**19CE21P2 - SURVEYING LABORATORY**

**(Civil Engineering)**

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| **Course Category**  | Program core | **Credits** | 1.5 |
| **Course Type** | Laboratory | **Lecture - Tutorial - Practical** | 0 - 0 - 3 |
| **Prerequisite** | Surveying | **Sessional Evaluation** | 40 |
| **Semester End Exam Evaluation** | 60 |
| **Total Marks** | 100 |

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| **Course Objective** | To obtain knowledge of various basic and advanced surveying equipments and their field applications.Understanding the field conditions to plan and the collect the data. |
| **Course Outcomes** | CO1 | Apply geometric and trigonometric principles of basic surveying calculations. |
| CO2 | Be able to measure elevations of points using auto level. |
| CO3 | Be able to use the theodolite along with chain/tape and also carry out tacheometric surveying. |
| CO4 | Be able to set out a simple curve.  |
| CO5 | Use the total station instrument in basic engineering works. |
| CO6 | Understand the use of advanced surveying instruments.  |
| **Course Content** | **EXERCISE -1**Demonstration on conventional equipment such as chain, ranging rod, compass, cross staff, Dumpy level etc.**EXERCISE -2**Determination of elevations of given points using auto level.**EXERCISE-3**1. Determination of difference in elevation between two points using auto level.
2. Locating a bench mark by fly levelling using auto level.

**EXERCISE -4** a) Plotting profile of given road section by obtaining longitudinal and cross sections using auto level. b) Plotting a contour map for the given area using auto level.**EXERCISE -5**Measurement of horizontal and vertical angles using theodolite**EXERCISE -6**Measurement of elevation and gradient between points by using tacheometry.**EXERCISE -7** Set out a simple curve by one theodolite method.**EXERCISE -8**Introduction and setting up of total station. **EXERCISE -9**a) Measurement of distance and direction using total station.b) Measurement of area of given field using total station.c) Measurement of height of an object in REM using total station.**EXERCISE -10**Setting out work using total station**DEMONSTRATION:**Introduction to advanced surveying instruments like hand held G.P.S, optical theodolite and electronic theodolite. |

**CO-PO Mapping:**3-High Mapping, 2-Moderate Mapping, 1-Low Mapping, - -Not Mapping

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|   | **a** | **b** | **c** | **d** | **e** | **f** | **g** | **h** | **i** | **j** | **k** | **l** |
| **CO1** | 3 | 1 | 1 | 2 | 2 | 1 | - | 1 | - | 3 | 2 | 2 |
| **CO2** | 3 | 3 | 2 | 2 | 2 | 1 | - | 2 | 2 | 1 | 1 | 1 |
| **CO3** | 3 | 2 | 2 | 3 | 2 | 1 | - | 1 | 2 | 2 | 2 | 2 |
| **CO4** | 3 | 3 | 2 | 2 | 2 | - | - | 1 | 1 | 2 | 2 | 2 |
| **CO5** | 3 | 3 | 2 | 3 | 3 | 1 | 2 | 1 | 2 | 3 | 3 | 3 |
| **CO6** | 2 | 2 | 2 | 2 | 3 | - | 1 | 1 | 2 | 1 | 3 | 2 |