**17CE2104 – SURVEYING – I**

**(Civil Engineering)**

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| **Course Category** | Professional Core | **Credits** | 3 |
| **Course Type** | Theory | **Lecture - Tutorial - Practical** | 2-2-0 |
| **Prerequisite** | Mathematics | **Sessional Evaluation** | 40 |
| **Semester End Exam. Evaluation** | 60 |
| **Total Marks** | 100 |

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| **Course Objectives** | 1. To apply knowledge of mathematics, science and engineering for understanding measurement techniques and equipment used in land surveying. 2. To understand various methods of measurements and markings. 3. To understand various methods of locating points related to land surveying. 4. To understand the procedure of establishing control points. 5. To interpret contours from levelling survey. 6. To understand various methods of completing areas and volumes. | |
| **Course Outcomes** | CO1 | Understand basic principles of land surveying. Be able to apply chain surveying principles to book observations and make necessary calculations. |
| CO2 | Understand various methods of angle measurement. Be able calculate bearings, magnetic dip and declination. Be able to plot survey using a prismatic compass. Be able to calculate errors in compass survey. |
| CO3 | Understand the fundamentals of plane table surveying. Apply various methods of plane tabling and be able to plot plane table survey with correction for errors. |
| CO4 | Understand fundamental principles and techniques of leveling and different types of level instruments. Use leveling principles to draw profiles, longitudinal sections and cross-sections. |
| CO5 | Understand the basic principles of contouring and uses of contour maps. |
| CO6 | Calculate areas and volumes from survey data using mathematical principles. |

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| **Course Content** | **UNIT – I**  **BASIC CONCEPTS:** Surveying definition – Classification – Principles of Surveying – Measurements – Basic measurements and methods – Plan and map – Scales used for maps and plans.  **CHAIN SURVEYING**: Principles of chain surveying – Basic definitions – Well conditioned triangle; Selection of survey stations and survey lines – Field work – Recording measurements – Types of Cross staff – Instruments for setting out right angles – Line ranger – Cross staff survey – Obstacles in chain survey.  **UNIT – II**  **COMPASS SURVEYING**: Traversing – Meridians – Azimuth – Bearings – Magnetic dip and declination – Prismatic compass – Compass traverse – Local attraction – Plotting of a survey work – Errors in compass surveying – Limits of accuracy.  **UNIT – III**  **PLANE TABLE SURVEYING**: Plane table and its accessories – Setting up – Plane tabling – Radiation – Traversing – Intersection and resection methods – Resection by trial and error method – Graphical method – Tracing paper method – Lehmann rules – Errors in plane tabling.  **UNIT-IV**  **LEVELLING:** Basic definitions – Curvature and refraction – Different methods of levelling – Classification of direct levelling methods – Levels – Dumpy level – Tilting level – Auto level – Levelling staff – Level field book – Profile levelling – Cross sectioning – Reciprocal levelling – Sources of errors in levelling – Degree of precision.  **UNIT – V**  **CONTOURING**: Methods of representing relief – Contouring – Contour interval – Characteristics of contours – Methods of locating contours – Direct and indirect methods of contouring – Interpolation and sketching of contours – Location of a contour gradient – Uses of contour maps.  **UNIT – VI**  **AREAS AND VOLUMES:** Computation of areas from field notes and plotted figures. Areas of figures at boundaries by mid-ordinate rule – Trapezoidal rule – Average ordinate rule – Simpson’s 1/3 rd rule.  Computation of straight volumes of level section using Trapezoidal and Prismoidal rules. Computations of volumes of borrow pits by spot levels and reservoirs by contours. |

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| **Textbooks**  **and Reference books** | **TEXTBOOKS:**   1. Surveying by Dr. K. R. Arora. 2. Surveying by Dr. B. C. Punmia. 3. Surveying by Dr. C. Venkatramaiah.   **REFERENCE BOOKS:**   1. Surveying and Levelling by S.S.Bhavikatti. 2. Surveying and Levelling by T.P.Kanetkar and S.V.Kulkarni. 3. Plane Surveying by A. M. Chandra. |