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| **LESSON PLAN(2023-24)** |
| **Academic Year** | **: 2023-2024** | **Semester** | **: I** |  |
| **Name of the Program** | **: B.Tech(R20-Regulation)** | **Year** | **: II** |  |
| **Course/Subject** | **: SURVEYING AND GEOMETRICS** | **Course Code** | **:R2021014** |  |
| **Name of the Faculty** | **: Mr.S.AVINASH** | **Branch** | **: CIVIL** |  |
| **Designation** | **: Assistant Professor** |  |  |  |
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| ***IV Year – I Semester*** |  | ***L*** | ***T*** | ***P*** | ***C*** |
| ***SURVEYING AND GEOMETRICS*** | ***3*** | ***0*** | ***0*** | ***3*** |

 |
| **UNIT****NO** | **LEC****NO** | **CONTENTS** | **DATE OF****LECTURE** | **TEXT/****REFERENCE** | **NATURE OF****LECTURE** |
| **1. Introduction and Basic Concepts:** Introduction, Objectives, classification and principles of surveying, surveying accessories. Introduction to Compass, levelling and Plane table surveying.**Measurement of Distances and Directions** **Linear distances-** Approximate methods, Direct Methods- Chains- Tapes, ranging, Tape corrections.**Prismatic Compass**- Bearings, included angles, Local Attraction, Magnetic Declination, and dip – W.C.B systems and Q.B. system of locating bearings. |
| ***UNIT-1*** | 1 | Introduction to Surveying, objectives and principles |  | **T1**  | **CHALK AND BLACK BOARD** |
| 2 | Surveying accessories |  | **T1**  |
| 3 | Introduction to Compass, levelling and Plane table surveying |  | **T1**  |
| 4 | Introduction to linear distances and chain survey |  | **T1**  |
| 5 | Approximate methods, Direct Methods |  | **T1**  |
| 6 | Chains- Tapes, ranging |  | **T1**  |
| 7 | Problems on area calculation using chain |  | **T1** |
| 8 | Problems on chain survey obstacles |  | **T1**  |
| 9 | Problems on chain survey obstacles |  | **T1** |
| 10  | Problems on chain survey obstacles |  | **T1** |
| 11 | Problems on Chain Survey error |  | **T1** |
| 12 | Problems on tape errors |  | **T1** |
| 13 | Introduction to compass |  | **T1** |
| 14 | Bearings, included angles |  | **T1** |
| 15 | WCB to QB Problems, Open Traverse, Closed Traverse |  | **T1** |
| 16 | Problems on Open Traverse and Closed Traverse |  | **T1** |
| 17 | Problems on Open Traverse and Closed Traverse |  | **T1** |
| 18 | Local Attraction, Magnetic Declination |  | **T1** |
| 19 | Problems on Local Attraction |  | **T1** |
| 20 | Problems on Compass errors |  | **T1** |
| 21 | Revision |  |  | **PPT** |
| 22 | Revision |  |  |
| **2.** **Leveling**- Types of levels, temporary and permanent adjustments, methods of levelling, booking and Determination of levels, Effect of Curvature of Earth and Refraction. **Contouring**- Characteristics and uses of Contours, methods of contour surveying. **Areas** - Determination of areas consisting of irregular boundary and regular boundary.Volumes -Determination of volume of earth work in cutting and embankments for level section, volume of borrow pits, capacity of reservoirs. |
| ***UNIT-2*** | 1 | Introduction to levelling, Types of levels, temporary and permanent adjustments |  | **T1 / T2** | **CHALK AND BLACK BOARD** |
| 2 | methods of levelling, booking and Determination of levels |  | **T1 / T2** |
| 3 | Problems on Height of Instrument Method |  | **T1 / T2** |
| 4 | Problems on Rise and Fall Method  |  | **T1 / T2** |
| 5 | Effect of Curvature of Earth and Refraction |  | **T1 / T2** |
| 6 | Introduction to Contouring |  | **T1 / T2** |
| 7 | Characteristics and uses of Contours, methods of contour surveying |  | **T1 / T2** |
| 8 | Determination of areas consisting of irregular boundary and regular boundary |  | **T1 / T2** |
| 9 | Problems on area calculation |  | **T1 / T2** |
| 10 | Problems on area calculation |  | **T1 / T2** | **PPT** |
| 11 | Determination of volume of earth work in cutting and embankments for level section |  | **T1 / T2** |
| 12 | Problems on Mid ordinate Rule |  | **T1 / T2** |
| 13 | Problems on Trapizoidal Rule |  | **T1 / T2** |
| 14 | Problems on Sympsons Rule |  | **T1 / T2** |
| 15 | Volume of borrow pits, capacity of reservoirs. |  | **T1 / T2** |
| 16 | Problems on Volume calculations |  | **T1 / T2** |
| 17 | Problems on Volume calculations |  | **T1 / T2** |
| 18 | Revision |  |  |
| 19 | Revision |  |
| **3. Theodolite Surveying:** Types of Theodolites, temporary adjustments, measurement of horizontal angle by repetition method and reiteration method, measurement of vertical Angle, Trigonometric leveling when base is accessible and inaccessible.**Traversing:** Methods of traversing, traverse computations and adjustments, Introduction to Omitted measurements. |
| ***UNIT-3*** | 1 | Introduction to Theodolite Types of Theodolites, temporary adjustments |  | **T1 / T2** | **CHALK AND BLACK BOARD** |
| 2 | Measurement of horizontal angle by repetition method |  | **T1 / T2** |
| 3 | Measurement of horizontal angle by reiteration method |  | **T1 / T2** |
| 4 | Problems on horizontal angle by repetition method |  | **T1 / T2** |
| 5 | Problems on horizontal angle by reiteration method |  | **T1 / T2** |
| 6 | measurement of vertical Angle |  | **T1 / T2** |
|  | 7 | Trigonometric leveling when base is accessible and inaccessible |  | **T1 / T2** |  |
|  | 8 | Problems on Trignometric Levelling |  | **T1 / T2** |  |
|  | 9 | Problems on Trignometric Levelling |  | **T1 / T2** |  |
|  | 10 | Introduction to Traversing: Methods of traversing, traverse computations and adjustments |  | **T1 / T2** |  |
|  | 11 | Introduction to Omitted measurements |  | **T1 / T2** |  |
|  | 12 | Problems on Taversing  |  | **T1 / T2** |  |
|  | 13 | Problems on Taversing |  | **T1 / T2** |  |

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|   |  14 | Revision |  |  | **PPT** |
| 15 | Revision |  |
| **4.** **Curves:** Types of curves and their necessity, elements of simple, compound, reverse curves. **Tachometric Surveying:** Principles of Tachometry, stadia and tangential methods of Tachometry, **Modern Surveying Methods:** Principle and types of E.D.M. Instruments, Total station- advantages and Applications. Introduction to Global Positioning System. |
| ***UNIT-4*** | 1 | Curves: Types of curves and their necessity |  | **T1 / T2** |  |
| 2 | Elements of simple curve |  | **T1 / T2** |  |
| 3 | Problems on Simple Curve |  | **T1 / T2** | **CHALK AND BLACK BOARD** |
| 4 | Elements of Compound curve |  | **T1 / T2** |
| 5 | Problems on Compound curve |  | **T1 / T2** |
| 6 | Elements of Reverse curve |  | **T1 / T2** |
| 7 | Problems on Reverse curve |  | **T1 / T2** |  |
| 8 | Tachometric Surveying: Principles of Tachometry |  | **T1 / T2** |  |
| 9 | stadia and tangential methods of Tachometry |  | **T1 / T2** |  |
| 10 | Problem on Tachometry |  | **T1 / T2** |  |
| 11 | Problem on Tachometry |  | **T1 / T2** |  |
| 12 | Modern Surveying Methods: Principle and types of E.D.M. Instruments |  | **T1 / T2** |  |
| 13 | Total station- advantages and Applications. Introduction to Global Positioning System |  | **T1 / T2** |  |
| 14 | Revision |  |  |  |
| 15 | Revision |  |  |
| **5.** **Photogrammetry Surveying:** Introduction, Basic concepts, perspective geometry of aerial photograph, relief and tilt displacements, terrestrial photogrammetry, flight planning; Stereoscopy, ground control extension for photographic mapping- aerial triangulation, radial triangulation, methods; photographic mapping- mapping using paper prints, mapping using stereo plotting instruments, mosaics, map substitutes. |
| ***UNIT-5*** | 1 | Introduction, Basic concepts of photogrammetry survey, perspective geometry of aerial photograph |  | **T1 / T2** |  |
| 2 | relief and tilt displacements, terrestrial photogrammetry |  | **T1 / T2** |  |
| 3 | flight planning; Stereoscopy, ground control extension for photographic mapping |  | **T1 / T2** | **CHALK AND BLACK BOARD** |
| 4 | aerial triangulation, radial triangulation, methods; photographic mapping |  | **T1 / T2** |
| 5 | mapping using paper prints, mapping using stereo plotting instruments |  | **T1 / T2** |
| 6 | mosaics, map substitutes |  | **T1 / T2** |
| 7 | Revision |  |  | **PPT** |
| 8 | Revision |  |  |

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| CO1 | Will be able to Apply the knowledge to calculate angles, distances and levels | APPLY,ANALYZE,EVALUATE | K3,K4,K5 |
| CO2 | Will be able to Identify data collection methods and prepare field notes | APPLY,ANALYZE,EVALUATE | K3,K4,K5 |
| CO3 |  Will be able to Understand the working principles of survey instruments, measurement errors and corrective measures | APPLY,ANALYZE,EVALUATE | K3,K4,K5 |
| CO4 |  Will be able to Interpret survey data and compute areas and volumes, levels by different type of equipment and relate the knowledge to the modern equipment and methodologies. | APPLY,ANALYZE,EVALUATE | K3,K4,K5 |
| CO5 | Will be able to apply the day to day civil engineering surveying practice. | APPLY,ANALYZE,EVALUATE | K3,K4,K5 |

CO-PO Mapping: **(**1: Slight [Low]; 2: Moderate [Medium]; 3: Substantial [High]]; ‘-‘: No Correlation**)**

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|  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| CO1-K4 | **2** | **3** | **1** | **2** | **2** | **-** | **2** | **1** | **-** | **1** | **2** | **-** |
| CO2-K5 | **3** | **1** | **3** | **-** | **2** | **3** | **-** | **-** | **1** | **2** | **-** | **1** |
| CO3-K5 | **2** | **2** | **-** | **2** | **1** | **2** | **2** | **3** | **1** | **-** | **2** | **-** |
| CO4-K5 | **2** | **1** | **2** | **1** | **2** | **3** | **-** | **2** | **-** | **2** | **1** | **2** |
| CO5-K5 | **3** | **3** | **1** | **1** | **2** | **2** | **-** | **1** | **1** | **2** | **2** | **-** |

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| **S.NO** | **GRADUATE ATTRIBUTION** | **ACTION VERBS** | **LEVEL** |
| 1 | ENGINEERING KNOWLEDGE | APPLY, ANALYZE | K3,K4 |
| 2 | PROBLEM ANALYSIS | ANALYZE | K4 |
| 3 | DESIGN DEVELOPMENT OF SOLUTIONS | EVALUATE | K5 |
| 4 | INVESTIGATION OF COMPLEX PROBLEMS | APPLY, ANALYZE, EVALUATE | K3,K4,K5 |
| 5 | MODERN TOOL USAGE | APPLY, EVALUATE | K3,K5 |
| 6 | ENGINEER AND SOCIETY |  |  |
| 7 | ENVIRONMENT AND SUSTAINABILITY |  |  |
| 8 | ETHICS |  |  |
| 9 | INDIVIDUALS AND TEAM WORK | ANALYZE, EVALUATE | K3,K4 |
| 10 | COMMUNICATION |  |  |
| 11 | PROJECT MANAGEMENT AND FINANCE  | APPLY | K3 |
| 12 | LIFE LONG LEARNING | CREATE | K6 |

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| ***Course Objectives:*** |
| * ***Know the principle and methods of surveying.***
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| * ***Measure horizontal and vertical- distances and angles.***
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| * ***Recording of observation accurately.***
* ***Perform calculations based on the observation.***
* ***Identification of source of errors and rectification methods.***
* ***Apply surveying principles to determine areas and volumes and setting out curves***
* ***Use modern surveying equipment’s for accurate results***
 |
| **Text books:** |
| ***1. Surveying (Vol – 1, 2 & 3), by B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain - Laxmi Publications (P) ltd., New Delhi.*** |
| ***2. Chandra A M, “Plane Surveying and highersurveying”, New Age International Pvt. Ltd., Publishers, New Delhi.*** |
| ***3. Duggal S K, “Surveying (Vol – 1 & 2), Tata McGraw Hill Publishing Co. Ltd. New Delhi.*** |
| **Reference Books :** |
| 1. ***Arthur R Benton and Philip J Taety, Elements of Plane Surveying, McGraw Hill.***
2. ***Surveying and levelling by R. Subramanian, Oxford university press, New Delhi***
3. ***Arora K R “Surveying Vol 1, 2 & 3), Standard Book House, Delhi.***
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**Signature of Faculty Signature of HOD Signature of PRINCIPAL**