Lab details of civil engineering

Civil Engineering ( 3rd Sem)

Name of Lab: Building Planning & Drawing Lab ( KCE-351)

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| --- | --- |
| Experiment No. | Name of Experiment |
| 1 | Introduction to the tools and commands of drafting software |
| 2 | Working in layers, blocks, x-ref, drawing layout and print setup. |
| 3 | 3D drafting and rendering |
| 4 | Planning and drafting of elevation and cross section of door and window. |
| 5 | Planning and drafting of plan and cross section of Dog legged and open well staircase |
| 6 | Planning and Drawings of Residential building of 1 room set (plan and section) |
| 7 | Planning and drawing of 3 room residential building with staircase. |
| 8 | Preparation of details general arrangement drawing of 4 room duplex house including planning and drafting |

Civil Engineering ( 3rd Sem)

Name of Lab: Surveying and Geomatics Lab ( KCE-352)

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| --- | --- |
| Experiment No. | Name of Experiment |
| 1 | To measure bearings of a closed traverse by prismatic compass and to adjust the traverse by graphical method |
| 2 | To find out reduced levels of given points using Auto/dumpy level. |
| 3 | To study parts of a Vernier and electronic theodolite and measurement of horizontal and vertical angle. |
| 4 | To measure horizontal angle between two objects by repetition/reiteration method. |
| 5 | To determine the height of a vertical structure (e.g. chimney/ water tank etc.) using trigonometrical leveling by taking observations in single vertical plane working on Electronic Total Station. |
| 6 | To set out a simple circular curve by Rankine’s method. |
| 7 | Demonstration and working on Electronic Total Station. Measurement of distances |
| 8 | Demonstration and working with Mirror stereoscopes, Parallax bar and Aerial photographs. |

Civil Engineering ( 3rd Sem)

Name of Lab: Fluid Mechanics Lab ( KCE-353)

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| --- | --- |
| Experiment No. | Name of Experiment |
|  | 1. To verify the momentum equation using the experimental set-up on impact of jet. |
|  | 2. To determine the coefficient of discharge of an orifice of a given shape. Also to determine the coefficient of velocity and the coefficient of contraction of the orifice mouth piece |
|  | 3. To calibrate an orifice meter and study the variation of the co-efficient of discharge with the Reynolds number |
|  | 4. To calibrate a Venturimeter and study the variation of the co-efficient of discharge with the Reynolds number |
|  | . 5. To calibrate a bend meter and study the variation of the co-efficient of discharge with the Reynolds number |
|  | 6. Verification of Bernoulli’s Theorem |
|  | 7. To study the transition from laminar to turbulent flow and to determine the lower critical Reynolds number |
|  | 8. To study the velocity distribution in a pipe and also to compute the discharge by integrating the velocity profile. |

Civil Engineering ( 3rd Sem)

Name of Lab: Mini Project or Internship Assessment ( KCE-354)

Civil Engineering ( 4th Sem)

Name of Lab: Material Testing Lab ( KCE-451)

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| --- | --- |
| Experiment No. | Name of Experiment |
| 1 | **I. Cement**  1. Normal Consistency of cement. 2. Initial & final setting time of cement 3. Compressive strength of cement 4. Fineness of cement by air permeability and Le-chatalier’s apparatus. 5. Soundness of cement. 6. Tensile strength |
| 2 | **II. Coarse Aggregate**  1. Water absorption of aggregate 2. Sieve Analysis of Aggregate 3. Specific gravity &bulk density 4. Grading of aggregates. |
| 3 | **III Fine Aggregate**:  1. Sieve analysis of sand 2. Silt content of sand 3. Bulking of sand |
| 4 | **IV Bricks:**  1. Water absorption. 2. Dimension Tolerances 3. Compressive strength 4. Efflorescence |

Civil Engineering ( 4th Sem)

Name of Lab: Solid Mechanics Lab ( KCE-452)

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| --- | --- |
| Experiment No. | Name of Experiment |
| 1 | Tension test on Mild Steel |
| 2 | Bending tests on simply supported beam and Cantilever beam |
| 3 | Determination of torsion and deflection, |
| 4 | Measurement of forces on supports in statically determinate beam |
| 5 | Determination of shear forces in beams, |
| 6 | Determination of bending moments in beams |
| 7 | Measurement of deflections in statically determinate beam |
| 8 | To determine Flexural Rigidity (EI) of a given beam |

Civil Engineering ( 4th Sem)

Name of Lab: Hydraulics & Hydraulic Machine Lab ( KCE-453)

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| --- | --- |
| Experiment No. | Name of Experiment |
| 1 | To determine the Manning’s coefficient of roughness ‘n’ for the bed of a given flume. |
| 2 | To study the velocity distribution in an open channel and to determine the energy and momentum correction factors |
| 3 | To study the flow characteristics over a hump placed in an open channel. |
| 4 | To study the flow through a horizontal contraction in a rectangular channel |
| 5 | To calibrate a broad-crested weir. |
| 6 | To study the characteristics of free hydraulic jump |
| 7 | To study centrifugal pump and their characteristics |
| 8 | To study characteristics of Pelton Turbine. |

Civil Engineering ( 5th Sem)

Name of Lab: KCE-551 CAD Lab

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| --- | --- |
| Experiment No. | Name of Experiment |
| 1 | Working on latest version of geotechnical engineering software (Open source/commercial software) |
| 2 | 2. Working on latest version of surveying software (Open source/commercial software) |
|  |  |

Civil Engineering ( 5th Sem)

Name of Lab: KCE-552 GEOTECHNICAL ENGINEERING LAB

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| --- | --- |
| Experiment No. | Name of Experiment |
| 1 | Determination of water content of a given moist soil sample by (i) oven drying method, (ii) pycnometer method. |
| 2 | Determination of specific gravity of a given soil sample by (i) density bottle, (ii) pycnometer method. |
| 3 | Determination of in situ dry density of soil mass by (i) core-cutter method, (ii) sand replacement method |
| 4 | Determination of relative density of a given soil sample |
| 5 | Determination of complete grain size distribution of a given soil sample by sieve analysis and sedimentation (hydrometer) analysis. |
| 6 | Determination of consistency limits (liquid, plastic and shrinkage limits) of the soil sample used in experiment no. 5 (grain-size analysis). |
| 7 | Determination of shear strength of soil by Direct shear test |
| 8 | Determination of compaction characteristics (OMC & MDD) of a given soil sample. |
| 9 | Determination of permeability of a remoulded soil sample by constant head &/or falling head method. |
| 10 | Determination of consolidation characteristics of a remoulded soil sample by an odometer |
| 11 | Determination of shear strength characteristics of a given soil sample by U/U test from Triaxial Compression Machine. |
| 12 | Retrieving soil samples and conducting SPT tests by advancing boreholes through hand-held auger |

Note: Any 8 experiments are to be performed from the list of experiments.

Civil Engineering ( 5th Sem)

Name of Lab: KCE ‐ 553: QUANTITY ESTIMATION AND MANAGEMENT LAB

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| --- | --- |
| Experiment No. | Name of Experiment |
| 1 | Study of DSR, CPWD specifications and NBC |
| 2 | Estimation of quantities for any one of the following: Building/ Septic tank/Water supply pipe line/road/bridge. |
| 3 | Preparation of Bill of Quantities (BOQ) for above project |
| 4 | Practice on open source project management software / MS Project/Primavera software for same problem. |
| 5 | Study of any full set of tender documents (Institute shall provide the set from ongoing/ completed tenders). |

NOTE:- 1. Suitable software must be used to complete above exercises in 8-10 hours. 2. For open source software the following link of FOSSEE may be used apart from other available resources: https://fossee.in

Civil Engineering ( 6th Sem)

Name of Lab: KCE 651 TRANSPORTATION ENGINEERING LAB

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| --- | --- |
| Experiment No. | Name of Experiment |
| 1 | To Determine the Crushing Value of Coarse Aggregates. |
| 2 | To Determine the Impact Value of Coarse Aggregates |
| 3 | To determine the Flakiness Index and Elongation Index of Coarse Aggregates. |
| 4 | To determine the Los Angeles Abrasion Value of Coarse Aggregates. |
| 5 | To determine the Stripping Value of Coarse Aggregates. |
| 6 | To determine the penetration Value of Bitumen. |
| 7 | To determine the Softening Point of Bituminous material. |
| 8 | To determine the Ductility Value of Bituminous material |
| 9 | To determine the Flash and Fire Point of Bituminous material. |
| 10 | To determine the Stripping Value of Bituminous material. |
| 11 | Classified both directional Traffic Volume Study. |
| 12 | Traffic Speed Study. (Using Radar Speedometer or Enoscope) |
| 13 | Determination of CBR Value of soil sample in the Lab or in Field. |

Note: A minimum of 8 experiments are to be performed from the list of Experiments.

Civil Engineering ( 6th Sem)

Name of Lab: KCE 652 ENVIRONMENTAL ENGINEERING LAB

|  |  |
| --- | --- |
| Experiment No. | Name of Experiment |
| 1 | Determination of turbidity and conductivity. |
| 2 | Determination of pH, alkalinity and acidity. |
| 3 | Determination of hardness and chlorides. |
| 4 | Determination of residual chlorine. |
| 5 | Determination of MPN (most probable number) of coliforms |
| 6 | Measurement of SPM and PM10 with high volume sampler. |
| 7 | Measurement of sound level with sound level meter. |
| 8 | Determination of total , suspended and dissolved solids. |
| 9 | Determination of BOD. |
| 10 | Determination of COD |
| 11 | Determination of kjeldahl nitrogen |
| 12 | Determination of fluoride |
| 13 | Determination of optimum dose of coagulants by Jar Test Apparatus. |
| 14 | Field Visit of Water/ Sewage Treatment Plant of a nearby area |

Note: 1. Experiment at S.NO. 14 is mandatory.

2. Any 8 Experiments out of the S.NO 1 to 13 are to be performed.

PART B 1. It is mandatory to perform experiments using virtual lab where ever applicable. 2. Relevant specifications and IS codes must be studied.

Civil Engineering ( 6th Sem)

Name of Lab: KCE 653 STRUCTURAL DETAILING LAB

|  |  |
| --- | --- |
| Experiment No. | Name of Experiment |
| 1 | To verify Maxwell’s Reciprocal theorem |
| 2 | To find horizontal thrust in a three-hinged arch and to draw influence line diagrams for Horizontal Thrust end Bending moment. |
| 3 | To find horizontal thrust in a two hinged arch and to draw influence line diagrams for horizontal Thrust and bending moment. |
| 4 | Study of SP34/IS13920/IS456:2000 for detailing of structural elements. |
| 5 | Preparation of working hand sketches and soft drawings using BIM software (Open source/Commercial) for the following  a)-Simply supported, Continuous and Cantilever RCC Beams(T-beam and l-Beam) b) RCC Slabs – (Simply supported, Continuous, One way and two way).  c) RCC Columns –(Tied columns and Spirally reinforced columns)  d) Isolated and combined footings for RC Columns. |
| 6 | Preparation of bar bending schedule |
| 7 | Detailing of buildings with respect to Earthquake Resistant Design |
| 8 | Study of full set of structural drawing of a building as made available by Institute |

Civil Engineering ( 7th Sem)

Name of Lab: RCE751 Non Destructive Testing Laboratory

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| --- | --- |
| Experiment No. | Name of Experiment |
| 1 | 1. ***Non Destructive Testing of reinforced cement concrete***   ***(a) Strength assessment using rebound hammer***  ***(b) Quality assessment using ultrasonic puls velocity test***  ***(c) Strength assessment using pull out method***  ***(d) Assessment of corrosion of reinforcing bars using half cell potentiometer***  ***(e) To determine thickness of concrete cover, diameter & spacing of reinforcing bars using***  ***rebar scanner.*** |
| 2 | ***Testing of structural steel***  ***(a) Testing for corrosion of structural steel***  ***(b) Assessment of thickness of pipes/tubes/structural steel***  ***(c) Test for welding performance with Di-penetration test, ultrasonic test & magnetic***  ***particle test*** |

civil Engineering ( 7th Sem)

Name of Lab: RCE752 Mini Project

Students will be asked to work upon minimum four of the following topics during the

semester.

 They will submit the report of each topic containing following information (as per need of

topic) like: introduction, general information, usage/application (if any) detailed

description of work/process, relevant diagrams, drawings & tabulation (if any),

observation and results (as applicable) or any other relevant information as per topic

|  |  |
| --- | --- |
| Experiment No. | Name of Experiment |
|  | 1-Work related to preparation of bill of quantity & tender document.  2. Work related to design & drawing of flat slab using IS code method.  3. Work related to cost estimation of (including market survey of rates by students) building/earth  work for a highway.  4. Work related to scheduling of activities of a project using relevant software  5. Work related to preparation of layout plan of a building and its marking on ground.  6. Design & analysis of a G+5 residential building using structural design and analysis software  like STAAD Pro/STRUDS/SAP/ETAB/STRAP.  7. Work related to design of a small sewage treatment plant (STP) unit for a residential society.  8. Work related to computation of surface runoff & design of rain water harvesting system for  given area (relevant software may be used for runoff computation). |