



K.S. SCHOOL OF ENGINEERING AND MANAGEMENT, BANGALORE - 560109
DEPARTMENT OF CIVIL ENGINEERING

CO-PO Mapping

Course: Geodetic Engineering				
Type: Integrated Professional Core Course			Course Code: 21CV32	
No of Hours				
Theory (Lecture Class)	Tutorials	Practical/Field Work/Allied Activities	Total/Week	Total hours of Pedagogy
2	2	2	6	50
Marks				
CIE	SEE	Total	Credits	
50	50	100	4	
Aim/Objectives of the Course				
<ol style="list-style-type: none"> 1. Provide basic knowledge about principles of surveying for location, design and construction of engineering projects 2. Develop skills for using surveying instruments including, levelling instruments, plane tables, theodolite, compass 3. Make students to familiar with cooperative efforts required in acquiring surveying data and applying fundamental concepts to eliminate errors and set out the works. 4. To set out the simple curves by using different methods. 5. Provide information about new technologies that are used to abstracting the information of earth surface 				
Course Learning Outcomes				
After completing the course, the students will be able to				
CO1	Calculate the bearings of the survey line and also included angle of the various geometrical figures using prismatic compass.			Applying (K3)
CO2	Calculate the Reduced level of various points using Height of Instrument and Rise and fall method.			Applying (K3)
CO3	Calculate the distance and elevation of the object using trigonometric levelling.			Applying (K3)
CO4	Calculate the offsets of various points to set out simple curve using various methods.			Applying (K3)
CO5	List the types of satellites, LIDAR, Visual and Digital Image Processing along with their applications.			Applying (K3)
Syllabus Content				
Module 1: Introduction to Surveying: Importance of surveying in Civil Engineering, Concepts of plane and geodetic surveying Principles of surveying – Plans and maps – Surveying equipment’s, Meridians, Bearings, Dip, Declination, Local attraction, Calculation of bearings and included angles. Compass surveying: Prismatic and surveyor’s compasses, temporary				

<p>adjustments.</p> <p>Plane Table Surveying: plane table and accessories, advantages and disadvantages of plane table survey, method of plotting - radiation, intersection, traversing, resection, two point and three point method</p> <p>LO: At the end of this session the student will be able to</p> <ol style="list-style-type: none"> 1. List the importance of Surveying. 2. Explain the principles of Surveying. 3. Explain the different types of Bearings and Meridians. 4. Differentiate between Surveyor Compass and Prismatic Compass. 5. Explain the temporary adjustments of Prismatic Compass. 6. Explain the various accessories used in Plane Table Surveying. 7. Explain the different methods of plotting using Plane Table Surveying. <p>Laboratory Experiments: Study the various instruments used in Surveying, measure the distance of two points using chain, tape and pacing, to set out geometrical figures using chain and Prismatic compass, To plot the various points using different methods of plane table surveying.</p> <p>LO: At the end of this session the student will be able to</p> <ol style="list-style-type: none"> 1. To study the various instruments used in Surveying. 2. To measure the distance between two points using Pacing, Chaining and Taping. 3. To set out Pentagon and Hexagon using Chain and Tape. 4. To set out Pentagon and Hexagon using Prismatic Compass. 5. To set out various points using Plane Table Surveying using Radiation and Intersection Method. 	<p>CO1</p> <p>10 hrs</p> <p>PO1-3 PO2-2 PO5-2 PO6-3 PO7-3 PO9-3 PO10-3 PO11-2 PO12-3 PSO1-3 PSO2-2</p>
<p>Module 2: Levelling – Principles and basic definitions – Types of Levels – Types of adjustments and objectives – Types of levelling – Simple, Differential, Fly, Reciprocal, Profile, Cross sectioning – Booking of levels – Rise & fall and H. I methods (Numerical)</p> <p>Areas and volumes: Measurement of area – by dividing the area into geometrical figures, area from offsets, mid ordinate rule, trapezoidal and Simpsons one third rule, area from co-ordinates, introduction to Planimeter, digital Planimeter. Measurement of volumes-trapezoidal and prismatic formula</p> <p>LO: At the end of this session the student will be able to</p> <ol style="list-style-type: none"> 1. Explain the different types of Levels. 2. Explain the different types of Levelling. 3. Explain the temporary adjustments of Levelling. 4. Calculate the Reduced Level of various points using H.I and Rise and Fall method. 5. Calculate the area of the ground by different methods. 6. Calculate the volume of earthwork by using different methods. 	<p>CO2</p> <p>10 hrs.</p> <p>PO1-3 PO2-2 PO4-2 PO5-2 PO6-3 PO7-3 PO9-3 PO10-3 PO11-2</p>

<p>7. Explain the different types of Planimeter.</p> <p>Laboratory Experiments: To calculate the elevation of various points using different methods of levelling</p> <p>LO: At the end of this session the student will be able to</p> <ol style="list-style-type: none"> 1. To determine the difference in elevation between two points using differential levelling. 2. To find the true difference in elevation between two points suited far apart by using Reciprocal Levelling. 	<p>PO12 -3 PSO1-3 PSO2-2</p>
<p>Module 3: Theodolite Surveying: Theodolite and types, fundamental axes and parts of theodolite, temporary adjustments of transit theodolite, Horizontal and Vertical angle measurements by repetition and reiteration Trigonometric levelling: Single and Double plane for finding elevation of objects Computation of distances and elevations using Tacheometric method..</p> <p>LO: At the end of this session the student will be able to</p> <ol style="list-style-type: none"> 1. Explain the different types of theodolite. 2. List the fundamental axis of theodolite. 3. Measure the horizontal angle between two points using Repetition and Reiteration method. 4. To determine the elevation of the object by using Trigonometric Levelling 5. Calculate the distance and elevations of the object using Tacheometric Levelling. <p>Laboratory Experiments: To measure the horizontal angle using Theodolite, To determine the elevation of object using Trigonometric levelling</p> <p>LO: At the end of this session the student will be able to</p> <ol style="list-style-type: none"> 1. Measure the horizontal angle by repetition and reiteration method using theodolite. 2. Calculate the distance and elevation of the object by using Single Plane Method. 3. Calculate the distance and elevation of the object by using Double Plane Method. 4. Calculate the distance and elevation of the object using Tacheometric method. 	<p>CO3</p> <p>10 hrs</p> <p>PO1-3 PO2-2 PO4-2 PO5-2 PO6-3 PO7-3 PO9-3 PO10-3 PO11-2 PO12 -3 PSO1-3 PSO2-2</p>
<p>Module 4: Curve Surveying: Curves – Necessity – Types, Simple curves, Elements , Designation of curves, Setting out simple curves by linear methods (numerical problems on offsets from long chord & chord produced method), Setting out curves by Rankine’s deflection angle method (numerical problems). Compound curves, Elements, Design of compound curves, Setting out of</p>	<p>CO4</p> <p>10hrs</p> <p>PO1-3 PO2-2</p>

<p>compound curves (numerical problems). Reverse curve between two parallel straights (numerical problems on Equal radius and unequal radius). Transition curves Characteristics, numerical problems on Length of Transition curve, Vertical curves –Types – (theory)</p> <p>LO: At the end of this session the student will be able to</p> <ol style="list-style-type: none"> 1. Explain the different types of curves. 2. Set out the simple curve by using different methods. 3. Set out the compound curves 4. Define the transition curve and characteristics of it. 5. Calculate the length of the transition curve. <p>Laboratory Experiments: To set out simple curve and compound curve.</p> <p>LO: At the end of this session the student will be able to</p> <ol style="list-style-type: none"> 1. To set out the simple curve by using Instrumental Method. 2. To set out the compound Curve by using Theodolite. 	<p>PO4-2 PO5-2 PO6-3 PO7-3 PO9-3 PO10-3 PO11-2 PO12 -3 PSO1-3 PSO2-2</p>
<p>Module 5: Photogrammetry and aerial survey: Introduction, definitions, basics principles, methods, importance of scale, height, applications. Remote sensing: Introduction, Principle of Remote sensing, EMR, types, resolutions, types of satellites, type of sensors, LIDAR, visual and digital image processing and its applications. Global Positioning System: Definition, Principles of GPS and applications. Geographical Information System: Introduction and principle of Geographical Information System, components of GIS, applications Advanced instrumentation in surveying: classification, measuring principles, Electronic theodolite, EDM, Total Station, Drones.</p> <p>LO: At the end of this session the student will be able to</p> <ol style="list-style-type: none"> 1. Explain the principles of Photogrammetry. 2. Explain the principles of Remote Sensing. 3. Explain the types of Sensors and Satellites. 4. Explain the components and applications of GIS. <p>Laboratory Experiments: Demo: Total Station and GPS</p> <p>LO: At the end of this session the student will be able to</p> <ol style="list-style-type: none"> 1. To operate the Total Station and GPS. 	<p>CO5</p> <p>10hrs</p> <p>PO1-3 PO2-2 PO5-2 PO6-3 PO7-3 PO9-3 PO10-3 PO11-2 PO12 -3 PSO1-3 PSO2-2</p>
<p>Suggested Learning Resources:</p> <ol style="list-style-type: none"> 1. B. C. Punmia, Surveying & levelling Vol. I, II & III, , Laxmi Publications; seventeenth edition (2016) 2. GopiSatheesh, R.Sathikumar, N. Madhu, Advanced Surveying: Total Station, GPS, GIS & 	

Remote Sensing, Pearson 2017 by
3. S. K. Duggal, **Surveying** Vol.I& II, McGraw Hill Education; Fourth edition (2017) 5
4. R. Subramanian , **Surveying and Levelling**, second edition, 2012, Oxford University Press;

Web links and Video Lectures (e-Resources):

- <https://www.nptel.ac.in>

Useful Journals

- Journal of Surveying Engineering, ASCE

Teaching and Learning Methods

1. Lecture class: 18 hrs.
2. Tutorial classes: 18 hrs. +03 hrs.
3. Practical: 14 hrs.
4. Revision: 17hrs.

Assessment

Type of test/examination: Written examination

Continuous Internal Evaluation (CIE): Theory component: Two out of Three Tests each of 20 marks and Two assignments each of 10 Marks reduced to 30 Marks.

Practical component 20 Marks.

Total CIE: 50 Marks

Semester End Exam (SEE): 100 marks (students have to answer all main questions) which will be reduced to 50 Marks.

Test duration: 1 hrs

Examination duration: 3 hrs

CO to PO Mapping

PO1: Science and engineering Knowledge	PO7: Environment and Sustainability
PO2: Problem Analysis	PO8: Ethics
PO3: Design & Development	PO9: Individual & Team Work
PO4: Investigations of Complex Problems	PO10: Communication
PO5: Modern Tool Usage	PO11: Project Management & Finance
PO6: Engineer & Society	PO12: Lifelong Learning

PSO1: The proficiency in mathematics, physical and management sciences helps to excel in the areas of planning, analysis related to Civil Engineering systems.

PSO2: Identify sustainable materials and technologies, code of practices in construction industry and transportation systems.

CO	PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
21CV32	K-level														
CO1	K3	3	2	-	-	2	3	3	-	3	3	2	3	3	2
CO2	K3	3	2	-	2	2	3	3	-	3	3	2	3	3	2
CO3	K3	3	2	-	2	2	3	3	-	3	3	2	3	3	2
CO4	K3	3	2	-	2	2	3	3	-	3	3	2	3	3	2
CO5	K3	3	2	-	-	2	3	3	-	3	3	2	3	3	2

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