



## VISAT Engineering College

	PO Attainment	CEE
B.Tech in Civil Engineering	Branch: B.Tech in Civil Engineering	
Semester: Semester 8	Academic Year: 2022-23	

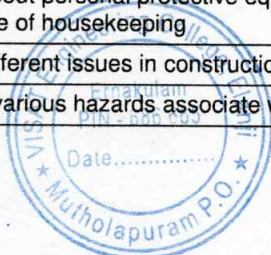
### Courses - Course Outcomes Attainment

SI No.	CO code	Attainment	Outcome
<b>QUANTITY SURVEYING AND VALUATION - CET402</b>			
1	CO1	2.28	Define basic terms related to estimation, quantity surveying and contract document
2	CO2	2.8	Interpret the item of work from drawings and explain its general specification and unit of measurement.
3	CO3	2.28	Make use of given data from CPWD DAR/DSR for calculating the unit rate of different items of work associated with building construction
4	CO4	1.6	Develop detailed measurement (including BBS) and BoQ of a various work like buildings, earthwork for road, sanitary and water supply work
5	CO5	2.28	Explain various basic terms related to valuation of land and building
6	CO6	1.68	Develop valuation of buildings using different methods of valuation.
<b>AIRQUALITY MANAGEMENT - CET464</b>			
7	CO1	2.8	Explain the sources of air pollution and different types of air pollutant.
8	CO2	2.8	Describe the effect of air pollutants on vegetation, animals, materials and human health.
9	CO3	2.8	Discuss the different methods of ambient air quality monitoring system which supports an air quality management program.
10	CO4	3	Explain the meteorological aspects of air pollutant dispersion
11	CO5	2.28	Describe the various air pollution control strategies that can be undertaken to meet the air quality goals.
<b>REPAIR AND REHABILITATION OF BUILDINGS - CET456</b>			
12	CO1	3	Recall the basics ideas and theories associated with Concrete technology and Masonry structures.
13	CO2	2.8	Understand the need and methodology of repair and rehabilitation of structures, the various mechanisms used, and tools for diagnosis of structures
14	CO3	3	Identifying the criterions for repairing / maintenance and the types and properties of repair materials used in site. Learn various techniques for repairing dam- aged and corroded structures
15	CO4	3	Proposing wholesom solutions for maintenance/rehabilitation and applying methodologies for repairing structures or demolishing structures.
16	CO5	3	Analyse and asses the damage to structures using various tests
<b>CLIMATE CHANGE AND SUSTAINABILITY - CET468</b>			
17	CO1	3	Explain the fundamental concepts of climate and its influencing factors
18	CO2	2.08	Explain the factors affecting climate change and the harmful impacts due to climate change
19	CO3	2.6	Discuss the problems due to urbanization and the need for sustainable development
20	CO4	2.4	Demonstrate the various adaptation and mitigation techniques for combating climate change
21	CO5	1.28	Discuss multilateral agreements on climate change, Case studies on Climate change
<b>COMPREHENSIVE COURSE VIVA - CET404</b>			
22	CO1	2.8	Demonstrate a deep understanding of the core principles, theories, and fundamental concepts in the specific core subjects
23	CO2	2	Exhibit proficiency in applying theoretical knowledge to practical scenarios through the use of relevant tools, techniques, and technologies
24	CO3	2.6	Engage in critical analysis when addressing viva questions, showcasing the ability to identify and solve problems through logical reasoning

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25	CO4	2.6	Communicate complex technical concepts clearly and effectively
26	CO5	2.8	Demonstrate the ability to think analytically
<b>PROJECT PHASE II - CED416</b>			
27	CO1	2.8	Model and solve real world problems by applying knowledge across domains
28	CO2	2.8	Develop products, processes or technologies for sustainable and socially relevant applications
29	CO3	2.8	Function effectively as an individual and as a leader in diverse teams and to comprehend and execute designated tasks
30	CO4	2.6	Plan and execute tasks utilizing available resources within timelines, following ethical and professional norms
31	CO5	2.8	Identify technology/research gaps and propose innovative/creative solutions
32	CO6	2.6	Organize and communicate technical and scientific findings effectively in written and oral forms
<b>DESIGN OF STEEL STRUCTURES - CET401</b>			
33	CO 1	2	To design bolted and welded connections.
34	CO 2	2.8	To design tension members and beams using IS specifications.
35	CO 3	1.88	To design columns under axial loads using IS specifications.
36	CO 4	2.6	To design beams and plate girders.
37	CO5	2.8	To assess loads on truss and design purlins and to evaluate the different fire resistant design approaches used in steel structures.
<b>GROUND IMPROVEMENT TECHNIQUES - CET423</b>			
38	CO1	1.88	Classify different ground improvement methods based on the soil suitability
39	CO2	2.6	Outline the basic concept/ design aspects of various ground improvement methods
40	CO3	2.6	Identify the construction procedure of different ground improvement methods
41	CO4	1.88	Choose different application of geosynthetics and soil stabilisation in Ground improvement
<b>ENVIRONMENTAL ENGG LAB - CEL411</b>			
42	CO1	2.6	Analyse various physico-chemical and biological parameters of water
43	CO2	2.6	Compare the quality of water with drinking water standards and recommend its suitability for drinking purposes
<b>SEMINAR - CEQ413</b>			
44	CO1	2.8	Identify academic documents from the literature which are related to her/his areas of interest (Cognitive knowledge level: Apply).
45	CO2	2.6	Read and apprehend an academic document from the literature which is related to her/ his areas of interest (Cognitive knowledge level: Analyze).
46	CO3	2.8	Prepare a presentation about an academic document (Cognitive knowledge level: Create).
47	CO4	2.6	Give a presentation about an academic document (Cognitive knowledge level: Apply)
48	CO5	1.2	Prepare a technical report (Cognitive knowledge level: Create).
<b>PROJECT PHASE I - CED415</b>			
49	CO1	2.8	Model and solve real world problems by applying knowledge across domains (Cognitive knowledge level: Apply).
50	CO2	2.8	Function effectively as an individual and as a leader in diverse teams and to comprehend and execute designated tasks (Cognitive knowledge level: Apply)
51	CO3	2.6	Plan and execute tasks utilizing available resources within timelines, following ethical and professional norms (Cognitive knowledge level: Apply)
52	CO4	0.6	Organize and communicate technical and scientific findings effectively in written and oral forms (Cognitive knowledge level: Apply).
<b>INDUSTRIAL SAFETY ENGINEERING - MCN401</b>			
53	CO1	2.4	describe the theories of accident causation and preventive measures of industrial accidents
54	CO2	2.4	Explain about personal protective equipment ,its selection ,safety performance & indicators and importance of housekeeping
55	CO3	1.68	Explain different issues in construction industries
56	CO4	2.4	Describe various hazards associate with different machines and mechanical material handling.





57	CO5	2.6	Utilise different hazard identification tools in different industries with knowledge of different types of chemical hazards
<b>Energy Management - EET455</b>			
58	CO1	3	Explain the significance and procedure for energy management and audit.
59	CO2	3	Discuss the energy efficiency and management of electrical loads.
60	CO3	2.8	Discuss the energy efficiency in boilers and furnaces.
61	CO4	2.4	Explain the energy management opportunities in HVAC systems
62	CO5	2.8	Compute the economic feasibility of the energy conservation measures.
<b>STRUCTURAL ANALYSIS - II - CET302</b>			
63	CO1	2.6	Understand the principles of plastic theory and its applications in structural analysis.
64	CO2	2.4	Examine the type of structure and decide on the method of analysis.
65	CO3	1.8	Apply approximate methods of analysis for framed structures to ascertain stress resultants approximately but quickly.
66	CO4	2.08	Apply the force method to analyse framed structures.
67	CO5	1.48	Apply the displacement methods to analyse framed structures.
68	CO6	1.08	Remember basic dynamics, understand the basic principles of structural dynamics and apply the same to simple structures.
<b>ENVIRONMENTAL ENGINEERING - CET 304</b>			
69	CO1	3	To appreciate the role of environmental engineering in improving the quality of environment
70	CO2	2.08	To plan for collection and conveyance of water and waste water
71	CO3	3	To enhance natural water purification processes in an engineered environment
72	CO4	2.28	To decide on appropriate technology for water and waste water treatment
<b>DESIGN OF HYDRAULIC STRUCTURES - CET306</b>			
73	CO1	2.28	Elucidate the causes of failure, principles of design of different components of hydraulic structures
74	CO2	2.08	Describe the features of canal structures and perform the design of alluvial canals
75	CO3	2.28	Perform the hydraulic design of minor irrigation structures such as cross drainage works, canal falls, cross regulator
76	CO4	1.6	Prepare the scaled drawings of different minor irrigation structures
77	CO5	2.28	Describe the design principles and features of dams and perform the stability analysis of gravity dams
<b>ADVANCED CONCRETE TECHNOLOGY - CET352</b>			
78	CO1	1.48	To recall the properties and testing procedure of concrete materials as per IS code
79	CO2	2.6	To describe the procedure of determining the properties of fresh and hardened concrete
80	CO3	2	To design concrete mix using IS Code Methods.
81	CO4	2.8	To explain nondestructive testing of concrete
82	CO5	2.28	To describe the various special types of concretes
<b>Industrial Economics &amp; Foreign Trade - HUT 300</b>			
83	CO1	3	Explain the problem of scarcity of resources and consumer behaviour, and to evaluate the impact of government policies on the general economic welfare. (Cognitive knowledge level: Understand)
84	CO2	2.9	Take appropriate decisions regarding volume of output and to evaluate the social cost of production. (Cognitive knowledge level: Apply)
85	CO3	2.47	Determine the functional requirement of a firm under various competitive conditions. (Cognitive knowledge level: Analyse)
86	CO4	2.9	Examine the overall performance of the economy, and the regulation of economic fluctuations and its impact on various sections in the society. (Cognitive knowledge level: Analyse)
87	CO5	2.47	Determine the impact of changes in global economic policies on the business opportunities of a firm. (Cognitive knowledge level: Analyse)
<b>COMPREHENSIVE COURSE WORK - CET308</b>			
88	CO1	2.8	Learn to prepare for a competitive examination
89	CO2	3	Comprehend the questions in Civil Engineering field and answer them with confidence
90	CO3	2.8	Communicate effectively with faculty in scholarly environments



91	CO4	2.8	Analyze the comprehensive knowledge gained in basic courses in the field of Civil Engineering
<b>TRANSPORTATION ENGINEERING LAB - CEL332</b>			
92	CO 1	2.8	Analyse the suitability of soil as a pavement subgrade material
93	CO 2	2.8	Assess the suitability of aggregates as a pavement construction material
94	CO 3	3	Characterize bitumen based on its properties so as to recommend it as a pavement construction material.
95	CO 4	2.8	Design bituminous mixes for pavement layers
96	CO 5	2.8	Assess functional adequacy of pavements based on roughness of pavement surface.
<b>CIVIL ENGINEERING SOFTWARE LAB - CEL 334</b>			
97	CO1	3	To undertake analysis and design of multi-storeyed framed structure, schedule a given set of project activities using a software.
98	CO2	2.8	To prepare design details of different structural components, implementation plan for a project.
99	CO3	2.8	To prepare a technical document on engineering activities like surveying , structural design and project planning.
<b>STRUCTURAL ANALYSIS - I - CET301</b>			
100	CO1	3	Apply the principles of solid mechanics to analyse trusses.
101	CO2	2.28	Apply various methods to determine deflections in statically determinate structures.
102	CO3	2.6	Identify the problems with static indeterminacy and tackling such problems by means of the method of consistent deformations and energy principles.
103	CO4	2.2	Apply specific methods such as slope deflection and moment distribution methods of structural analysis for typical structures with different characteristics.
104	CO5	1.48	Apply suitable methods of analysis for various types of structures including cables, suspension bridges and arches.
105	CO6	1.88	Analyse the effects of moving loads on structures using influence lines.
<b>DESIGN OF CONCRETE STRUCTURES - CET303</b>			
106	CO1	2.2	Recall the fundamental concepts of limit state design and code provisions for design of concrete members under bending, shear, compression and torsion.
107	CO2	2.2	Analyse reinforced concrete sections to determine the ultimate capacity in bending, shear and compression.
108	CO3	1.6	Design and detail beams, slab, stairs and footings using IS code provisions.
109	CO4	2.2	Design and detail columns using IS code and SP 16 design charts.
110	CO5	1.8	Explain the criteria for earthquake resistant design of structures and ductile detailing of concrete structures subjected to seismic forces.
<b>GEOTECHNICAL ENGINEERING - II - CET 305</b>			
111	CO 1	1.8	Understand soil exploration methods
112	CO 2	2.6	Explain the basic concepts, theories and methods of analysis in foundation engineering
113	CO 3	3	Calculate bearing capacity, pile capacity, foundation settlement and earth pressure
114	CO 4	2.6	Analyze shallow and deep foundations
115	CO 5	2.6	Solve the field problems related to geotechnical engineering
<b>HYDROLOGY &amp; WATER RESOURCES ENGINEERING - CET 307</b>			
116	CO1	2.28	Describe and estimate the different components of hydrologic cycle by processing hydro-meteorological data
117	CO2	1.6	Determine the crop water requirements for the design of irrigation canals by recollecting the principles of irrigation engineering
118	CO3	2.08	Perform the estimation of streamflow and/or describe the river behavior and control structures
119	CO4	1.88	Describe and apply the principles of reservoir engineering to estimate the capacity of reservoirs and their useful life
120	CO5	1.08	Demonstrate the principles of groundwater engineering and apply them for computing the yield of aquifers and wells
<b>CONSTRUCTION TECHNOLOGY AND MANAGEMENT - CET309</b>			
121	CO1	3	Describe the properties of materials used in construction
122	CO2	3	Explain the properties of concrete and its determination



123	CO3	3	Describe the various elements of building construction
124	CO4	2.28	Explain the technologies for construction
125	CO5	1.08	Describe the procedure for planning and executing public works
126	CO6	1.08	Apply scheduling techniques in project planning and control
<b>DISASTER MANAGEMENT - MCN 301</b>			
127	CO1	3	Define and use various terminologies in use in disaster management parlance and organise each of these terms in relation to the disaster management cycle (Cognitive knowledge level: Understand).
128	CO2	2.6	Distinguish between different hazard types and vulnerability types and do vulnerability assessment (Cognitive knowledge level: Understand).
129	CO3	2	Identify the components and describe the process of risk assessment, and apply appropriate methodologies to assess risk (Cognitive knowledge level: Understand).
130	CO4	2.6	Explain the core elements and phases of Disaster Risk Management and develop possible measures to reduce disaster risks across sector and community (Cognitive knowledge level: Apply)
131	CO5	2.28	Identify factors that determine the nature of disaster response and discuss the various disaster response actions (Cognitive knowledge level: Understand).
132	CO6	1.28	Explain the various legislations and best practices for disaster management and risk reduction at national and international level (Cognitive knowledge level: Understand).
<b>MATERIAL TESTING LAB II - CEL331</b>			
133	CO 1	3	To describe the basic properties of various construction materials
134	CO 2	3	Characterize the physical and mechanical properties of various construction materials.
135	CO3	3	Interpret the quality of various construction materials as per IS Codal provisions.
<b>GEOTECHNICAL ENGINEERING LAB - CEL 333</b>			
136	CO1	3	Identify and classify soil based on standard geotechnical experimental methods.
137	CO2	3	Perform and analyze permeability tests.
138	CO3	3	Interpret engineering behavior of soils based on test results.
139	CO4	3	Perform laboratory compaction, CBR and in-place density test for fill quality control in the field.
140	CO5	2.8	Evaluate the strength of soil by performing various tests viz. direct shear test, unconfined compressive strength test and triaxial shear test.
141	CO6	3	Evaluate settlement characteristics of soils.
<b>PROBABILITY, STATISTICS AND NUMERICAL METHODS - MAT202</b>			
142	CO1	3	Understand the concept, properties and important models of discrete random variables and,using them, analyse suitable random phenomena.
143	CO2	3	Understand the concept, properties and important models of continuous random variables and,using them, analyse suitable random phenomena.
144	CO3	3	Perform statistical inferences concerning characteristics of a population based on attributes of samples drawn from the population
145	CO4	2.8	Compute roots of equations, evaluate definite integrals and perform interpolation on given numerical data using standard numerical techniques
146	CO5	3	Apply standard numerical techniques for solving systems of equations, fitting curves on given numerical data and solving ordinary differential equations.
<b>ENGINEERING GEOLOGY - CET202</b>			
147	CO1	3	Recall the fundamental concepts of surface processes, subsurface process, minerals, rocks, groundwater and geological factors in civil engineering constructions.
148	CO2	3	Identify and describe the surface processes, subsurface process, earth materials, groundwater and geological factors in civil engineering constructions
149	CO3	2.8	Apply the basic concepts of surface and subsurface processes, minerals, rocks, groundwater and geological characteristics in civil engineering constructions.
150	CO4	2.28	Analyze and classify geological processes, earth materials and groundwater.
151	CO5	2.08	Evaluation of geological factors in civil engineering constructions
<b>GEOTECHNICAL ENGINEERING – I - CET204</b>			
152	CO 1	2.84	Explain the fundamental concepts of basic and engineering properties of soil
153	CO 2	2.84	Describe the laboratory testing methods for determining soil parameters
154	CO 3	2.64	Solve the basic properties of soil by applying functional relationships



155	CO 4	1.92	Calculate the engineering properties of soil by applying the laboratory test results and the fundamental concepts of soil mechanics
156	CO 5	0.72	Analyze the soil properties to identify and classify the soil
<b>TRANSPORTATION ENGINEERING - CET206</b>			
157	CO1	2.08	Apply the basic principles of Highway planning and design highway geometric elements
158	CO2	3	Apply standard code specifications in judging the quality of highway materials; designing of flexible pavements
159	CO3	3	Explain phenomena in road traffic by collection, analysis and interpretation of traffic data through surveys; creative design of traffic control facilities
160	CO4	2.8	Understand about railway systems, tunnel, harbour and docks
161	CO5	2.8	Express basics of airport engineering and design airport elements
<b>DESIGN &amp; ENGINEERING - EST200</b>			
162	CO 1	3	Explain the different concepts and principles involved in design engineering.
163	CO 2	3	Apply design thinking while learning and practicing engineering.
164	CO 3	3	Develop innovative, reliable, sustainable and economically viable designs incorporating knowledge in engineering
<b>CONSTITUTION OF INDIA - MCN202</b>			
165	CO 1	2.28	Explain the background of the present constitution of India and features.
166	CO 2	3	Utilize the fundamental rights and duties.
167	CO 3	2.28	Understand the working of the union executive, parliament and judiciary.
168	CO 4	2.28	Understand the working of the state executive, legislature and judiciary.
169	CO 5	3	Utilize the special provisions and statutory institutions.
170	CO 6	2.28	Show national and patriotic spirit as responsible citizens of the country
<b>MATERIAL TESTING LAB- I - CEL202</b>			
171	CO 1	3	The understand the behaviour of engineering materials under various forms and stages of loading
172	CO 2	2.8	Characterize the elastic properties of various materials.
173	CO3	3	Evaluate the strength and stiffness properties of engineering materials under various loading conditions
<b>FLUID MECHANICS LAB - CEL204</b>			
174	CO 1	2.8	Apply fundamental knowledge of Fluid Mechanics to corresponding experiments
175	CO 2	2.8	Apply theoretical concepts in Fluid Mechanics to respective experiments
176	CO 3	3	Analyse experimental data and interpret the results
177	CO 4	2.8	Document the experimentation in prescribed manner
<b>PARTIAL DIFFERENTIAL EQUATION AND COMPLEX ANALYSIS - MAT201</b>			
178	CO1	2.84	Understand the concept and the solution of partial differential equation.
179	CO2	2.84	Analyse and solve one dimensional wave equation and heat equation.
180	CO3	2.84	Understand complex functions, its continuity differentiability with the use of Cauchy- Riemann equations.
181	CO4	2.84	Evaluate complex integrals using Cauchy's integral theorem and Cauchy's integral formula, understand the series expansion of analytic function
182	CO5	2.84	Understand the series expansion of complex function about a singularity and Apply residue theorem to compute several kinds of real integrals.
<b>MECHANICS OF SOLIDS - CET201</b>			
183	CO1	2.84	Recall the fundamental terms and theorems associated with mechanics of linear elastic deformable bodies.
184	CO2	2.84	Explain the behavior and response of various structural elements under various loading conditions.
185	CO3	2.84	Apply the principles of solid mechanics to calculate internal stresses/strains, stress resultants and strain energies in structural elements subjected to axial/transverse loads and bending/twisting moments.
186	CO4	2.12	Choose appropriate principles or formula to find the elastic constants of materials making use of the information available.



187	CO5	1.92	Perform stress transformations, identify principal planes/ stresses and maximum shear stress at a point in a structural member.
188	CO6	2.84	Analyse the given structural member to calculate the safe load or proportion the cross section to carry the load safely.
<b>FLUID MECHANICS&amp; HYDRAULICS - CET203</b>			
189	CO1	2.48	Recall the relevant principles of hydrostatics and hydraulics of pipes and open channels
190	CO2	1.76	Identify or describe the type, characteristics or properties of fluid flow
191	CO3	1.56	Estimate the fluid pressure, perform the stability check of bodies under hydrostatic condition
192	CO4	1.56	Compute discharge through pipes or estimate the forces on pipe bends by applying hydraulic principles of continuity, energy and/or momentum
193	CO5	2.48	Analyze or compute the flow through open channels, perform the design of prismatic channels
<b>SURVEYING &amp; GEOMATICS - CET205</b>			
194	CO1	2.28	Apply surveying techniques and principles of leveling for the preparation of contour maps, computation of area-volume and sketching mass diagram
195	CO2	1.8	Apply the principles of surveying for triangulation
196	CO3	2.08	Apply different methods of traverse surveying and traverse balancing
197	CO4	2.08	Identify the possible errors in surveying and apply the corrections in field measurements
198	CO5	2.08	Apply the basic knowledge of setting out of different types of curves
199	CO6	2.8	Employ surveying techniques using advanced surveying equipments
<b>PROFESSIONAL ETHICS - HUT200</b>			
200	CO 1	2.28	Understand the core values that shape the ethical behaviour of a professional.
201	CO 2	2.08	Adopt a good character and follow an ethical life.
202	CO 3	2.6	Explain the role and responsibility in technological development by keeping personal ethics and legal ethics.
203	CO 4	2.08	Solve moral and ethical problems through exploration and assessment by established experiments.
204	CO 5	2.8	Apply the knowledge of human values and social values to contemporary ethical values and global issues.
<b>SUSTAINABLE ENGINEERING - MCN201</b>			
205	CO 1	2.8	Understand the relevance and the concept of sustainability and the global initiatives in this direction
206	CO 2	2.8	Explain the different types of environmental pollution problems and their sustainable solutions
207	CO 3	2.4	Discuss the environmental regulations and standards
208	CO 4	2.6	Outline the concepts related to conventional and non-conventional energy
209	CO 5	2.6	Demonstrate the broad perspective of sustainable practices by utilizing engineering knowledge and principles
<b>CIVIL ENGINEERING PLANNING &amp; DRAFTING LAB - CEL201</b>			
210	CO 1	3	Illustrate ability to organise civil engineering drawings systematically and professionally
211	CO 2	2.8	Prepare building drawings as per the specified guidelines.
212	CO3	2.8	Assess a complete building drawing to include all necessary information
213	CO 4	2.8	Create a digital form of the building plan using any drafting software
<b>SURVEY LAB - CEL203</b>			
214	CO 1	3	Use conventional surveying tools such as chain/tape and compass for plotting and area determination.
215	CO 2	3	Apply levelling principles in field
216	CO 3	2.8	Solve triangulation problems using theodolite
217	CO 4	3	Employ total station for field surveying
218	CO 5	2.8	Demonstrate the use of distomat and handheld GPS
<b>VECTOR CALCULUS, DIFFERENTIAL EQUATIONS AND TRANSFORMS - MAT 102</b>			
219	CO1	2.8	Compute the derivatives and line integrals of vector functions and learn their applications
220	CO2	2.8	Evaluate surface and volume integrals and learn their inter-relations and applications.
221	CO3	2.6	Solve homogeneous and non-homogeneous linear differential equation with constant coefficients



222	CO4	2.8	Compute Laplace transform and apply them to solve ODEs arising in engineering
223	CO5	2.8	Determine the Fourier transforms of functions and apply them to solve problems arising in engineering
<b>ENGINEERING GRAPHICS - EST 110</b>			
224	CO1	2.44	Draw the projection of points and lines located in different quadrants
225	CO2	2.44	Prepare multiview orthographic projections of objects by visualizing them in different positions
226	CO3	2.8	Draw sectional views and develop surfaces of a given object
227	CO4	2.28	Prepare pictorial drawings using the principles of isometric and perspective projections to visualize objects in three dimensions
228	CO5	2.44	Convert 3D views to orthographic views
229	CO6	0	Obtain multiview projections and solid models of objects using CAD tools
<b>BASICS OF CIVIL &amp; MECHANICAL ENGINEERING - EST 120</b>			
230	CO1	2.08	Recall the role of civil engineer in society and to relate the various disciplines of Civil Engineering.
231	CO2	2.8	Explain different types of buildings, building components, building materials and building construction
232	CO3	1.88	Describe the importance, objectives and principles of surveying.
233	CO4	2.08	Summarise the basic infrastructure services MEP, HVAC, elevators, escalators and ramps
234	CO5	2.8	Discuss the Materials, energy systems, water management and environment for green buildings.
235	CO6	1.12	Analyse thermodynamic cycles and calculate its efficiency
236	CO7	2.8	Illustrate the working and features of IC Engines
237	CO8	2.04	Explain the basic principles of Refrigeration and Air Conditioning
238	CO9	2.08	Describe the working of hydraulic machines
239	CO10	2.08	Explain the working of power transmission elements
240	CO11	2.08	Describe the basic manufacturing, metal joining and machining processes
<b>PROFESSIONAL COMMUNICATION - HUN 102</b>			
241	CO1	3	Develop vocabulary and language skills relevant to engineering as a profession
242	CO2	3	Analyze, interpret and effectively summarize a variety of textual content
243	CO3	2.28	Create effective technical presentations.
244	CO4	0.6	Discuss a given technical/non-technical topic in a group setting and arrive at generalizations/consensus
245	CO5	0.6	Identify drawbacks in listening patterns and apply listening techniques for specific needs
246	CO6	0.6	Create professional and technical documents that are clear and adhering to all the necessary conventions
<b>PROGRAMING IN C - EST 102</b>			
247	CO1	2.28	Analyze a computational problem and develop an algorithm/flowchart to find its solution
248	CO2	3	Develop readable* C programs with branching and looping statements, which uses Arithmetic, Logical, Relational or Bitwise operators.
249	CO3	3	Write readable C programs with arrays, structure or union for storing the data to be processed
250	CO4	2.4	Divide a given computational problem into a number of modules and develop a readable multi-function C program by using recursion if required, to find the solution to the computational problem
251	CO5	1.88	Write readable C programs which use pointers for array processing and parameter passing
252	CO6	1.88	Develop readable C programs with files for reading input and storing output
<b>ENGINEERING PHYSICS LAB - PHL 120</b>			
253	CO1	3	Develop analytical/experimental skills and impart prerequisite hands on experience for engineering laboratories
254	CO2	3	Understand the need for precise measurement practices for data recording
255	CO3	3	Understand the principle, concept, working and applications of relevant technologies and comparison of results with theoretical calculations
256	CO4	3	Analyze the techniques and skills associated with modern scientific tools such as lasers and fiber optics
257	CO5	3	Develop basic communication skills through working in groups in performing the laboratory experiments and by interpreting the results

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<b>CIVIL &amp; MECHANICAL WORKSHOP - ESL 120</b>			
258	CO1	2.8	Name different devices and tools used for civil engineering measurements
259	CO2	2.8	Explain the use of various tools and devices for various field measurements
260	CO3	2.8	Demonstrate the steps involved in basic civil engineering activities like plot measurement, setting out operation, evaluating the natural profile of land, plumbing and undertaking simple construction work.
261	CO4	2.8	Choose materials and methods required for basic civil engineering activities like field measurements, masonry work and plumbing
262	CO5	2.8	Compare different techniques and devices used in civil engineering measurements
263	CO6	2.8	Identify Basic Mechanical workshop operations in accordance with the material and objects
264	CO7	2.8	Apply appropriate Tools and Instruments with respect to the mechanical workshop trades
265	CO8	2.8	Apply appropriate safety measures with respect to the mechanical workshop trades
<b>ENGINEERING PHYSICS B (FOR NON-CIRCUIT BRANCHES) - PHT 110</b>			
266	CO1	2.44	Compute the quantitative aspects of waves and oscillations in engineering systems.
267	CO2	2.44	Apply the interaction of light with matter through interference, diffraction and identify these phenomena in different natural optical processes and optical instruments.
268	CO3	3	Analyze the behaviour of matter in the atomic and subatomic level through the principles of quantum mechanics to perceive the microscopic processes in electronic devices.
269	CO4	3	Apply the knowledge of ultrasonics in non-destructive testing and use the principles of acoustics to explain the nature and characterization of acoustic design and to provide a safe and healthy environment
270	CO5	2.44	Apply the comprehended knowledge about laser and fibre optic communication systems in various engineering applications
<b>LINEAR ALGEBRA AND CALCULUS - MAT 101</b>			
271	CO1	2.48	solve systems of linear equations, diagonalize matrices and characterise quadratic forms
272	CO2	2.48	compute the partial and total derivatives and maxima and minima of multivariable functions
273	CO3	2.08	compute multiple integrals and apply them to find areas and volumes of geometrical shapes, mass and centre of gravity of plane laminas
274	CO4	1.76	perform various tests to determine whether a given series is convergent, absolutely convergent or conditionally convergent
275	CO5	1.56	determine the Taylor and Fourier series expansion of functions and learn their applications.
<b>LIFE SKILLS - HUN 101</b>			
276	CO1	2.28	Define and Identify different life skills required in personal and professional life
277	CO2	2.28	Develop an awareness of the self and apply well-defined techniques to cope with emotions and stress
278	CO3	2.28	Explain the basic mechanics of effective communication and demonstrate these through presentations
279	CO4	2.28	Take part in group discussions
280	CO5	2.28	Use appropriate thinking and problem solving techniques to solve new problems
281	CO6	1.8	Understand the basics of teamwork and leadership
<b>ENGINEERING CHEMISTRY - CYT 100</b>			
282	CO1	3	Apply the basic concepts of electrochemistry and corrosion to explore its possible applications in various engineering fields.
283	CO2	3	Understand various spectroscopic techniques like UV-Visible, IR, NMR and its applications
284	CO3	2.6	Apply the knowledge of analytical method for characterizing a chemical mixture or a compound. Understand the basic concept of SEM for surface characterisation of nanomaterials.
285	CO4	3	Learn about the basics of stereochemistry and its application. Apply the knowledge of conducting polymers and advanced polymers in engineering.
286	CO5	3	Study various types of water treatment methods to develop skills for treating wastewater
<b>ENGINEERING MECHANICS - EST 100</b>			
287	CO1	2.64	Recall principles and theorems related to rigid body mechanics
288	CO2	2.64	Identify and describe the components of system of forces acting on the rigid body
289	CO3	2.64	Apply the conditions of equilibrium to various practical problems involving different force system



290	CO4	2.84	Choose appropriate theorems, principles or formulae to solve problems of mechanics.
291	CO5	2.64	Solve problems involving rigid bodies, applying the properties of distributed areas and masses
<b>BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING - EST 130</b>			
292	CO1	2.8	Apply fundamental concepts and circuit laws to solve simple DC electric circuits
293	CO2	2.8	Develop and solve models of magnetic circuits
294	CO3	2.8	Apply the fundamental laws of electrical engineering to solve simple ac circuits in steady state
295	CO4	2.8	Describe working of a voltage amplifier
296	CO5	1.87	Outline the principle of an electronic instrumentation system
297	CO6	3	Explain the principle of radio and cellular communication
<b>ENGINEERING CHEMISTRY LAB - CYL 120</b>			
298	CO1	0.88	Understand and practice different techniques of quantitative chemical analysis to generate experimental skills and apply these skills to various analyses
299	CO2	0.68	Develop skills relevant to synthesize organic polymers and acquire the practical skill to use TLC for the identification of drugs
300	CO3	0.48	Develop the ability to understand and explain the use of modern spectroscopic techniques for analysing and interpreting the IR spectra and NMR spectra of some organic compounds
301	CO4	0.88	Acquire the ability to understand, explain and use instrumental techniques for chemical analysis
302	CO5	0.88	Learn to design and carry out scientific experiments as well as accurately record and analyze the results of such experiments
303	CO6	1.08	Function as a member of a team, communicate effectively and engage in further learning. Also understand how chemistry addresses social, economical and environmental problems and why it is an integral part of curriculum
<b>ELECTRICAL &amp; ELECTRONICS WORKSHOP - ESL 130</b>			
304	CO1	2.8	Demonstrate safety measures against electric shocks.
305	CO2	2.6	Identify the tools used for electrical wiring, electrical accessories, wires, cables, batteries and standard symbols
306	CO3	2.6	Develop the connection diagram, identify the suitable accessories and materials necessary for wiring simple lighting circuits for domestic buildings
307	CO4	2.8	Identify and test various electronic components
308	CO5	3	Draw circuit schematics with EDA tools
309	CO6	2.8	Assemble and test electronic circuits on boards
310	CO7	3	Work in a team with good interpersonal skills



  
**PRINCIPAL**  
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