

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous) Dundigal, Hyderabad - 500 043

CIVIL ENGINEERING

COURSE DESCRIPTION FORM

Course Title	Surveying					
Course Code	A30108					
Regulation	R13 - JNTUH					
Commo Strengture	Lectures	Tutorials	Practicals	Credits		
Course Structure	4	-	- 4			
Course Coordinator	Course Coordinator Mr. B. Suresh, Civil Engineering Department					
Team of Instructors	Mr. M. Suresh, C	ivil Engineering D	epartment			

I. COURSE OVERVIEW:

Surveying is the technique, profession, science and art of making all essential measurements to determine the relative position of points or physical and cultural details above, on, or beneath the surface of the Earth, and to depict them in a their objective, surveyors use elements of mathematics (geometry and trigonometry), physics, engineering and law. Surveyor measures certain dimensions that generally occur on the surface of the Earth. Surveying equipment, such as levels and theodolites, are used for accurate measurement of angular deviation, horizontal, usable form, or to establish the position of points or details. These points are usually on the surface of the earth, and they are often used to establish land maps and boundaries for ownership or governmental purposes. To accomplish vertical and slope distances. With computerization, electronic distance measurement (EDM), total stations, GPS surveying and laser scanning have supplemented (and to a large extent supplanted) the traditional optical instruments.

II. **PREREQUISITE(S):**

Level	Credits	Periods/ Week	Prerequisites
UG	4	4	Basic Mathematics

III. MARKS DISTRIBUTION:

Sessional Marks	University End Exam marks	Total marks
For theory subject the distribution shall be 25 marks for Internal Evaluation and 75 marks for the End-Examination. For theory subjects, during the semester there shall be 2 mid terms examination. Each midterm examination consists of one objective paper, one subjective paper and one assignment. The objective paper is for 10 marks and subjective paper is for 10 marks, with a duration of 1 hour 20 minutes (20 minutes for objective and 60 minutes for subjective paper). Objective paper is set for 20 bits of – multiple choice questions, fill –in the blanks , matching type questions – for the 10 marks. Subjective paper of each semester shall contain 4 full questions (one from each unit) of which , the students has to answer 2 questions, each carrying 5 marks. First midterm examination shall be conducted for 1-4 units of syllabus and second midterm examination shall be conducted for 5-8 units. 5 marks are allocated for Assignments (as specified by the concerned subject teacher) - first	75	100

Sessional Marks	University End Exam marks	Total marks
Assignments should be submitted before the conduct of the first mid, and the second Assignment should be submitted before the conduct of the second mid. The total marks secured by the students in each midterm examination are evaluated for 25 marks, and the better of the two midterm examinations shall be taken as the final marks secured by each candidate.		

IV. EVALUATION SCHEME:

S. No	Component	Duration	Marks
1.	I Mid Examination	80 minutes	20
2.	I Assignment	-	5
3.	II Mid Examination	80 minutes	20
4.	II Assignment	-	5
5.	External Examination	3 hours	75

V. COURSE OBJECTIVES:

At the end of the course, the students will be able to:

- I. In this course we can know the basic of civil engineering for planning an area.
- II. To calculate the unknown area of the earth surface. By mathematical formulas.
- III. The graduate can assist land survey in various surveying and mapping projects.
- IV. Their technical skills and knowledge will enable them to perform their work duties with a commitment to quality, timeliness, and continuous improvement.
- V. To understand the mathematical formulas for survey in different types such as plane table survey, compass survey and chain survey.
- VI. To develop professional and ethical attitude, effective communication skills, leadership, teamwork skill, multidisciplinary approach and an ability to measure the area and distance from starting station to end station.
- VII. Graduates will exhibit an interest in lifelong learning.
- VIII. To gain experience of doing independent work by the surveying methods.

VI. COURSE OUTCOMES:

After completing this course the student must demonstrate the knowledge and ability to:

- 1. To understand the use of three basic surveying **tools**: **the tape**, **the level**, and the (**Theodolite**).
- 2. To apply geometric and trigonometric principlesto basic surveying calculations.
- 3. To become efficient in keeping accurate, legible and complete notes in a well-prepared field book.
- 4. To understand field procedures in basic types of surveys, and the responsibilities of a surveying team.
- 5. To acquire an awareness of the limitations of the basic surveying instruments and the possible errors that could arise.
- 6. To apply drawing techniquesin the development of a topographic map.
- 7. Demonstrate knowledge of professional and ethical responsibilities.
- 8. To understand the different methods of calculation of areas and volumes of an irregular boundaries.
- 9. To understand the different methods of calculation of heights and distances using angular measurements.
- 10. Develop confidence for self education and ability for life-long learning in field works.
- 11. Can participate and succeed in competitive examinations like GATE, PGECET.

VII. HOW PROGRAM OUTCOMES ARE ASSESSED:

	Program Outcomes	Level	Proficiency assessed by
PO1	An ability to apply knowledge of computing, mathematical foundations, algorithmic principles, and computer science and engineering theory in the modeling and design of computer-based systems to real-world problems (fundamental engineering analysis skills)	S	Assignments, Tutorials.
PO2	An ability to design and conduct experiments, as well as to analyze and interpret data (information retrieval skills)	Н	Assignments, Tutorials, Exams.
PO3	An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs, within realistic constraints such as economic, environmental, social, political, health and safety, manufacturability, and sustainability (Creative Skills)	Н	Assignments, Tutorials, Exams
PO4	An ability to function effectively on multi-disciplinary teams (team work)	S	
PO5	An ability to analyze a problem, identify, formulate and use the appropriate computing and engineering requirements for obtaining its solution (Engineering problem solving skills)	Н	Assignments, Exams
PO6	An understanding of professional, ethical, legal, security and social issues and responsibilities (professional integrity)	S	
PO7	An ability to communicate effectively both in writing and orally (speaking / writing skills)	S	
PO8	The broad education necessary to analyze the local and global impact of computing and engineering solutions on individuals, organizations, and society (engineering impact assessment skills)	S	Assignments, Exams.
PO9	Recognition of the need for, and an ability to engage in continuing professional development and life-long learning (continuing education awareness)	Н	Assignments and Exams
PO10	A Knowledge of contemporary issues (social awareness)	Н	Assignments and Exams
PO11	An ability to use current techniques, skills, and tools necessary for computing and engineering practice (practical engineering analysis skills)	Н	Assignments and Exams
PO12	An ability to apply design and development principles in the construction of software and hardware systems of varying complexity (software hardware interface)	N	

N - None

S - Supportive

H - Highly Related

VIII. HOW PROGRAM SPECIFIC OUTCOMES ARE ASSESSED:

	Program Specific Outcomes	Level	Proficiency assessed by
PSO1	UNDERSTANDING: Graduates will have an ability to understand, analyze and solve problems using basic mathematics and apply the techniques related to irrigation, structural design, etc.	Н	Assignments, Tutorials, Exams

	Program Specific Outcomes	Level	Proficiency assessed by
PSO2	ANALYTICAL SKILLS: Graduates will have an ability to design civil structures, using construction components and to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety manufacturability and reliability and learn to work with multidisciplinary teams.	н	Projects
PSO3	BROADNESS: Graduates will have an exposure to various fields of engineering necessary to understand the impact of other disciplines on civil engineering blueprints in a global, economic, and societal context and to have necessary focus for postgraduate education and research opportunities at global level.	S	Guest Lectures

S - Supportive

H - Highly Related

IX. SYLLABUS:

UNIT – I

INTRODUCTION: Overview of plane surveying (chain, compass and plane table), Objectives, Principles and classifications, scales, conventional symbols, signals.

DISTANCES AND DIRECTION: Distance measurement methods; use of chain tape and Electronic distance measurements, Meridians, Azimuths and Bearings, declination, computation of angle.

UNIT - II

LEVELING: Concept and Terminology, Temporary and permanent Adjustments, method of leveling. **CONTOURING:** Characteristics and Uses of contours- methods of conducting contour surveys and their plotting.

UNIT - III

COMPUTATION OF AREAS AND VOLUMES: Area from field notes, computation of areas along irregular boundaries and area consisting of regular boundaries. Embankments and cutting for a level section and two level sections with and without transverse slopes, determination of the capacity of reservoir, volume of barrow pits.

UNIT - IV

THEODOLITE: Theodolite, description, uses and adjustments - temporary and permanent, Measurement of horizontal and vertical angles. Principles of Electronic Theodolite, Trigonometrical leveling, Traversing.

UNIT – V

TACHEOMETRIC SURVEYING: Stadia and tangential methods of tacheometry. Distance and Elevation formulae for Staff vertical position.

CURVES: Types of curves, design and setting out – simple and compound curves.

INTRODUCTION TO ADVANCED SURVEYING: Total Station and Global positionin system, Introduction to Geographic information system (GIS).

Text Books:

- 1. Chandra A M, "Plane Surveying" and "Higher Surveying" New age International Pvt.Ltd., Publishers, New Delhi, 2002.
- 2. Duggal S K, "Surveying (Vol 1 & 2), Tata Mc.Graw Hill Publishing Co. Ltd. New Delhi, 2004.

Reference Books:

1. Surveying and Leveling by R. Subramanian, Second Edition Oxford University Press – 2012

- 2. Surveying Theory and Practice Seventh edition by James M. and Andeson Edward M. Mikhail TATA McGraw Hill.
- 3. Arthur R Benton and Philip J Taety, Elements of Plane Surveying, McGraw Hill- 2000.
- 4. "Advanced Surveying Total Station GIS and Remote Sensing by Satheesh Gopi, R. Sathi Kumar and N.Madhu.

X. COURSE PLAN:

At the end of the course, the students are able to achieve the following course learning outcomes:

Lecture No.	Learning Objective	Topics to be covered	References
1	To know about surveying	INTRODUCTION:- Objective of survey and primary division.	T2:24.6 T2:24.8
2	To understand about the principles and classification of surveying	Principles of survey, Classification of survey.	T2:24.7
3	To know about chain survey	Use of chain survey & terminology instruments used in it.	T7:12.14
4	To learn about types of chains and uses	Types of chains, errors while using it.	T4:3.10
5	To know the problems in chain survey	Problems on error due to chain.	T2:24.6
6	To understand the ranging of area which is calculated	Ranging, traversing using chain	T7:12.14
7	To know about the compass survey and its principles	Types in compass, principle and objective.	T4:3.10
8	To learn how to adjust the compass survey	Terms, terminology and adjustments in it.	T4:3.11 T4:3.12
9	To understand about bearings and its types	Types of bearings	T1:16.2
10	To learn about plane table survey	Plane table survey objective	T1:16.5
11,12	To understand about different methods of plane table survey	Methods of plane table survey	T1:16.6.2
13,14	To know the errors and problems in plane table survey	Error in plane table survey, Problem solving	T2:26.9
15	To understand about measurements and types in measuring	DISTANCES AND DIRECTION:- Different methods distance measurement	T2:26.11
16	To know the problems in measurements	Problems	T1:16.7
17	To understand the chaining on irregular grounds	Chaining on un even ground	T2:26
18	To know the errors in chain measurement	Errors in chain	T2:20.4
19	To know the errors in tape	Errors in tape	T2:23.4

	measurement		
20,21	To know the area between to shores of river by chaining and tape measurement	Obstacles in chaining	T2:20.9 T2:20.10
22	To learn about azimuth, bearings	Azimuth, bearings	T4:5.13 T2:34.2
23	To know the measurements of angles in an area which we are plotting	Measurement of angles	T2:21.1-21.2
24,25	To know about the dip & declination	Dip & declination	T:21.3- T:21.4
26,27	To calculate the area by different formals and solving the problems and measuring the areas	problems	T2:21.5-21.6
28	To understand about leveling and its terminology	LEVELING:- Introduction on leveling, terminology and their definitions.	T4:7.1-7.3
29	To know about the instruments used for leveling	instruments	T3:27.2
30	To know the adjustments in temporary method	Temporary adjustments in leveling	T3:27.9
31,32	To know the adjustments in permanent method	Permanent adjustments and focusing	T3:27.9
33	To learn methods of leveling	Methods of leveling	T3:27.10
34,35	To know the steps and problems in leveling	Steps in leveling and problems	T3:27.11
36	To know about the contouring	CONTOURING:- Introduction on contour	T4:10.6
37	To learn the characteristics of contouring	characteristics	T4:10.7
38	To know different methods	Methods of locating contour	T4:10.8
39	To understand the contour gradient	Contour gradient	T4:10.9
40	To know the uses and functions of contour	Use of Contour	T4:10.11
41,42	To know the computation of areas & volumes	COMPUTATION OF AREAS AND VOLUMES:- Introduction and methods	T5:11.1
43,44	To learn in different methods for different areas and volumes	Computation of area using different methods of regular and irregular areas &problems on each type	T5:11.2
45	To know the calculation of different types of pits	Calculation of volume of different type pits	T5:11.3
46,47	To know the different levels and their problems	A level section, two level section and respective problems	T5:11.4

48	To calculate the volume of reservoir for storage of water for drinking and irrigation	Volume of a reservoir	T5:11.5
49	To learn about theodolites and its description	THEODOLITE:- Description	T5:11.1
50	To know about terminology	Terminology	T5:11.2
51	To understand about temporary adjustments	Temporary adjustments	T5:11.3
52,53	To understand about permanent adjustments	Permanent adjustments	T5:11.5
54,55	To know about the measuring horizontal angles	Measuring horizontal angles	T5:11.7
56	To understand the uses of theodolites	Uses of theodolites	T5:11.8
57	To know about the errors of theodolites	Errors in theodolites	T5:11.10
58	To know about the trigonometric leveling of theodolites	Trigonometric leveling	T5:11.11
59,60	To know about the leveling in different conditions depend on ground and respective	Leveling in different conditions depend on ground and respective	T5:11.15
61,62	To know about the Problems on trigonometric leveling	Problems on Trigonometric leveling	T5:11.19
63,64, 65,66	To understand total problems	All the problems explanation	T5:11.22

XI. MAPPING COURSE OBJECTIVES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES:

Course					Pr	ograr	n Out	come	s		Program Specific Outcomes				
Objectives	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
Ι	S	Н											Н		S
II	Н	S											Н	S	
III				Н			S						Н	S	
IV											S		S	Н	
V			Н	S						S			S	Н	S
VI								S	S			S			S
VII															
VIII										l					
-	•	S – S	Suppo	rtive	•	•	•	•	•	•	Н - Н	ighly R	elated	•	•

XII. MAPPING COURSE OUTCOMES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES:

Course Outcomes	Program Outcomes												Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	Н	S						S					Н		S
2		Н	S								l		Н		
3		Н							S	S	S		Н		
4				S	Н							S	Н	S	
5					Н						U	S	S	Н	
6			Н				S				U		S		
7				Н						S			Н	Н	
8						Н		S				S	Н	Н	S
9					S		Н						Н	Н	S

S – Supportive

H - Highly Related

Prepared by:Mr. B Suresh, Civil EngineeringDate:20 June, 2016

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