

Course File

Subject Title/Subject Code: Surveying (3CE4- 05)

Semester: III Year: II

Name of the Faculty: Mr. Gourav Purbia

E-mail id: gourav.purbia@technonjr.org

Class Schedule

Total Number of Lectures: 42

i) Course Objective

The objective of this course is to provide students with a solid foundation in surveying principles, techniques, and modern practices. Students will learn to perform linear and angular measurements, apply various leveling methods, and conduct curve and tacheometric surveys. The course also introduces photogrammetry and modern field surveying techniques using tools like EDM devices and total stations. By the end of the course, students will be equipped to effectively conduct surveys for civil engineering projects using both traditional and modern technologies.

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VISSION & MISSION OF INSTITUTE

Vision

Empowering student with recent and emerging technologies to create innovative technical leaders capable of contributing to industrial and societal needs for betterment of mankind across the globe.

Mission

M1: To provide dynamic learning environment to students by providing constant exposure to latest technologies by linking closely with the industries.

M2: To establish effective interface with industry to obtain live problems to enhance critical thinking and problem-solving skills among students and consultancy projects for faculty.

M3: To provide avenues and opportunities to faculty for domain specific trainings and qualification upgradation.

M4: To develop ethical leaders with strong communication skills.

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VISION & MISSION OF DEPARTMENT

Department Vision

To increase students learning of fundamentals for designing and planning of buildings and latest technologies through industry-aligned project-based learning which will help in transforming students to be good civil engineering professionals leading to innovation and incubation of new ideas.

Department Mission

M1: To create experimental learning through solving problems of Government, Society, Smart Cities, Industry and other entities.

M2: To teach the latest technologies to the students as beyond the syllabus activity so that they are updated and industry ready.

M3: To enable engineering students, understand industry-aligned technologies and learn to find solutions from their early engineering days and this is the only way to produce globally relevant engineers solving real-life problems applying current technologies.

M4: To enable students to generate projects through problem faced by and requirement of Smart cities, industry, Government and other entities whereby those outlined problem statements are to be studied deeply by a group of faculty members to convert them into real-time project format.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEOs 1: To provide an in-depth understanding of the fundamentals of Civil Engineering and create a foundation for lifelong learning to facilitate a progressive career in the construction Industry, as an entrepreneur and in pursuit of higher studies.

PEOs 2: To equip the students with technical and analytical skills to develop innovative solutions to complex real-life problems using existing and novel technologies. To equip the students with good communication and interpersonal skills, inter-disciplinary teamwork and leadership skills to enable them to fulfill professional responsibilities.

PEOs 3: To expose them to various contemporary issues which will enable them to become ethical and responsible towards themselves, co-workers, Society and the Nation.

PEOs 4: To make the student's industry ready by imparting education related to the latest technologies so that they can grab future industry jobs.

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PROGRAM SPECIFIC OUTCOMES (PSO's)

PSO1: To be aware of and initiate some-work on future technologies and new developments which may impact the future Industry 4.0.

PSO2: Hands on training on upcoming technologies and project-based learning.

PSO3: Get exposure to BIM (Building Information Modeling).

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PROGRAMME OUTCOMES (POs)

A student will develop:

PO01. ENGINEERING KNOWLEDGE: An ability to apply knowledge of Mathematics, Science and Engineering Fundamentals in Electronics and Communication Engineering.

PO02. PROBLEM ANALYSIS: Ability to analyze and interpret data by designing and conducting experiments. Develop the knowledge of developing algorithms, designing, implementation and testing applications in electronics and communication related areas.

PO03. DESIGN/ DEVELOPMENT OF SOLUTION: An ability to Design a system Component or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.

PO04. CONDUCTION OF INVESTIGATION OF COMPLEX PROBLEMS: Ability to Identify, formulate and solve engineering problems.

PO05. MODERN TOOL USAGE: An ability to use the techniques, skills and modern engineering tools necessary for engineering practice.

PO06. THE ENGINEERING AND SOCIETY: Broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and societal context.

PO07. ENVIRONMENT & SUSTAINABILITY: Understand the impact of professional engineering solution in societal and environmental contexts, and demonstrate the knowledge of, and need of sustainable development.

PO08. ETHICS: An ability to understand the professional, social and ethical responsibility.

PO09. INDIVIDUAL AND TEAM WORK: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10. COMMUNICATION: An ability to Communicate effectively in order to succeed in their profession such as, being able to write effective reports and design documentation, make effective presentations.

PO11. PROJECT MANAGEMENT & FINANCE: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in team, to manage projects and in multidisciplinary environment.

PO12. LIFE-LONG LEARNING: Recognize the need and an ability to engage in life-long learning.

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COURSE OUTCOMES (COs) OF THE SUBJECT

CO No.	Mapping	Statement
CO23405.1	Remembering	Recall the basic concepts and terminology of surveying, including linear and angular measurements, leveling methods, and types of curves.
CO23405.2	Understanding	Explain the use of various surveying instruments, such as chains, tapes, compasses, and theodolites, in performing field measurements.
CO23405.3	Applying	Apply appropriate leveling methods (differential, trigonometrical, digital) to determine elevations and create contour maps for different terrains.
CO23405.4	Analyzing	Analyze the methods for setting out different types of curves (simple, circular, reverse, and transition) and vertical curves in civil engineering projects.
CO23405.5	Evaluating	Evaluate different surveying techniques and tools, such as EDM devices and total stations, to determine their accuracy and suitability for specific construction projects.

COS MAPPING WITH POs AND PSOs

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO23405.1	1	2	0	2	0	1	1	0	1	0	0	1	1	1	1
CO23405.2	2	2	0	1	0	2	1	0	1	0	0	1	1	1	1
CO23405.3	3	2	0	2	0	1	1	0	1	0	0	1	1	1	1
CO23405.4	2	2	0	1	0	2	1	0	1	0	0	1	1	1	1
CO23405.5	1	2	0	2	0	1	1	0	1	0	0	1	1	1	1
CO23405 (AVG)	1.8	2	0	1.6	0	1.4	1	0	1	0	0	1	1	1	1

UNIVERSITY ACADEMIC CALENDAR

Academic Calendar for Odd Semester for Session

RAJASTHAN TECHNICAL UNIVERSITY KOTA				
Course: Bachelor of Technology (B.TECH.) for Odd Semester				
Semester	I	III	V	VII
Induction Program	17.08.2023			
Commencement of Classes	11.09.2023	24.08.2023	04.09.2023	04.09.2023
Commencement of First Mid Term	02.11.2023	03.10.2023	05.10.2023	05.10.2023
Commencement of Second Mid Term	07.12.2023	16.11.2023	20.11.2023	20.11.2023
Last Working Day	23.12.2023	02.12.2023	02.12.2023	30.11.2023
Commencement of Practical Exams	02.01.2024	04.12.2023	23.12.2023	14.12.2023
Commencement of Theory Exams	18.01.2024	14.12.2023	08.12.2023	07.12.2023
Winter Break				

Academic Calendar of Institute

Academic Calendar for Odd semester for session 2023-24

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Academic Calendar

Academic Calendar for Odd Semester for Session 2023-24 (Odd Semester)

Course: Bachelor of Technology (B.TECH.)				
Semester	I	III	V	VII
Induction Program	10-08-2023			
Commencement of Classes	20-08-2023	11-09-2023	30-08-2023	22-08-2023
Commencement of First Mid Term	04-11-2023	02-11-2023	02-11-2023	27-09-2023
Commencement of Second Mid Term	15-01-2024	27-12-2023	27-12-2023	05-12-2023
Last Working Day	20-01-2024	12-01-2024	12-01-2024	20-12-2023
Commencement of Practical Exams	29-01-2024	15-01-2024	15-01-2024	31-12-2023
Commencement of Theory Exams	15-02-2024	30-01-2024	29-01-2024	27-12-2023

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Evaluation Scheme

FACULTY DETAILS:

Name of the Faculty : Gourav Purbia
Designation : Technical Assistant
Department : Civil Engineering

1. TARGET

- a) Percentage Pass: 100%
b) Percentage I class: 60 %

2. METHOD OF EVALUATION

- Continuous Assessment Examinations (Mid-Term 1, Mid-Term 2)
 Assignments / Seminars
 Mini Projects
 Quiz
 Semester Examination

Others _____

3. List out any new topic(s) or any innovation you would like to introduce in teaching the subject in this Semester.

4. Take the help of creative tools to stimulate creativity. Include slide presentations, demonstration or forms of visual exercises that will excite the young minds and capture their interest.

Signature of Faculty:

Signature of HOD

UNIVERSITY SYLLABUS



RAJASTHAN TECHNICAL UNIVERSITY, KOTA

SYLLABUS

II Year - III Semester: B.Tech. (Civil Engineering)

3CE4-05: SURVEYING

Credit: 3
3L+0T+0P

Max. Marks: 100 (IA:30, ETE:70)
End Term Exam: 3 Hours

SN	Contents	Hrs.
1	Introduction: objective, scope and outcome of the course.	1
2	LINEAR AND ANGULAR MEASUREMENTS Method of linear measurements, Correction to length measured with a chain/tape, Ranging a survey line; direct and indirect Angular measurement by compass, Designation of bearing, Traversing with tape and compass, Correction to measured bearing, Angular measurement by theodolite; Temporary adjustments, Method of horizontal angle measurement and vertical angle, Traverse computation, plotting of traverse and determining the closing error, Balancing traverse.	14
3	LEVELLING Measurements of elevations methods of levelling; direct/differential, Indirect/Trigonometrical, and Profile/Cross sectional levelling. Digital and Auto level, Errors in levelling, contours and contour lines; methods of contouring; direct and indirect, characteristics, uses, area and vol. measurements.	8
4	CURVE SURVEYING Elements of simple and compound curves, Types of curves, Elements of circular, reverse, and transition curves. Method of setting out simple, circular, transition and reverse curves, Types of vertical curves, length of vertical curves, setting out vertical curves. Tangent corrections.	5
5	TACHEOMETRY AND PHOTOGRAMMETRY SURVEYING Advantages of tacheometric surveying, different systems of tacheometric measurements, Stadia system of tacheometry, distance elevation formulae for horizontal sights. Determination of tacheometric constants, distance and elevation formulae for inclined sights with staff vertical. Introduction to basic concepts perspective geometry of aerial photographs, relief and tilt displacements, Terrestrial Photogrammetry, flight planning	8
6	SETTING OUT WORKS & MODERN FIELD SURVEY SYSTEMS Instruments and methods for laying out buildings, setting out culverts, setting out sewer lines. Principle of E.D.M. (Electronic Distance Measurements), Modulation, Types of E.D.M., Distomat, Total station, parts of total station, advantages and application.	6
TOTAL		42

PRESCRIBED BOOKS

1. Surveying Volume I & II by Dr. B. C. Punmia, Laxmi Publications (P)Ltd.
2. Surveying Volume I & II by Dr. K.R. Arora, Standard Book House Delhi.
3. Surveying & Levelling by Subramanian Oxford University Press.

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WEEKLY TIME TABLE OF THE TEACHER

First Time Table: with effect from (Date):

Day	1	2	3	4	5	6	7
Monday	Survey						
Tuesday			Survey				
Wednesday							
Thursday						Survey	Survey
Friday							
Saturday				Survey			

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COURSE-PLAN

UNIT	Lect. No.	TOPICS	Teaching Methods/ Teaching Aids
1	1.	INTRODUCTION: Objective, scope and outcome of the course	White Board
2	2.	Student should be able to understand Method of linear measurements, Correction to length measured with a chain/tape	White Board
2	3.	Student should be able to understand (Contd.) Correction to length measured with a chain/tape	White Board
2	4.	Student should be able to Numerical based on Correction to length measured with a chain/tape	White Board
2	5.	Student should be able to understand Ranging a survey line	White Board
2	6.	Student should be able to understand Direct and indirect Angular measurement by compass, Designation of bearing	White Board
2	7.	Student should be able to understand Traversing with tape and compass, Correction to measured bearing	White Board
2	8.	Student should be able to solve Numerical regarding surveying.	White Board
2	9.	Student should be able to understand Angular measurement by theodolite; Temporary adjustments	White Board
2	10.	Student should be able to understand Method of horizontal angle measurement	White Board
2	11.	Student should be able to understand Method of vertical angle measurement	White Board
2	12.	Student should be able to understand Numerical based on horizontal and vertical angle measurement	White Board
2	13.	Student should be able to understand Traverse computation, plotting of traverse and determining the closing error	White Board
2	14.	Student should be able to understand Balancing traverse, Numerical	White Board
2	15.	Student should be able to understand Numerical based on Traversing.	White Board
3	16.	Student should be able to understand Measurements of elevations methods of levelling; direct/differential, Indirect/Trigonometrical	White Board
3	17.	Student should be able to understand Profile/Cross sectional levelling	White Board
3	18.	Student should be able to understand Digital and Auto level.	White Board
3	19.	Student should be able to understand Errors in levelling & Numerical	White Board
3	20.	Student should be able to understand contours and contour lines; methods of contouring; direct and indirect	White Board

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3	21.	Student should be able to understand (Contd.) methods of contouring; direct and indirect.	White Board
3	22.	Student should be able to understand Characteristics, uses, area and vol. measurements.	White Board
5	23.	Student should be able to solve Numerical based on levelling	White Board
4	24.	Student should be able to understand Elements of simple and compound curves	White Board
4	25.	Student should be able to understand Types of curves, Elements of circular, reverse, and transition curves	White Board
4	26.	Student should be able to understand Method of setting out simple, circular, transition and reverse curves	White Board
4	27.	Student should be able to understand Types of vertical curves, length of vertical curves	White Board
	28.	Student should be able to understand Setting out vertical curves. Tangent corrections	White Board
5	29.	Student should be able to understand Advantages of tachometric surveying, different systems of tachometric measurements	White Board
5	30.	Student should be able to understand Stadia system of tachometry, distance elevation formulae for horizontal sights	White Board
5	31.	Student should be able to solve Numerical based on levelling	White Board
5	32.	Student should be able to Determine of tachometric constants, distance and elevation formulae for inclined sights with staff vertical	White Board
5	33.	Student should be able to solve Numerical based on levelling	White Board
5	34.	Student should be able to understand Introduction to basic concepts perspective geometry of aerial Photographs	White Board
5	35.	Student should be able to understand Relief and tilt displacements	White Board
5	36.	Student should be able to understand Terrestrial Photogrammetry, flight planning	White Board
6	37.	Student should be able to understand Instruments and methods for laying out buildings	White Board
6	38.	Student should be able to understand Setting out culverts, setting out sewer lines	White Board
6	39.	Student should be able to solve problem based on leveling.	White Board
6	40.	Student should be able to understand Principle of E.D.M.(Electronic Distance Measurements)	White Board
6	41.	Student should be able to understand Modulation, Types of E.D.M	White Board
6	42.	Student should be able to understand Total station, parts of total station, advantages and application	White Board

Signature of Faculty:

Signature of HOD

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Assignment – 1

B. TECH 2nd – YEAR (III SEM.)

Subject: - *Surveying*

1. Define the purpose of surveying in civil engineering and describe its scope in construction projects.
2. Explain the methods of linear measurement using chains and tapes. What are the corrections that need to be applied to the measured lengths?
3. A surveyor measures a distance of 500 meters with a steel tape at a temperature of 30°C. If the standard temperature is 20°C, calculate the corrected distance, given that the coefficient of thermal expansion for steel is $11 \times 10^{-6}/^{\circ}\text{C}$.
4. Describe the process of ranging a survey line. How do direct and indirect methods differ?
5. A surveyor measures the bearing of a line as 150° with a compass. If the local magnetic declination is 5° East, calculate the true bearing of the line.
6. Explain how bearings are designated in compass surveying. What are the corrections needed for measured bearings?
7. A theodolite is set up at point A and measures a horizontal angle of 120° to point B and another horizontal angle of 80° to point C. Determine the included angle at point A between lines AB and AC.
8. Differentiate between direct (differential) leveling and indirect (trigonometrical) leveling. Provide examples of when each method is most appropriate.
9. Explain the concepts of contours and contour lines. What are the methods for contouring, and what are their applications in civil engineering?
10. Discuss the types of errors that can occur in leveling. How can these errors be minimized or corrected?

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Assignment – 2

B. TECH 2nd – YEAR (III SEM.)

Subject: - *Surveying*

1. Define the elements of simple and compound curves and describe their significance in curve surveying.
2. A simple circular curve has a radius of 300 meters and a central angle of 40° . Calculate the length of the curve.
3. Explain the methods of setting out a circular curve on the field.
4. Calculate the tangent length of a circular curve with a radius of 200 meters and a deflection angle of 30° .
5. Describe the types and characteristics of transition curves. How are they different from circular curves?
6. A tachometer is set up at a point, and the staff is held at a point 100 meters away. The staff intercept is 2.5 meters. If the multiplying constant is 100 and the additive constant is 0, calculate the horizontal distance between the instrument and the staff point.
7. Discuss the methods for setting out a vertical curve. What factors need to be considered to determine the length of the vertical curve?
8. An EDM device measures a slope distance of 250 meters with a vertical angle of 5° . Calculate the horizontal distance.
9. Describe the instruments and methods used for setting out buildings, culverts, and sewer lines on-site.
10. A photogrammetry survey captures an aerial photograph with a focal length of 150 mm and a flying height of 1000 meters above mean sea level. If the scale of the photograph is required, calculate it.

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SAMPLE QUIZ QUESTIONS

1. What is the main purpose of surveying in civil engineering?
 - A) To measure horizontal distances only
 - B) To determine the relative position of points on, above, or below the earth's surface
 - C) To calculate the weight of construction materials
 - D) To design structural components

Answer: B) To determine the relative position of points on, above, or below the earth's surface

2. Which instrument is commonly used for measuring horizontal and vertical angles in surveying?
 - A) Chain
 - B) Tape
 - C) Theodolite
 - D) Compass

Answer: C) Theodolite

3. Which of the following methods is used for determining elevations in leveling?
 - A) Trigonometrical leveling
 - B) Stadia method
 - C) Compass surveying
 - D) Chain surveying

Answer: A) Trigonometrical leveling

4. What is the correction applied to the measured length when using a steel tape in surveying?
 - A) Temperature correction
 - B) Slope correction
 - C) Sag correction
 - D) All of the above

Answer: D) All of the above

5. Which type of curve is defined as a transition curve in surveying?
 - A) Circular curve
 - B) Reverse curve
 - C) Spiral curve
 - D) Vertical curve

Answer: C) Spiral curve

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6. In tachometry, what is the purpose of the multiplying constant (K)?

- A) To measure the area
- B) To calculate the distance
- C) To adjust the angle of sight
- D) To determine elevation differences

Answer: B) To calculate the distance

7. What is the main advantage of using a total station in modern surveying?

- A) It is less accurate than traditional methods
- B) It combines electronic distance measurement and angle measurement
- C) It is only used for small-scale surveys
- D) It requires manual recording of data

Answer: B) It combines electronic distance measurement and angle measurement

8. Which of the following is a characteristic of contour lines?

- A) They cross each other
- B) They represent points of equal elevation
- C) They are parallel to the direction of the slope
- D) They are always straight lines

Answer: B) They represent points of equal elevation

9. Which method is typically used for setting out a vertical curve?

- A) Tangent correction method
- B) Reciprocal leveling method
- C) Offset from tangents
- D) Radiation method

Answer: A) Tangent correction method

10. What does EDM stand for in surveying?

- A) Elevation Distance Measurement
- B) Electronic Distance Measurement
- C) Enhanced Data Modeling
- D) Earth Data Management

Answer: B) Electronic Distance Measurement

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TECHNO INDIA NJR INSTITUTE OF TECHNOLOGY, UDAIPUR

B. TECH 2nd – YEAR (III SEM.) – MT-I

SURVEYING (3CE4-05)

Time: 2 Hr

Max. Marks:70

Note:

- 1) The paper is divided into 2 parts: Part-A and, Part-B.
- 2) Part-A contains 10 questions and carries 2 mark each.
- 3) Part-B contains 5 questions. Each question is having two options and carries 10 marks each.

Part- A (20 Marks)

A.	What is Surveying?	CO1
B.	What is magnetic declination?	CO1
C.	What do you mean by normal tension?	CO1
D.	Give the RF of A plan 400 sqm in area represented by 4 sqcm?	CO1
E.	What are the temporary adjustments of vernier theodolite?	CO2
F.	In which area does the compass surveying is not recommended?	CO2
G.	Find the hypotenusal allowance per chain 20m length if Angle of slope 10°?	CO2
H.	What do you mean by contour interval?	CO2
I.	What do you mean by bench mark and reduce level?	CO3
J.	How a curve may be designated?	CO3

Part- B (50 Marks)

1. Explain Types of survey	CO1
OR	
1. Write difference between plain survey and geodetic survey	CO1

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2. The following bearing were observed while traversing with a compass
At what station do you suspect the local attraction? Determine the correct magnetic bearing.

Line	FB	BB
AB	$75^{\circ} 20'$	$254^{\circ} 20'$
BC	$115^{\circ} 20'$	$296^{\circ} 35'$
CD	$165^{\circ} 35'$	$345^{\circ} 35'$
DE	$224^{\circ} 50'$	$44^{\circ} 15'$
EA	$304^{\circ} 50'$	$125^{\circ} 50'$

CO1

OR

2. Calculate internal angle

line	bearing
AB	$60^{\circ} 30'$
BC	$122^{\circ} 0'$
CD	$46^{\circ} 0'$
DE	$205^{\circ} 30'$

CO1

3. Convert following angle WCB to QB

- $22^{\circ} 30'$
- $170^{\circ} 12'$
- $211^{\circ} 54'$
- $315^{\circ} 24'$

CO2

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OR	
3. Write down Convert following angle QB to WCB <ul style="list-style-type: none">• N 12° 24' E• S 31° 36' E• S 68° 6 'W• N 5° 42' W	CO2

4. Explain the procedure of measurement of horizontal angle by reiteration method	CO2
OR	
4. Explain the procedure of measurement of horizontal angle by Repetition Method.	CO2

5. The following consecutive reading was taken with a level and a 4.0 m staff on a continuous sloping ground at a common interval of 30 m. .780, 1.535, 1.955, 2.430, 2.985, 3.480, 1.155, 2.365, 3.640, .935, 1.045, 1.630, 2.545 The reduce level of First Point A was 180.750 m. Calculate the reduce level of the points by suitable method.	CO3
OR	
5. What are the sources of error in leveling? What precautions are necessary to avoid them?	CO3

Marks and Gap Analysis of Mid-Term I

S.No.	University Roll No.	Name of Student	Mid-Term 1 MM-70	Remark (Remedial Class need or not – Y/N)
1.	22ETCCE001	ANKIT KUMAR	47	N
2.	22ETCCE002	ARMAAN CHAUHAN	45	N
3.	22ETCCE003	AYUSH SINGH JHALA	50	N
4.	22ETCCE004	PARIDHI NINAMA	58	N
5.	22ETCCE005	PRAVEEN DANGI	56	N
6.	22ETCCE006	ROSHNI TABIYAR	65	N

(Y, if obtained marks are <50%)

Signature of Faculty:

Signature of HOD

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Remedial Action Taken to Remove the Gaps (After Mid-Term 1)

S.no.	University Roll no.	Name of Student	Topics to be discussed in Remedial Class	Schedule Date of Remedial Class	Outcome Achieved
1.	NIL				
2.					

Signature of Faculty:

Signature of HOD

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Mid Term Paper-II

TECHNO INDIA NJR INSTITUTE OF TECHNOLOGY, UDAIPUR

B. TECH 2nd – YEAR (III SEM.)

Survey (3CE4-05)

Time: 3 Hr

Max. Marks: 70

Note:

- 1) The paper is divided into 2 parts: Part-A, Part-B and Part-C.
- 2) Part-A contains 10 questions and carries 2 mark each.
- 3) Part-B contains 7 questions. Each question carries 4 marks each. Attempt any 5 Questions
- 4) Part-C contains 5 questions. Each question carries 10 marks each. Attempt any 3 Questions

Part- A (20 Marks)

A.	What is Surveying?	CO1
B.	Explain Following terms: <ul style="list-style-type: none">• First Principal of surveying• Representative Fraction	CO1
C.	What do you mean by bench mark & Datum?	CO2
D.	What is Reciprocal Leveling?	CO2
E.	How Can a Curve May be Designed?	CO3
F.	What is a Circular Curve? & What are different method of setting out of curve?	CO3
G.	What is Tacheometer?	CO4
H.	Give any two Advantages of Tacheometer Surveying?	CO4
I.	Give Types of EDM	CO5
J.	Define Bearing of line?	CO5

Part- B (20 Marks)

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1. Convert WCB TO QB <ul style="list-style-type: none">• 30°• 112°• 180°• 358°	CO1
2. Convert QB To WCB <ul style="list-style-type: none">• N 12 ° 24 °E• S 31 ° 36 ° E• S 68 ° 6 °W• N 5° 42 °W	CO1

3. Explain Curvature Refraction and Combined Corrections?	CO2
4. The Following Staff reading were observed Successively with a level the Instrument having been moved after third, sixth, eight readings: 2.20, 1.606, 0.898, 2.090, 2.880, 1.255, 0.602, 1.982, 1.044, 2.684m Enter above readings in a page of level book and calculate the RL of points if first reading was taken with a staff held on Bench mark of 432.284m.	CO3

5. What are the sources of error in leveling? What precautions are necessary to avoid them?	CO3
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6. Calculate internal angle

line	bearing
AB	60° 30'
BC	122° 0'
CD	46° 0'
DE	205° 30'
EA	300°

CO4

7. What do you mean by meridian? Differentiate between True meridian and magnetic meridian?

CO5

Part C (30 Marks)

1. Explain Types of survey	CO1
2. Explain Following: <ul style="list-style-type: none">● Check Leveling● Temporary Benchmark● Reduce level● Rise and fall method	CO2
3. Explain Plain Table Surveying	CO3
4. What are Characteristics OF contour Line	CO4
5. What is EDM? Explain principal of EDM and types of EDM	CO5

Marks and Gap Analysis of Mid-Term II

S.No.	University Roll No.	Name of Student	Mid-Term 2 MM-70	Remark (Remedial Class need or not – Y/N)
1.	22ETCCE001	ANKIT KUMAR	46	N
2.	22ETCCE002	ARMAAN CHAUHAN	44	N
3.	22ETCCE003	AYUSH SINGH JHALA	49	N
4.	22ETCCE004	PARIDHI NINAMA	57	N
5.	22ETCCE005	PRAVEEN DANGI	55	N
6.	22ETCCE006	ROSHNI TABIYAR	64	N

(Y, if obtained marks are <50%)

Signature of Faculty:

Signature of HOD

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Remedial Action Taken to Remove the Gaps (After Mid- Term 1I)

S.no.	University Roll no.	Name of Student	Topics to be discussed in Remedial Class	Schedule Date of Remedial Class	Outcome Achieved
1.	NIL				
2.					

Signature of Faculty:

Signature of HOD

Model Question Paper

4E4114	Roll No. _____	Total No. of Pages : 4
	4E4114 B. Tech. IV-Sem. (Main & Back) Exam; April-May 2017 Civil Engineering 4CE4A Surveying - I	

Time : 3 Hours Maximum Marks : 80
Min. Passing Marks : 26

Instructions to Candidates :-

Attempt any five questions, selecting one question from each unit. All Questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used / calculated must be stated clearly. Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL _____ 2. NIL _____

UNIT - I

1 Differentiate between the following terms :

- (a) Chainage and offset
- (b) Base line and check line
- (c) Main station and tie station
- (d) Cumulative and Compensating error.

OR

1 (a) Define surveying. What are the principles of surveying ? Explain them.

4E4114] 16
I [P.T.O.

- (b) A line was measured with a steel tap which was exactly 30 m at a temperature of 20°C and a pull of 10 kg. The measured length was 1650 m. The temperature during measurement was 30°C and the pull applied was 15 kg. Find the true length of line, if cross-sectional area of tap was 0.025 cm^2 . The coefficient of expansion is $3.5 \times 10^{-6}/^{\circ}\text{C}$ and modulus of elasticity $E = 2.1 \times 10^6\text{ kg/cm}^2$.

16

UNIT - II

- 2 (a) Given below are the bearings observed in a traverse survey conducted with a prismatic compass at a place where local attraction was suspected :

<i>Line</i>	<i>Fore bearing</i>	<i>Back bearing</i>
AB	$124^{\circ} 30'$	$304^{\circ} 30'$
BC	$68^{\circ} 15'$	$246^{\circ} 00'$
CD	$310^{\circ} 30'$	$135^{\circ} 15'$
DA	$200^{\circ} 15'$	$17^{\circ} 45'$

At what stations do you suspect local attraction. Find the correct bearings of the lines and the included angles.

- (b) Define : True meridian, magnetic meridian, angle of dip, local attraction and angle of magnetic declination.

16

OR

- 2 (a) Does local attraction at a point affect the magnitude of an angle computed from magnetic bearing read at that point. Explain.
- (b) Find out the bearing of the lines of an equilateral triangle ABC running clockwise if the bearing of the line AB is $60^{\circ} 30'$.

16

UNIT - III

- 3 (a) Enlist the source of errors in a theodolite traverse survey. How is the closing error of a traverse adjusted graphically ?

- (b) What is meant by balancing a traverse ? State various rules used to do this.

16

OR

- 3 (a) What do you mean by latitude and departure ? State the checks to be applied in case of closed and open traverse.

- (b) The bearings of two inaccessible stations A and B taken from a station C were $250^{\circ} 00'$ and $153^{\circ} 26'$ respectively. The co-ordinates of A and B were as follows :

Station	Easting	Northing
A	300 m	200 m
B	400 m	150 m

Calculate the independent co-ordinates of 'C'.

16

UNIT - IV

- 4 Differentiate between the following pairs :

- (a) Back sight and fore sight
(b) Line of collimation and axis of telescope
(c) Profile levelling and cross-sectioning.
(d) Curvature and Refraction correction.

16

OR

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4 (a) Explain how the procedure of reciprocal levelling eliminates the effect of refraction and curvature as well as the error of collimation.

(b) The reduced level of ground at four points A, B, C and D are 54.35, 54.30, 54.20, 54.30 m respectively. A sewer is to be laid so that its invert is 3.048 m below the ground at A and it falls with uniform gradient of 1 in 340 to D. The distances AB, AC and AD are 35.845 m, 80.742 m and 134.7 m respectively. Find the invert level and depth of trench at B, C and D.

16

UNIT - V

5 (a) Define a contour. State the various characteristics of contour lines.

(b) Discuss in detail, the methods of direct and indirect contouring.

16

OR

5 Describe concisely the components of a plane table outfit. Explain how would you set up and orient the plane table. State the errors in plane tabling. Describe with sketches, the methods of plane table surveying.

16

01/07/2016

4E4114	Roll No. _____	Total No of Pages: 4
4E4114 B.Tech. IV-Sem (Main & Back) Exam; June-July 2016 Civil Engineering 4CE4A Surveying-I		

Time: 3 Hours

Maximum Marks: 80

Min. Passing Marks (Main & Back): 26

Min. Passing Marks (Old Back): 24

Instructions to Candidates:-

Attempt any five questions, selecting one question from each unit. All Questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.

Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination.

1. NIL _____ 2. NIL _____

UNIT-I

- Q.1 (a) What is surveying? How it is useful for civil Engineers? [8]
- (b) Distinguish between plain and geodetic surveying. [8]

OR

- Q.1 (a) Briefly explain sources of errors in surveying. [6]
- (b) Explain different corrections to take measurements. [10]

UNIT-II

Q.2 (a) Explain with a neat sketch working of a prismatic compass. [8]

(b) During a traverse survey ABCDA, the following interior angles were measured with a compass:- [8]

$$\angle A = 75^\circ, \quad \angle B = 120^\circ, \quad \angle C = 80^\circ \quad \text{and} \quad \angle D = 85^\circ$$

If the bearing of the line AB is 99° . What are the bearings of the remaining lines of traverse?

OR

Q.2 (a) Differentiate between:-

(i) Line of collimation and line of sight [2]

(ii) Face left and Face right condition. [2]

(iii) Altitude level axis and plate level axis. [2]

(b) Explain the temporary adjustment of transit theodolite. [10]

UNIT-III

Q.3 (a) What is a traverse? Discuss different uses of traverse surveying. [6]

(b) Differentiate between:- [10]

(i) Open traverse and closed traverse.

(ii) Bowditch's rule and transit rule.

(iii) Latitude and departure.

OR

Q.3 The following bearings are taken on a closed traverse: [16]

Line	A B	B C	C D	D E	E A
F. B	80° 10'	120° 20'	170° 50'	230° 10'	310° 20'
B. B	259° 0'	310° 50'	350° 50'	49° 30'	130° 15'

Compute the interior angles and find correct bearings of lines if bearings of CD is correct.

UNIT-IV

Q.4 (a) Differentiate between simple levelling and differential levelling. [8]

(b) What are temporary adjustments of dumpy levels? How they are performed? [8]

OR

Q.4 The following readings were observed successfully with a levelling instrument. The instrument was shifted after 5th and 11th readings. [16]

(1) 0.585 (2) 1.010 (3) 1.735 (4) 3.295 (5) 3.775

(6) 0.350 (7) 1.300 (8) 1.795 (9) 2.575 (10) 3.375

(11) 3.895 (12) 1.735 (13) 0.635 (14) 1.605

Draw up a page of level book and determine the R. L. of various points, if R. L. of first point is 136.440m. Use the Rise and Fall method.

UNIT-V

- Q.5 (a) What are different methods of plane table survey? Discuss intersection method with its suitability. [8]
- (b) Explain the two points problem and its solution. [8]

OR

- Q.5 (a) What is contour interval? Explain the factors to be considered in deciding the contour interval. [8]
- (b) What are different uses of contour maps? Explain. [8]

STUDENT PERFORMANCE REPORT

Roll No.	Name of Student	I Mid-Term	II Mid-Term	Average
22ETCCE001	ANKIT KUMAR	47	46	46.5
22ETCCE002	ARMAAN CHAUHAN	45	44	44.5
22ETCCE003	AYUSH SINGH JHALA	50	49	49.5
22ETCCE004	PARIDHI NINAMA	58	57	57.5
22ETCCE005	PRAVEEN DANGI	56	55	55.5
22ETCCE006	ROSHNI TABIYAR	65	64	64.5

Signature of Faculty:

Signature of HOD

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RESULT ANALYSIS

S.NO.	RTU ROLL NUMBER	NAME OF STUDENT	END TERM MARKS	SESSIONAL MARKS	TOTAL
		MAX MARKS	70	30	100
1.	22ETCCE001	ANKIT KUMAR	32	21	53
2.	22ETCCE002	ARMAAN CHAUHAN	1	20	21
3.	22ETCCE003	AYUSH SINGH JHALA	20	22	42
4.	22ETCCE004	PARIDHI NINAMA	33	26	59
5.	22ETCCE005	PRAVEEN DANGI	24	25	49
6.	22ETCCE006	ROSHNI TABIYAR	38	29	67

TOTAL	PASS	FAIL	ABSENT	PASS %
6	5	1	0	83.33%

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Indirect Assessment:

Overall Teacher Self-Assessment (at the completion of course) in terms of course objective and outcomes

Course Objectives:

The objective of this course is to provide students with a solid foundation in surveying principles, techniques, and modern practices. Students will learn to perform linear and angular measurements, apply various leveling methods, and conduct curve and tacheometric surveys. The course also introduces photogrammetry and modern field surveying techniques using tools like EDM devices and total stations. By the end of the course, students will be equipped to effectively conduct surveys for civil engineering projects using both traditional and modern technologies.

Course Outcomes:

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

CO1: Recall the basic concepts and terminology of surveying, including linear and angular measurements, leveling methods, and types of curves.

CO2: Explain the use of various surveying instruments, such as chains, tapes, compasses, and theodolites, in performing field measurements.

CO3: Apply appropriate leveling methods (differential, trigonometrical, digital) to determine elevations and create contour maps for different terrains

CO4: Analyze the methods for setting out different types of curves (simple, circular, reverse, and transition) and vertical curves in civil engineering projects.

CO5: Evaluate different surveying techniques and tools, such as EDM devices and total stations, to determine their accuracy and suitability for specific construction projects.

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Methodology to identify bright student

It is done by considering a range of criteria, including academic performance, creativity, critical thinking, problem-solving skills, and enthusiasm for learning. Bright students often excel in multiple areas. Observed how students perform in the classroom. In terms of active participation, engagement in discussions, leadership, and the ability to grasp complex concepts.

Efforts to keep students engaged

1. **Active Learning:** Incorporate active learning strategies, such as group discussions, problem-solving activities, and hands-on projects. Active participation keeps students engaged and encourages critical thinking.
2. **Varied Teaching Methods:** Use a variety of teaching methods, including lectures, group work, multimedia presentations, and interactive activities to cater to different learning preferences.
3. **Technology Integration:** Leverage technology, such as online platforms, educational apps, and interactive software, to make lessons more engaging and interactive.

Methodology to identify weak student

It is done by considering a range of criteria, including classroom observation, formative assessment, summative assessment, assignment review etc. Weak students are struggling students with sensitivity and a desire to support their learning. Some measures, such as additional tutoring, personalized assignments, or alternative assessment methods, to help students succeed.

Targeted interventions for weak student

1. Additional Resources

Offer supplementary learning materials, such as textbooks, online resources, or multimedia content, to provide alternative explanations and reinforce key concepts.

2. Remedial classes

Establish a tutoring program where students can receive extra help from teachers.

3. Flipped classroom

Students are assigned pre-class learning materials, often in the form of videos, readings, or online modules, to cover the foundational concepts before coming to class.