


Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bangalore

	Course Title: SURVEYING PRACTICE - II		
	Credits (L:T:P) : 0:2:4	Total Contact Hours: 78	Course Code: 15CE36P
	Type of Course: Practical's & Student Activity	Credit : 03	Core/ Elective: Core
CIE- 25 Marks		SEE- 50 Marks	

Pre requisite: Knowledge of Surveying Practice – I & Surveying-II

Course Objective:

1. To provide knowledge of Total Station & advanced surveying instruments.
2. Develop skills in using Total Station & advanced surveying instruments and analyse data.
3. Develop skills to set out Curves in the field using both Total Station and Theodolite.
4. Develop skills to conduct traverse survey & to find the area

COURSE OUTCOMES :

On successful completion of this course student will be able to

Course Outcome		Experiments Linked	CL	Linked PO	Teaching Hrs
CO1	Use and operate Theodelite in the field.	1,2,3,4,5,6	U/Ap/E	1,2,3,4,8,9	21
CO2	Apply the knowledge of Theodolite in different operations in civil engineering projects.	7,8	U/Ap/E	1,2,3,4,8,9	06
CO3	Apply the knowledge of principles and purpose of Tacheometry in finding out the constants.	9,10,11	U/Ap	1,2,3,4,8,9	09
CO4	Formulate the setting out of curve by linear and angular methods.	12,13,14	U/Ap	1,2,3,4,8,9	09
CO5	Use total station in the fireld of civil engineering land survey.	15,16,17,18,19	U/Ap	1,2,3,4,5,8,9,10	27
CO6	Summarize the basic principles of GPS and GIS in civil engineering.	20,21,22	U/Ap	1,2,3,4,5,8,9,10	06
CO7	Manage the suggested or identified constructional problems, solve in teams, in order to improve future problem solving ability and able to present it.	Student activity	R/U/Ap /Ay/E/C	1,2,3,4,5,6,7,8,9,10	*
Total sessions					78

Legend- R: Remember U: Understand Ap: Application Ay: Analysis C: Creation E: Evaluation

* Related to Student activity beyond classroom hours.



Programme outcome Attainment Matrix

Course	Programme Outcome									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
	Basic knowledge	Discipline knowledge	Experiments and practice	Engineering Tools	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Life long learning
SURVEYING PRACTICE-II	3	3	3	3	3	1	1	3	3	3

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.

If $\geq 40\%$ of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3

If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2

If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1

If $< 5\%$ of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

DETAILED COURSE CONTENT

GRADED EXERCISES		HOURS
1. Theodolite		
Experiment 1	Study of parts of a Transit Theodolite and its temporary adjustments	3
Experiment 2	Measurement of horizontal angle by Repetition method	3
Experiment 3	Measurement of horizontal angle by Reiteration method	3
Experiment 4	Measurement of vertical angle	3
Experiment 5	Open traversing using theodolite and plotting	3
Experiment 6	Conducting a Closed traverse of a given area and balancing it by a. Bowditch rule & b. Transit rule	6
2. Trigonometric Levelling		
Experiment 7	Determination of height of an object whose base is accessible	3
Experiment 8	Determination of height of an object whose base is inaccessible (single plane method instrument axes at different levels only-two cases)	3
3. Tachometric Surveying		
Experiment 9	Determination of Stadia constants	3
Experiment 10	Determine horizontal distance by Horizontal sight	3
Experiment 11	Determine Horizontal distance and elevation for inclined sight with staff held vertical by Stadia hair method	3
4. Curves		
Experiment 12	Setting out simple curve by Offsets from Long chord method	3
Experiment 13	Setting out simple curve by Rankines method using Theodolite	3

GRADED EXERCISES		HOURS
	and Total station	
Experiment 14	Setting out Compound curves given two Radii by Deflection angle method	3
5. Total Station		
Experiment 15	Total station-general commands used- instrument preparation and setting-reading distances and angles	6
Experiment 16	Measurement of distances and coordinates of given points, using a) EDM b) Total station	6
Experiment 17	Measurement of altitudes of given elevated points, using total station	3
Experiment 18	Run a closed traverse using Total station and plotting the traverse	6
Experiment 19	Determination of areas of field (enclosed three or more points) by total station	6
6. Global Positioning System		
Experiment 20	Study of hand held GPS	6
Experiment 21	Measurement of latitude, longitude and altitude using hand held GPS	
Experiment 22	Selection and marking of routes using hand held GPS	

Course Delivery: The course will be delivered through lectures, demonstration, site visits, expert lectures.



SUGGESTED STUDENT ACTIVITY

The topic should be related to the course in order to enhance his knowledge, practical skill & and lifelong learning, communication, modern tool usage.

1. Road survey (at least for 100m) by total station.
2. Conduct a traverse survey of a given plot and find out the area.
3. Prepare the contour maps of the given area in your locality.
4. Set out a center line of a given building using theodolite.
5. Find out the parameters of a curve for an existing road in your locality.
6. Locate a permanent structure using GPS in your locality and prepare a map.
7. Prepare a topographical map by using total station.
8. Detailed study report on telescope used in surveying instrument.
9. To set out two parallel lines along both the sides of an obstacle by using total station.
10. To find the distance between two inaccessible points by using total station.
11. Make a presentation on refraction error, curvature error caused by telescope.
12. Prepare a report on any one of the following. Aerial survey, photogrammetric survey, hydrographic survey, military survey and mine survey.



NOTE

1. Students should select any one of the above or other topics relevant to the subject approved by the concerned faculty, individually or in a group of 3 to 5. Students should mandatorily submit a written report and make a presentation on the topic. The task should not be repeated among students. Report will be evaluated by the faculty as per rubrics. Weightage for 5 marks Internal Assessment shall be as follows:

Unsatisfactory **1**, Developing **2**, Satisfactory **3**, Good **4**, Exemplary **5**

2. Reports should be made available along with bluebooks to IA verification officer

Example of model of rubrics / criteria for assessing student activity

Dimension	Students score				
	(Group of five students)				
	STUDENT 1	STUDENT 2	STUDENT 3	STUDENT 4	STUDENT 5
Rubric Scale	Unsatisfactory 1 , Developing 2 , Satisfactory 3 , Good 4 , Exemplary 5				
1.Organisation	2				
2.Fulfill team's roles & duties	3				
3.Conclusion	4				
4.Conventions	5				
Total	14				
Average=(Total /4)	3.5=4				
Note: Concerned faculty (Course coordinator) must devise appropriate rubrics/criteria for assessing Student activity for 5 marks One activity on any one CO (course outcome) may be given to a group of FIVE students					

Note: Dimension should be chosen related to activity and evaluated by the course faculty.

Dimension	Rubric Scale				
	1 Unsatisfactory	2 Developing	3 Satisfactory	4 Good	5 Exemplary
1.Literature	Has not included relevant info	Has included few relevant info	Has included some relevant info	Has included many relevant info	Has included all relevant info needed
2. Fulfill team's roles & duties	Does not perform any duties assigned	Performs very little duties	Performs partial duties	Performs nearly all duties	Performs all duties of assigned team roles
3.Communication	Poor	Less Effective	Partially effective	Effective	Most Effective
4.Conventions	Frequent Error	More Error	Some Error	Occasional Error	No Error



Course Assessment and Evaluation Scheme

	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
Direct Assessment method	CIE	IA	Students	Two test (average of Two tests)	10	Blue books	1,2,3,4,5,6
				Graded Exercise(Record)	10	Record	1,2,3,4,5,6
	SEE	End Exam		Student activity	05	Report	CO7
				End of the course	50	Answer scripts at BTE	1,2,3,4,5,6
Indirect Assessment	Student Feedback on course		Students	Middle of the course		Feedback forms	1, 2 & 3 Delivery of course
	End of Course Survey			End of the course		Questionnaires	1,2,3, 4,5,6 Effectiveness of Delivery of instructions & Assessment Methods

*CIE – Continuous Internal Evaluation

*SEE – Semester End Examination

Note:

- I.A. test shall be conducted as per SEE scheme of valuation. However obtained marks shall be reduced to 10 marks. Average marks of two tests shall be rounded off to the next higher digit.
- Rubrics to be devised appropriately by the concerned faculty to assess Student activities.

Questions for CIE and SEE will be designed to evaluate the various educational components such as:

Sl. No	Bloom's taxonomy	% in Weightage
1	Remembering and Understanding	20
2	Applying the knowledge acquired from the course	50
3	Analysis	10
4	Synthesis (Creating new knowledge)	10
5	Evaluation	10



TEXT BOOKS

- Surveying and Levelling Vol- I & II by B C Punmia
- Fundamentals of Surveying by S K Roy
- Surveying and Levelling by T P Kanetkar & S V Kulkarni
- Surveying and Levelling by S S Bhavikatti vol 1 & 2
- Surveying by Duggal
- Surveying by R Agor
- Surveying and Levelling by N N Basak
- Advanced Surveying by R Agor



E-links

<http://nptel.ac.in/video.php?subjectId=105104101>
<http://media.sakshat.ac.in/NPTEL-IIT-Videos/>
http://nptel.iitk.ac.in/courses/Civil_Eng/IIT%20Roorkee/Surveying.htm
<http://nptel.iitk.ac.in/>
<http://www.slideshare.net/Ehabtariq/surveying-by-using-digital-theodolite>
<http://www.tcd.ie/civileng/Staff/Brian.Caulfield/3A1/3A1%20Lecture%206.pdf>
<http://madinpoly.com/pdf/labmanual/1/surveying%20practical-ii%28317%29.pdf>

SCHEME OF EVALUATION

SL NO	DESCRIPTION	MARKS
1	Writing procedure	05
2	Conducting & Performance	20
3	Calculation and results	15
4	Viva-voce	10
	Total	50

LIST OF EQUIPMENTS

SL NO	EQUIPMENTS	QUANTITY
1	THEODOLITE WITH 20" LC	10
2	EDM	06
3	TOTAL STATION	06
4	HAND HELD GPS NAVIGATOR	05
5	LEVELLING STAFF	10
6	PRISM AND PRISM POLE AND ELECTRONIC BOOK	06
7	LINKING SOFTWARE	02

VIVA QUESTIONS

Theodolite

1. Difference between a Transit Theodolite and a Dumpy level.
2. Difference between Swinging and Transiting.
3. Difference between Telescope normal and Telescope inverted.
4. Difference between Repetition method and Reiteration method.
5. What is meant by size of Theodolite.
6. What is the function of Levelling head and shifting head.
7. Define the term Changing face.
8. What are the uses of a Theodolite.
9. What are the fundamental lines of a Theodolite and how they are Related.
10. What are the errors in Theodolite work.

Theodolite traversing

1. What is meant by Theodolite traversing.
2. Difference between open traverse and closed traverse.
3. Difference between independent co-ordinates and consecutive co-ordinates.
4. Define the term Latitude and Departure.
5. What is meant by Closing error and Balancing the Traverse.
6. Difference between Bowditch rule and Transit rule.
7. What are the Principles of a Closed traverse.
8. What is meant by Omitted measurements.
9. Difference between Included angle and Deflection angle.

Trigonometric levelling.

1. What is meant by Trigonometrical levelling.
2. Under what circumstances Trigonometrical levelling is adopted.
3. What is meant by single plane method.

Tacheometry

1. Explain the principle of Tacheometry.
2. Under what circumstances Tacheometric surveying is adopted.
3. List the advantages and disadvantages of Tacheometer.
4. What are Tacheometric constants and how to eliminate additive constant zero.
5. What is Annalatic lense and where it is used and what is its purpose.
6. How horizontal distances and elevations are determined by Stadia hair method.

Curves

1. Define the following terms
 - a. Point of commencement.
 - b. Point of tangency
 - c. Length of Curve
 - d. Length of long chord.
 - e. Degree of curve.
2. What is the relation between degree of curve and radius of curve.
3. Under what circumstances the following curves are adopted.
 - a. Simple Circular curve
 - b. Compound curve.
 - c. Reverse Curve
 - d. Transition curve
 - e. Valley curve
 - f. Summit curve.
4. What are the precautions to be taken while introducing reverse curve.
5. What are the functions and objectives of transition Curve?
6. What are the importance of Curves?

Total Station.

1. What is a Total station.
2. What are the advantages of total station.
3. What are the applications of total station.
4. What is meant by Electronic Theodolite.
5. What are the principles of an electronic theodolite.
6. What is the Brain of Total Station.

GPS & GIS

1. What is meant by Remote sensing and What are its basic Principles.
2. What are the applications of Remote sensing.
3. What are GPS receivers?
4. What is meant by GIS and what are its applications.
5. Compare GIS with Auto CAD.
6. What are the uses of GPS Navigators.

