – By S.K.Duggal, Tata McGraw Hill Book Co.
Surveying – Vol – II – By S.K. Duggal, Tata McGraw Hill Book Co
Engineering survey by Schofield W, Elsevier India, 2013