

Civil Engineering
Project Management Skills

UNIT NO	Unit skill set (In cognitive domain)	Topics / Subtopics	Hours L-T-P
1 Introduction	Use Basic Science, Maths skills to understand Project management and project planning, execution and control.	Introduction and definition, Features of a Project, Types of Projects, Benefits and Obstacles in Project Management, Project Management Profession, Role of Project manager, Consultants, Project and Operation, Project Management Process, Project Scope	02-00-04
2 Project Administration	Able to develop WBS, PEP and PM processes for Project with given inputs	Project Administration, Project Team, Project Design, Work Breakdown Structure (WBS), Project Execution Plan (PEP), Systems and Procedure Plan, Project Direction, Communication and Co-ordination, Project Success Case Study I	06-00-12
3 Project Lifecycle	Use project administration and project lifecycle knowledge to Assess and plan for project risk	Project Life Cycle, Phases - Project Planning, Project Execution, Project Closure, Project Risks, Project Cost Risk Analysis, Time and Cost overruns Case Study 2a	04-00-08
4. Project Planning, Project Scheduling and Project Monitoring and Implementation	Able to develop a detailed project plan given the inputs on manpower, funds availability and time availability	Project Planning Function, Structure, Project Scheduling, Project monitoring and Project evaluation Case Study 2b	06-00-12
5. Project Control, Review and Audit	Use Project Management lifecycle knowledge to Control project parameters, review and audit project performance	Project Control, Problems of Project Control, Gantt Charts, Milestone Charts, Critical Path Method (CPM), Network Technique in Project Scheduling, Crashing Project Duration through Network, Project Review, Initial Review, Performance Evaluation,	06-00-12

		Abandonment Analysis, Project Audit Case Study 2c	
6.Digital Project Management	Understand latest trends of digital technologies impacting the domain of project management and application of the same in multiple scenario	Digital Technology trends in Project management, Cloud Technology, IoT, Smart cities, Data and analytics, case studies Case study 3	02-00-04

Statistics and Analytics

UNIT NO	Unit skill set(In cognitive domain)	Topics/Subtopics	Hours L-T-P
UNIT-1 STATISTICAL DATA COLLECTION AND TYPES	1. Able to collect statistical data. 2. Able to distinguish the data types. 3. Understands the usage of data collection tools 4. Able to specify problem statement for data collection 5. Able to collect data pointing the root cause of the problem statement.	a Definition of data and classification (qualitative quantitative discrete and continuous data). b Data collection tools iv) Questionnaires. v) Survey. vi) Interviews. vii) Focus group discussion. 1.3 Data cleaning.	4-0-8
UNIT-2 SUMMARIZATION OF DATA	6. Sketches bar, pie and histograms on Microsoft Excel spread sheet. 7. Sketches frequency curve and frequency polygon for the data set on Microsoft Excel spread sheet. 8. Sketches bar, pie and histograms on Microsoft Excel spread sheet.	a Descriptive statistics viii) Data tabulation (frequency table) ix) Relative frequency table. b Grouped data x) Bar graph xi) Pie chart xii) Line graph xiii) Frequency polygon xiv) Frequency curve xv) Relative frequency polygon xvi) Histograms xvii) Box plot xviii) Leaf-stem plot To be done in Microsoft excel.	8-0-16

	<p>9. Sketches frequency curve and frequency polygon for the data set on Microsoft Excel spread sheet.</p>		
<p>UNIT-3 MEASURE OF LOCATION AND DISPERSION</p>	<ul style="list-style-type: none"> ➤ Able to determine the descriptive statistical variables using Microsoft Excel. ➤ Able to determine the absolute measures of dispersion of the given data set. ➤ Explain the symmetry and asymmetry of the distributed data. 	<ul style="list-style-type: none"> a Determination of central tendencies Range, Mean, Mode and Median for the data in Microsoft excel. b Determination of absolute measures of dispersion for data like range quartile deviation, mean deviation, standard deviation and variance in Microsoft Excel. c Skewness and kurtosis graphs in Microsoft excel and interpretations of results. 	<p>6-0-12</p>
<p>UNIT-4 INTRODUCTION TO PYTHON PROGRAMMING</p>	<ul style="list-style-type: none"> ➤ Able Install and run the Python interpreter. Create and execute Python programs. ➤ Understand the concepts of file I/O. ➤ Able to read data from a text file using Python. ➤ Learn variable declarations in Python. ➤ Learn control structures. ➤ Learn loop constructs. 	<ul style="list-style-type: none"> 4.1 Introduction to PYTHON. 4.2 Syntax of PYTHON. 4.3 Comments of PYTHON. 4.4 Data types of PYTHON. 4.5 Variables of PYTHON. 4.6 If-else in PYTHON. 4.6 Loops in PYTHON. 4.7 Arrays and functions in PYTHON. 	<p>8-0-16</p>

Practical					
SL NO	Practical outcomes/Practical exercises	Unit no	PO	CO	L:T:P
1	Prepare a questionnaire (closed end) containing 25 questions for a specified problem statement: for example experience of an individual in a restaurant.	1	1,2,4,5,7	1	0:0:2
2	Prepare a Google form for a specified problem statement to collect the dataset. (for example questionnaire to conduct online quiz)	1	1,2,4,5,7	1	0:0:2
3	Send out a survey on your problem statement to number of 50 (By Google forms) and collect the data.	1	1,2,4,5,7	1	0:0:2
4	Remove duplicate or irrelevant observations. Remove unwanted observations from the dataset provided, including duplicate observations or irrelevant observations.	1	1,2,4,5,7	1	0:0:2
5	In Microsoft Excel spread sheet draw the frequency distribution table for the given data (data set should contain minimum 50 data).	2	1,2,4,5,7	2	0:0:2
6	In Microsoft Excel spread sheet draw the relative frequency distribution table for the given data (data set should contain minimum 50 data).	2	1,2,4,5,7	2	0:0:2
7	Using Microsoft Excel spread sheet plot bar graph for the data collected from 100 people(for example, conduct a survey on the favorite fruit of a person in your locality(restricting to 5 to 6 fruits). Explain the bar graph with minimum 30 words.	2	1,2,4,5,7	2	0:0:2
8	Using Microsoft Excel spread sheet plot pie chart for the data collected from 50 people(for example, conduct a survey on the smokers with respect to their ages in your locality. Explain the pie chart with minimum 30 words.	2	1,2,4,5,7	2	0:0:2
9	Using Microsoft Excel spread sheet draw a line graph for the given dataset.	2	1,2,4,5,7	2	0:0:2
10	Using Microsoft Excel spread sheet draw frequency polygon and frequency curve for the data collected from 50 people. (For example, marks obtained by the students in your class in 5 subjects in previous examination). Explain your observations from the graph in minimum 30 words.	2	1,2,4,5,7	2	0:0:2
11	Using Microsoft Excel spread sheet construct a box plot for the given dataset. (For example dataset can be the number of passengers in a flat form at different time in a day).	2	1,2,4,5,7	2	0:0:2
12	Using Microsoft Excel spread sheet construct a leaf plot for the given dataset. Explain the graph with minimum 30 words.	2	1,2,4,5,7	2	0:0:2

13	Using Microsoft Excel spread sheet find the Mean, Mode and Median for the data (univariate data) given and also represent them in a Histogram.	3	1,2,4,5,7	2	0:0:2
14	Generate a 50 random data sample (even and odd number dataset) using Microsoft Excel spread sheet and determine the range and Quartiles.	3	1,2,4,5,7	2	0:0:2
15	Collect the current yield of a crop from 50 different persons (problem statement can be changed according to priorities of the tutor) in your locality and determine mean deviation and Quartile deviation in Microsoft excel spread sheet and brief your inference with less than 30 words.	3	1,2,4,5,7	3	0:0:2
16	Collect the data of any 2 livestock population from 50 different houses in your locality (problem statement can be changed according to priorities of the tutor) and determine standard deviation for both the two separately in Microsoft excel spread sheet and brief your inference with less than 30 words.	3	1,2,4,5,7	3	0:0:2
17	Collect the data of two wheeler (with a rider and a pillion) crossing a busy junction in your locality in the peak hours (problem statement can be changed according to priorities of the tutor) and determine the variance of the data in Microsoft excel spread sheet and brief your inference with less than 30 words.	3	1,2,4,5,7	3	0:0:2
18	Using Microsoft Excel spread sheet draw a Skewness graph and kurtosis graph for randomly generated dataset.	3	1,2,4,5,7	3	0:0:2
20	Write a python program to add 2 integers and 2 strings and print the result.	4	1,2,4,5,7	4	0:0:2
21	Write a python program to find the sum of first 10 natural numbers.	4	1,2,4,5,7	4	0:0:2
22	Write a python program to find whether the number is odd or even.	4	1,2,4,5,7	4	0:0:2
23	Write a python program to find the variance and standard deviation for the given data..	4	1,2,4,5,7	4	0:0:2
24	Write a python program to display student marks from the record.	4	1,2,4,5,7	4	0:0:2
25	Write a python program to create a labeled bar graph using matplotlib. pyplot.	4	1,2,4,5,7	4	0:0:2
26	Write a python program to create a labeled pie chart using matplotlib. pyplot.	4	1,2,4,5,7	4	0:0:2
Total Hours					0:0:52=5 2

FUNDAMENTALS OF ELECTRICAL & ELECTRONICS ENGINEERING

Sl No	Unit skill set (In cognitive domain) <i>On successful completion of the class, the students will be able to</i>	Topics/Sub topics	Practical	Hours L-T-P
UNIT-1 Electrical Safety				
1	Comply with the Electrical safety	1. Electrical Symbols 2. Electrical safety <ul style="list-style-type: none"> • Identify Various types of safety signs and what they mean • Demonstrate and practice use of PPE • Demonstrate how to free a person from electrocution • Administer appropriate first aid to victims, bandaging, heart attack, CPR, etc. • Fire safety, causes and precautionary activities. • Use of appropriate fire extinguishers on different types of fires. • Demonstrate rescue techniques applied during fire hazard, correct method to move injured people during emergency • Inform relevant authority about any abnormal situation • Earthing: Types 	1. Electrical symbols related to electrical engineering. 2. Electrical safety 3. Electrical earthing	02-00-04

		<ul style="list-style-type: none"> ➤ http://nreeder.com/Flash/sy mbols.htm ➤ http://bouteloup.pierre.free.fr /iufm/as/de/house/safety.html 		
UNIT-2 Electrical Fundamentals				
2	<ol style="list-style-type: none"> 1. Identify and select the different measuring devices. 2. Identify different electrical supply systems 3. Identify open circuit, close circuit and short circuit conditions. 	<ol style="list-style-type: none"> 1. Describe the sources of electrical energy. 2. Electrical current, voltage, emf, potential difference, resistance with their SI units. 3. Mention the meters used to measure different electrical quantities. <p>Identification Measuring devices</p> <ul style="list-style-type: none"> • Ammeter • Voltmeter • Wattmeter • Ohmmeter • Digital Multimeter • Megger • Tong tester <ol style="list-style-type: none"> 4. Explain supply systems like AC, DC. <ul style="list-style-type: none"> ➤ http://nreeder.com/Flash/units.htm 	<ol style="list-style-type: none"> 1. Connect voltmeter and ammeter in a simple circuit. (Practicing of identification and connection of different meters) 	1:0:2
3	Calculate basic electrical quantities	<ul style="list-style-type: none"> • Relationship between V, I and R. (Ohms law) • Behavior of V, I in Series and Parallel DC circuits. • Describe open circuit, close circuit and short circuit <ul style="list-style-type: none"> • http://nreeder.com/Flash/ohmsLaw.htm 	<ol style="list-style-type: none"> 1. Measure current, voltage and analyze effective resistance in series circuit. 2. Demonstrate effects of shorts and opens in a circuit 	1:0:2
4	Connect resistances in different combination	<ol style="list-style-type: none"> 1. Equation to find the effective Resistances connected in series 2. Equation to find effective Resistances connected in parallel 3. Resistances connected series and parallel combinations 4. Simple problems. 	<ol style="list-style-type: none"> 1. Determine the equivalent Resistance of parallel connected resistances. 	1:0:2
5	Calculate and measurement of different parameters of an AC quantity.	<p>Ac sinewave: Sinusoidal voltage, current, amplitude, time-period, cycle, frequency, phase, phase difference, and their units.</p> <ul style="list-style-type: none"> ➤ http://nreeder.com/Flash/freqPeriod.htm ➤ http://nreeder.com/Flash/oscill 	<p>Generate and demonstrate the measurement of frequency, time period and phase difference of</p>	1:0:2

		oscope.htm	AC quantity using CRO and function generator.	
6	<ol style="list-style-type: none"> 1. Calculate and measure electric power and energy 2. Identify and differentiate Single phase and Three phase supply 	<ol style="list-style-type: none"> 1. Electrical work, power and power factor <ul style="list-style-type: none"> • SI units • Mention the meters used to measure them <p>➤ http://nreeder.com/Flash/powerLaw.htm</p>	<ul style="list-style-type: none"> • Measure the voltage, current, power using relevant measuring instruments in a Single-phase load. 	1:0:2
7.		<ol style="list-style-type: none"> 1. Electrical energy <ul style="list-style-type: none"> • SI units • Mention the meters used to measure them 2. Single phase and Three phase supply. 	<ol style="list-style-type: none"> 1. Measure single phase energy using relevant measuring instruments in a Single-phase load. 2. Measure the voltages in Three phase supply. 	
UNIT-3				
Protective Devices and Wiring circuits				
8.	<ol style="list-style-type: none"> 1. Identify and select Protective Devices for given current and voltage rating 2. Identify and select the various electrician tools 	<ul style="list-style-type: none"> • Necessity of Protective Devices • Various Protective devices and their functions • fuse wire, • Glass cartridge fuse • HRC fuse • Kit-kat fuse • MCB • MCCB • RCCB • ELCB • Relay • Different types of electrician tools and their function. • Describe various wiring tools. • State procedure of care and maintenance of wiring tools. 	<ol style="list-style-type: none"> 1. Wire up and test PVC Conduit wiring to control one lamp from two different places using suitable protective devices. 	1:0:2

9	<ol style="list-style-type: none"> 1. Identify and select Wiring systems for a given applications 2. Identify and select the cables used for different current and voltage ratings. 3. Draw the wiring diagram 	<ol style="list-style-type: none"> 1. Describe different types of wiring systems. <ul style="list-style-type: none"> • Surface conduit • concealed conduit • PVC casing capping 2. Wiring systems and their applications. 3. Describe the types of wires, cables used for different current and voltage ratings. 	<ol style="list-style-type: none"> 1. Wire up and test PVC Conduit wiring to control of 2 sockets and 2 lamps. 	2:0:4
10	Estimate and plan electrical wiring	Explain Plan and estimate the cost of electrical wiring for one 3m × 3m room consisting of 2 lamps, 1 ceiling fan, 2 three pin sockets.	Prepare the estimation and plan	1:0:2
UNIT-4 Electrical Machines and Batteries and UPS				
11	<ol style="list-style-type: none"> 1. Identify the types of transformer. 2. verify the transformation ratio. 	Transformer <ul style="list-style-type: none"> • working principle • Transformation ratio • Types and applications with their ratings 	Connect the Single- phase transformer as Step-Up, Step-Down transformer and verify the transformation ratio.	1:0:2
12	<ol style="list-style-type: none"> 1. Start and run the induction motor. 2. Troubleshoot DOL/Star-delta starter and induction motor 	1. Induction motor <ul style="list-style-type: none"> • Single phase and three phase Induction motor. • Necessity of starters. • Describe DOL AND STAR-DELTA starters. <ol style="list-style-type: none"> 2. What are different causes and remedies for a failure of starter and induction motor. 	<ol style="list-style-type: none"> 1. Construct a suitable circuit to start and reverse the direction of three phase induction motor using DOL/ Star-delta starter. 2. Troubleshoot the DOL/ Star-delta starter and induction motor 	2:0:4

13	Select and test the battery for a given application	Battery <ul style="list-style-type: none"> Types of batteries (Lead acid battery, lithium, sealed maintenance free (SMF) battery, Modular battery). Selection criteria of batteries for different applications. Ampere-Hour Capacity. Efficiency 	Testing Condition of charging and discharging of a Lead-acid battery	1:0:2
14	Select the size of the UPS for a given application	UPS <ul style="list-style-type: none"> List the types and applications Selection criteria of UPS Sizing of UPS 	Sizing of UPS	1:0:2
UNIT-5 Introduction to Electronic Devices and Digital Electronics				
15	Identify and differentiate Conductors, insulators and semiconductors.	1. Compare Conductors, insulators and semiconductors with examples. 2. Identification of types and values of resistors-color codes. ➤ http://nreeder.com/Flash/resistor.htm	Determine the value of resistance by color code and compare it with multimeter readings.	1:0:2
16	Identify and test PN junction Diode	PN junction diode <ul style="list-style-type: none"> Symbol Characteristics Diode as switch. Types of diodes and ratings Applications 	Identify the terminals of a Diode and test the diode for its condition.	1:0:2
17	Build and test bridge rectifier circuit	Rectifier <ul style="list-style-type: none"> Need for AC to DC conversion Bridge rectifier with and without C filter, Rectifier IC. 	Construct and test bridge rectifiers using semiconductor diode and rectifier IC. Compare the waveforms using CRO.	1:0:2
18	1. Identify and test Transistor 2. Build and test transistor as an electronic switch	Transistor (BJT) <ul style="list-style-type: none"> Symbol Structure Working principle 	1. Identification of transistor terminals and test. 2. Construct and test the transistor as an electronic switch	1:0:2
19.	1. Identify and test different digital IC	<ul style="list-style-type: none"> Comparison of analog and digital signal Digital systems, examples. Binary numbers, Boolean identities and laws. Digital system building blocks: Basic logic gates, symbols and truth tables. IC-Definition and advantages.	<ul style="list-style-type: none"> Test a Digital IC. Identification and selection of suitable ICs for basic gates. 1. Verify NOT, AND, OR, NOR, EXOR and NAND gate operations (two inputs).	2:0:4

20	Identify and test various Sensors and actuators.	1.Sensors <ul style="list-style-type: none"> • Concept • Types: Temperature, Pressure, Water, Light, Sound, Smoke, proximity Sensors, Flow, humidity, voltage, vibration, IR (Principle/working, ratings/specifications, cost, and applications) 2.Actuators <ul style="list-style-type: none"> • Concept • Types and applications. • Relay as an actuator. 	2. Connect and test an IR proximity sensor to a Digital circuit. <ul style="list-style-type: none"> • Connect and test a relay circuit using an Optocoupler. (Photo Diode & Transistor) Refer note	2:0:4
21	Know the application of Microcontroller and PLC	<ul style="list-style-type: none"> • Microcontroller as a programmable device, and list of real-world applications. • PLC and Their applications. (Activity based learning)	<ul style="list-style-type: none"> • Identify different application microcontroller. • Identify commercially available PLC and their specifications 	1:0:2
TOTAL				26-0-52=78 Hours

FUNDAMENTALS OF ELECTRICAL & ELECTRONICS ENGINEERING LAB

Sl. No.	Practical Out Comes/Practical exercises	Unit No.	PO	CO	L: T:P Hrs.
1	<ul style="list-style-type: none"> • Identify Various types of safety signs and what they mean Demonstrate and practice use of PPE • Demonstrate how to free a person from electrocution appropriate first aid to victims, bandaging, heart attack, CPR, etc. • Fire safety, causes and precautionary activities. • Use of appropriate fire extinguishers on different types of fires. • Demonstrate rescue techniques applied during fire hazard. • Inform relevant authority about any abnormal situation during fire hazard. 	1	1,4	1	0:0:2
2	<ul style="list-style-type: none"> • Demonstrate different types of earthing/using videos. • Prepare a Report on types of Earthing 	1	1,4	1	0:0:2
3	Connect voltmeter and ammeter in a simple circuit. (Practicing of identification and connection of different meters)	2	1,4	2	0:0:2
4	<ol style="list-style-type: none"> 1. Determine the equivalent Resistance of series connected resistances. 2. Demonstrate effects of shorts and opens in a circuit 	2	1,4	2	0:0:2
5	Determine the equivalent Resistance of parallel connected resistances.	2	1,4	2	0:0:2
6	Generate and demonstrate the measurement of frequency, time period and phase difference of AC quantity using CRO and function generator.	2	1,4	2	0:0:2
7	Measure the voltage, current, power using relevant measuring instruments in a Single-phase load.	2	1,4	2	0:0:2
8.	<ol style="list-style-type: none"> 1. Measure single phase energy using relevant measuring instruments in a Single-phase load. 2. Measure the voltages in Three phase supply. 				
9.	Wire up and test PVC Conduit wiring to control one lamp from two different places using suitable protective devices.	3	1,4	3	0:0:2
10	2. Wire up and test PVC Conduit wiring to control of 2 sockets and 2 lamps.	3	1,4	3	0:0:2
11	Wire up and test PVC Conduit wiring to control one lamp from two different places.	3	1,4	3	0:0:2
12	Plan and estimate the cost of electrical wiring for one 3m x 3m room consisting of 2 CFL 1 ceiling fan, 2 three pin sockets.	3	1,4	3	0:0:2
13	Connect the Single- phase transformer as Step-Up, Step-Down transformer and verify the transformation ratio.	4	1,4	4	0:0:2

14	Construct a suitable circuit to start and reverse the direction of three phase induction motor using DOL/star-delta starter.	4	1,4	4	0:0:2
15	Troubleshoot the DOL/Star-delta starter and induction motor	4	1,4	4	0:0:2
16	Testing Condition of charging and discharging of a Lead-acid battery.	4	1,4	4	0:0:2
17	Estimate the UPS rating for a computer lab with 50 computers/domestic.	4	1,4	4	0:0:2
18	Determine the value of resistance by color code and compare it with multimeter readings	5	1,4	5	0:0:2
19	Identify the terminals of a Diode and test the diode for its condition.	5	1,4	5	0:0:2
20	Construct and test bridge rectifiers using semiconductor diode and rectifier IC. Compare the waveforms using CRO.	5	1,4	5	0:0:2
21	Identification of transistor terminals and test. Construct and test the transistor as an electronic switch.	5	1,4	5	0:0:2
22	Test an IC. Verify the truth-table AND, OR, NOT logic gates.				
23	Verify the truth-table NAND, NOR, EX-OR, EX-NOR logic gates.	5	1,4	5	0:0:2
24	Connect and test an IR proximity sensor to a Digital circuit. NOTE: Any sensor listed in the theory may be used for condition appropriately.				
25	Connect and test a relay circuit using an Optocoupler. (Photo Diode & Transistor)	5	1,4	5	0:0:2
26	1. Identify MCS-51 variants 2. Identify commercially available PLC and their specifications.	5	1,4	5	0:0:2
Total					0:0:52 =52Hrs

Construction Materials

UNIT NO	Unit skill set (In cognitive domain)	Topics/Sub topics		Hours L-T-P
UNIT-1 Natural Constructi on Materials	1. Identify rocks based on geology of its origin 2. Explain the requirements and characteristics of stones 3. Explain the methods of Quarrying of stones 4. Explain the methods of deterioration of stones 5. Explain the methods of preservation of stones 6. Mention the properties of sand and its uses 7. Explain the classification of Coarse aggregate according to size 8. Explain the structure and properties of timber 9. apply the use of Bamboo in construction	1.1	Geological classification of Rocks	15-0-0
		1.2	Requirements of good building stone	
		1.3	General characteristics of stone	
		1.4	Quarrying of stones by wedging	
		1.5	Quarrying of stones by blasting	
		1.6	Deterioration of stones	
		1.7	Preservation of stones	
		1.8	Properties of sand and uses	
		1.9	Classification of coarse aggregate according to size	
		1.10	Structure of timber	
		1.11	General properties and uses of good timber	
		1.12	Different methods of seasoning for preservation of timber.	
		1.13	List various Defects in timber	
		1.14	Use of bamboo in construction	
		1.15	Asphalt-properties and uses	

	10. Mention the properties and uses of Asphalt.			
UNIT-II Artificial Constructi on Materials	1.Explain the constituents and characteristics of Bricks 2. Perform Field tests on Bricks 3. With a neat diagram able to explain manufacturing process of bricks 4. Write the properties of Aerated Concrete Blocks 5. Identify different varieties of Floor tiles and wall tiles, Glazed tiles and vitrified tiles 6. With a neat diagram able to explain manufacturing process of cement. 7. Identify different types of cement and mention their uses. 8. Explain properties and uses of Precast hollow and solid concrete blocks and pavement blocks. 9. Explain and identify Plywood Particle board, veneers and laminated boards 10 Identify and explain uses of different types of glasses. 11. Explain the properties and uses of Ferrous, Non- ferrous and alloys.	2.1	Constituents of Good brick earth	21:0:0
		2.2	Modular and Standard bricks	
		2.3	Special bricks -fly ash bricks	
		2.4	Characteristics of good brick	
		2.5	Field tests on Bricks	
		2.6	Manufacturing process of burnt clay brick	
		2.7	Clamp burning of Bricks	
		2.8	Hoffmann's kiln	
		2.9	Aerated concrete blocks-Properties and uses	
		2.10	Flooring and wall tiles - Clay tiles,	
		2.11	Glazed tiles and vitrified tiles	
		2.12	Manufacturing process of Cement-only dry process	
		2.13	Types of cement and its uses.	
		2.14	Properties and uses of Pre-cast hollow and solid concrete blocks	
2.15	Properties and uses of pavement blocks			
2.16	Artificial or Industrial Timber -Plywood, Particle board, Veneers			
2.17	Laminated board and their uses.			
2.18	Types of glass: Soda lime glass, Lead glass and Borosilicate glass and their uses.			
2.19	Ferrous Metals- Cast Iron and Steel- List Properties and Uses			
2.20	Non-ferrous metals- Aluminium, Copper, Zinc, - Properties and uses			
2.21	Alloys- Aluminium Alloys and Steel Alloys- Composition, and uses			
UNIT-III Processed Constructi on Materials	1. Explain the constituents and Uses of POP 2.Explain properties and uses of Fiber reinforced plastics 3. Explain properties and uses of Paints, Distempers, oil paints and varnishes and able to apply for different types of surfaces, 4. Know the manufacturing process and uses of Manufactured Sand. 5. Identify different Cladding materials.	3.1	Constituents and uses of POP (Plaster of Paris),	10-0-0
		3.2	Plastics- Properties and uses of plastics	
		3.3	Fiber reinforced plastic (FRP) its properties and applications	
		3.4	Paints and Distempers, Ingredients and their uses. Properties of good paint.	
		3.5	Oil Paints and Varnishes with their uses. (Situations where used).	
		3.6	Varnishes with their uses. (Situations where used).	
		3.7	Special processed construction materials; Geo synthetic, Ferro Crete.	
		3.8	Manufactured sand (m sand): its manufacturing and their uses.	
		3.9	Cladding materials-Terracotta,	
		3.10	High Pressure Laminates (HPL) Aluminium Composite panels (ACP), Glass Reinforced Concrete (GRC), Pre painted Galvanized Iron sheets.	

UNIT-IV Special Constructi on Materials	1.Explain the types of water proofing materials, Termite proofing materials, and sound insulating materials and suitability of its different types in construction	4.1 Water proofing material- Types and its suitability in construction	
	2.Explain the properties and applications of Geopolymer cement	4.2 Termite proofing- Types and its suitability in construction	
	3. Explain the applications of Epoxy Resins, Non-Shrink Grouts	4.3 Sound insulating materials- Types and its suitability in construction,	
		4.4Epoxy Resins ,Non-Shrink Grouts Shotcrete-Applications	
		4.5 Gypsum and its products :Types and its suitability in construction	
		4.6 Properties and uses of Geo polymer cement	

CIVIL ENGINEERING GRAPHICS

UNIT	DETAILED COURSE CONTENT	CO	PO	Contact Hrs
UNIT-1 :INTRODUCTION TO ENGINEERING DRAWING AND DIMENSIONING PRACTICE				
1	<ul style="list-style-type: none"> Introduction to Engineering drawing, Drawing Instruments, Standard Sizes of Drawing sheets Layout of drawing sheets, Folding of Drawing sheets as per Bureau of Indian Standards 	CO1	1,2,4	3
	<ul style="list-style-type: none"> Types of lines and their applications, Conventions used in Civil Engineering Introduction to Dimensioning, Elements of Dimensioning, Systems of Dimensioning Methods of arrangements of Dimensioning 	CO1	1,2,4	6
	<ul style="list-style-type: none"> Representative Fraction and Scales recommended by the Bureau of Indian Standards(Reducing scale, Enlarging scale and Full scale) Dimensioning of common features like diameters, radii, arcs and chords and simple Civil Engineering Objects. 	CO1	1,2,4	9
UNIT-2 GEOMETRIC CONSTRUCTION AND CONIC SECTIONS				
2	<ul style="list-style-type: none"> To divide a line into any number of equal parts Construction of regular Polygons using different methods Elements of Ellipse and Parabola 	CO2	1,2,4	12
	<ul style="list-style-type: none"> Applications of Ellipse and Parabola in engineering constructions Construction of Ellipse by Concentric Circle method and Rectangle method Construction of Parabola by Rectangle method and Parallelogram method 	CO2	1,2,4	15
UNIT-3 : ORTHOGRAPHIC PROJECTION,PROJECTION OF POINTS AND LINES				
3	<ul style="list-style-type: none"> Introduction to orthographic projection Principal planes of projection- Four Quadrants Concept of First angle & Third angle projection method 	CO3	1,2,4	18
	<ul style="list-style-type: none"> Projection of points in all the four quadrant system. Exercises on projection of points in all four quadrants 	CO3	1,2,4	21
	<ul style="list-style-type: none"> Introduction to projection of line Projections of Line Parallel to both HP and VP Projection of Line parallel to one plane and Perpendicular to other 	CO3	1,2,4	24
	<ul style="list-style-type: none"> Projections of Line parallel to one plane and Inclined to the other Projection of line inclined to both HP and VP. 	CO3	1,2,4	27
UNIT-4 : ORTHOGRAPHIC PROJECTION AND PROJECTION OF PLANES AND SOLIDS				
4	<ul style="list-style-type: none"> Introduction to projection of planes. Projection of plane surfaces parallel to one plane and perpendicular to the other Projection of Plane surface perpendicular to one plane and inclined to other 	CO3	1,2,4	30

	<ul style="list-style-type: none"> • Projection of Plane surface inclined to both HP and VP • Exercises on projection of planes 	C03	1,2,4	33
	<ul style="list-style-type: none"> • Introduction-Positioning of solids • Solid lying with base on HP • Solids lying with base or axis inclined to HP. 	C03	1,2,4	36
	<ul style="list-style-type: none"> • Positioning of solid with lateral faces, lateral edge on HP • Solids lying with their base inclined to both HP and VP 	C03	1,2,4	39
	<ul style="list-style-type: none"> • Exercises on projection of solids 	C03	1,2,4	42
UNIT-5 : ISOMETRIC VIEWS				
5	<ul style="list-style-type: none"> • Principles of isometric Views • Isometric views of regular polygons. 	C04	1,2,4	45
	<ul style="list-style-type: none"> • Conversion of orthographic projection into isometric View of solids like prisms, pyramids, cylinder, cone. 	C04	1,2,4	48
	<ul style="list-style-type: none"> • Conversion of orthographic projection into isometric Views of combination of solids and simple civil engineering objects 	C04	1,2,4	51
	<ul style="list-style-type: none"> • Conversion of isometric views into orthographic projection of combination of solids 	C04	1,2,4	54
	<ul style="list-style-type: none"> • Conversion of isometric views into orthographic projection of simple civil engineering objects 	C04	1,2,4	57
	<ul style="list-style-type: none"> • Exercises on isometric views 	C04	1,2,4	60
UNIT-6 : BASIC CADD IN CIVIL ENGINEERING				
6	<ul style="list-style-type: none"> ➤ Introduction to CADD • General features of CADD, CADD work station, Hardware and Software requirements, • Advantages of using CADD, Starting CADD • Understanding CADD Editor Screen- title bar, menu bar, dashboard, standard tool bar, drawing area, UCS, command prompt area, status bar. ➤ Demonstration of commands in CADD • Commands- Command Entry Options using -Command Line, Menus (File, Edit, View, Insert, Format, Tools, Draw, Dimension, Modify, Window, Help) and Dialog Boxes. Understanding the use of CADD Menus and Tool Bars 	C05	1,2,4	63
	<ul style="list-style-type: none"> • CADD Basic Entities- Drawing Line, Arc, Circle, Rectangle and polygons using different coordinate Systems such as Absolute Cartesian Coordinates, Relative Cartesian Coordinates, and Absolute Polar coordinates, Relative Polar Coordinates • Direct distance entry and line command, picking coordinates on the screen and line command. • Using a wizard, using a template, starting from scratch. • Selection of units, Selection of paper space, Setting up of limits 	C05	1,2,4	66
	<ul style="list-style-type: none"> • Four Exercises on 2 Dimensional (2D) drawings 	C05	1,2,4	69
	<ul style="list-style-type: none"> • Exercises on isometric views(Conversion of Orthographic projection to Isometric view) 	C05	1,2,4	72
	<ul style="list-style-type: none"> • Exercises on isometric views (Conversion of Orthographic projection to Isometric view) 	C05	1,2,4	75

	<ul style="list-style-type: none">Exercises on isometric views (Conversion of Isometric view to orthographic projection)	C05	1,2,4	78
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ENVIRONMENTAL SUSTAINABILITY

Unit No & Name	Detailed Course Content	ContactHrs
1. Ecosystem	Structure of ecosystem, Biotic & Abiotic components, Aquatic(Lentic and Lotic) and terrestrial ecosystem.	1
	Global warming - Causes, effects.	2
	Green House Effect, Ozone depletion - Causes, effects	3
2. Air and Pollution	Air pollution, Natural sources of air pollution, Man Madesources of air pollution	4
	Air pollutants and Types, Effects of Particulate Pollutants and control by Cyclone separator	5
	Effects of Particulate Pollutants and control by Electrostatic Precipitator, Air (prevention and control of pollution) act 1981.	6
3. Noise Pollution	Noise pollution: sources of pollution, Measurement of Noise pollution level.	7
	Effects and Control of Noise pollution. Noise pollution (Regulation and Control) Rules, 2000	8
4. Water and Soil Pollution:	Sources of water pollution. Types of water pollutants, Characteristics of water pollutants.	9
	Control measures of water pollution.	10
	Definition and list unit operations in water and WasteWaterTreatment process, Water (prevention and control of pollution) act 1974.	11
	Water conservation – Importance of Rain Water Harvesting	12
	Soil pollution, Causes and Effects due to Fertilizers, Pesticides and Insecticides	13
	Preventive measures of Soil Pollution due to Excessive use of Fertilizers, Pesticides and Insecticides.	14
5. Renewable sources of Energy	Solar Energy: Basics of Solar energy. Solar collectors and advantages of Advanced solar collectors.	15
	Solar water heater, Solar stills and their uses.	16
	Biomass: Overview of biomass as energy source. Thermal characteristics of biomass as fuel.	17
	Wind energy: Current status and future prospects of wind energy. Wind energy in India.	18
	Need of new Energy sources, Different type's new energy sources. Environmental benefits of New Energy Sources-Hydrogen energy	19
	Environmental benefits of New Energy Sources- Ocean energy resources	20
	Environmental benefits of New Energy Sources-Tidal energy conversion.	21
	Solid waste generation, Sources, Characteristics of solid waste Solid Waste Management rules 2016	22

6. Solid Waste Management and Environmental Acts	E- Waste generation Sources and characteristics,E waste management rules 2016	23
	Plastic Waste generation Sources and characteristics,Plastic Waste Sources and characteristics	24
	Recycled plastic rules 2016,Importance of Environment (protection) act 1986,	25
	Occupational health and safety measures.	26

Basic Surveying Lab