

P. E. S. COLLEGE OF ENGINEERING, MANDYA
Scheme of Teaching and Examinations - 2025
Outcome-Based Education (OBE) and Choice Based Credit System (CBCS)
(Effective from the academic year 2025-26)

B.E. I – Semester [Chemistry Group]			Stream: –Civil Engineering Stream (CES)		Programme: Civil Engineering								
Sl. No	Course and Course Code		Course Title	TD/PSB	Teaching Hours/Week				Examination				Credits
					Theory Lecture	Tutorial	Practical/ Drawing	SAAE	SEE Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	S					
1	ASC(IC)	P25MACV101	Applied Mathematics -I (Differential Calculus and Linear Algebra)	Maths	3	0	2		03	50	50	100	04
2	ASC	P25CHCV102	Applied Chemistry for Advanced Metal Protection and Sustainable Energy Systems	CHE	3	0	0		03	50	50	100	03
3	ESC	P25ESC1031	Computer-Aided Drawing for CV Stream	ME dept	2	0	2		03	50	50	100	03
4	ESC	P25ESC1044	Engineering Science Course-I (Introduction to Mechanical Engineering)	Respective Engg dept	3	0	0		03	50	50	100	03
5	PLC	P25PLC1051	Programming Language Course (Introduction to C Programming)	Respective Engg dept	3	0	0		03	50	50	100	03
6	PLC	P25PLCL1061	Programming Language Course Laboratory (Introduction to C Programming Laboratory)	Respective Engg dept	0	0	2		03	50	50	100	01
7	ASC	P25CHCVL107	Applied Chemistry Laboratory (Applied Chemistry for Sustainable Built Environment)	CHE	0	0	2		03	50	50	100	01
8	AEC	P25ENG108	Communicative English-I	Humanities	0	2	0		02	50	50	100	01
9	AEC/ SDC	P25IDT109	Innovation and Design Thinking Lab (Project-based learning - IDEA Lab Workshop/ Maker's space)	Any Dept	0	0	2		02	50	50	100	01
10	NMC	P25ICO110	Indian Constitution	Humanities	1	0	0		01	100	--	100	PP
	TOTAL									550	450	1000	20
10	AICTE Activity Points (students have to earn 100 activity points between 01 to 08 semesters)				Compulsory requirement for the award of a degree								
S- (SAAE)Students Academic Activity Engagement Hours, ASC-Applied Science Course, ESC- Engineering Science Courses, IC – Integrated Course (Practical Course Integrated with Theory Course), PLC(IC)- Programming Language Course (Integrated Course), AEC- Ability Enhancement Course, AEC/SDC- Ability Enhancement Course/Skill Development course, ETC- Emerging Technology Course, TD/PSB- Teaching Department / Paper Setting Board, HSMC- Humanity, Social Science and management Course, CIE –Continuous Internal Evaluation, SEE- Semester End Examination, NCMC: Non Credit Mandatory Course, PP : (Pass/Pass) is assigned to a non-credit course. “PP” represents pass in course provided students have successfully completed the CIE requirements. Otherwise, “NP-not pass shall be awarded. “PP” is essential for the award of the degree													

<p>Credit Definition: 1-hour Lecture (L) per week=1Credit 2-hours Tutorial(T) per week=1Credit 2-hours Practical / Drawing (P) per week=1Credit</p>	<p>04-Credits courses are to be designed for 50 hours of Teaching-Learning Session 04-Credits (IC) are to be designed for 40 hours' theory and 10-12 hours of practical sessions 03-Credits courses are to be designed for 40 hours of Teaching-Learning Session 02- Credits courses are to be designed for 25 hours of Teaching-Learning Session 01-Credit courses are to be designed for 12 hours of Teaching-Learning sessions</p>
<p>The Student Induction Programme (SIP), initiated by the All India Council for Technical Education (AICTE), is designed to help newly admitted students in technical institutions transition smoothly into the higher education environment. It aims to familiarize students with the institutional culture, foster connections with peers and faculty, and provide a foundation for holistic learning. The first year of Engineering programmes is composed of I semester and II semester and Summer Semester. SIP activities shall be scheduled in the afternoon sessions during the first week of class commencement of I and II semesters only. Activities under SIP may include Physical Activities, Creative Arts, Universal Human Values, Literary Events, Proficiency Modules, Lectures by Eminent Personalities, Local Area Visits, Department/Branch Familiarization, and Innovation-related sessions. The specific programmes to be conducted will be notified separately by the University, with the academic calendar or separately.</p>	
<p>AICTE Activity Points Requirement for BE/B.Tech. Programmes As per AICTE guidelines (refer Chapter 6 – <i>AICTE Activity Point Program, Model Internship Guidelines</i>), in addition to academic requirements, students must earn a specified number of Activity Points to be earned is to be eligible for the award of their degree.</p> <ul style="list-style-type: none"> • Regular students admitted to a 4-year degree program must earn 100 Activity Points. • Lateral entry students (joining from the second year) must earn 75 Activity Points. • Students transferred from other universities directly into the fifth semester must earn 50 Activity Points from the date of entry into VTU. <p>These Activity Points are non-credit and will not be considered for the SGPA/CGPA or be used for vertical progression. However, they are mandatory for the award of the degree, and the points earned will be reflected on the eighth semester Grade Card.</p> <p>The hours spent for earning the activity points shall not be counted for regular attendance requirements. Students can accumulate these points at any time during their program, including on weekends, holidays, and vacations starting from the year of admission, provided they meet the minimum hours of engagement prescribed for each activity.</p> <p>If a student fails to earn the required Activity Points, the eighth-semester Grade Card will be withheld until the requirement is fulfilled. Consequently, the degree will be awarded only after the Grade Card has been released.</p>	

Applied Mathematics-I					Applied Chemistry				
Code	Title	L	T	P	Code	Title	L	T	P
P25MACV101	Differential Equations and Linear Algebra: CV Stream	3	2	0	P25CHCV102	Applied Chemistry for Sustainable Built Environment (CV)	3	0	0
P25MAME101	Differential Calculus and Linear Algebra: ME Stream	3	2	0	P25CHME102	Applied Chemistry for Metal Protection and Sustainable Energy (ME)	3	0	0
P25MAEE101	Calculus and Numerical Techniques: EEE Stream	3	2	0	P25CHEE102	Applied Chemistry for Futuristic Devices (EEE, ECE)	3	0	0
P25MACS101	Calculus and Linear Algebra: CSE Stream	3	2	0	P25CHCS102	Applied Chemistry for Smart Systems (CSE)	3	0	0
(ESC-I) Engineering Science Courses-I					(PLC) Programming Language Courses and Laboratory				
Code	Title	L	T	P	Code	Title	L	T	P
P25ESC1041	Introduction to Building Sciences	3	0	0	P25PLC1051	Introduction to C Programming (For none IT programmes)	3	0	0
P25ESC1042	Introduction to Electrical Engineering	3	0	0	P25PLC1052	Python Programming (for CSE and allied programmes)	3	0	0
P25ESC1043	Introduction to Electronics & Communication	3	0	0	P25PLCL1061	Introduction to C Programming Laboratory (For none IT programmes)	0	0	2
					P25PLCL1062	Python Programming Laboratory (For CSE and allied programmes)	0	0	2
P25ESC1044	Introduction to Mechanical Engineering	3	0	0	Computer Aided Engineering Drawing				
P25ESC1045	Essentials of Information Technology	3	0	0	P25ESC1031	Computer Aided Drawing for CV Stream	2	0	2
					P25ESC1032	Computer Aided Drawing for ME stream Engineering	2	0	2
	Applied Chemistry Lab (ASC Lab)				P25ESC1033	Computer Aided Drawing for EEE stream	2	0	2
P25CHCVL107	Applied Chemistry Laboratory (Applied Chemistry for Sustainable Built Environment)	0	0	2	P25ESC1034	Computer Aided Drawing for CSE stream	2	0	2
<p>The Mathematics/Chemistry courses shall be taught by a single faculty member per session, with no sharing of the course (subject) modules. The tutorial sessions for the mathematics course shall be conducted in the Laboratory environment using MATLAB software to enhance computational understanding and application skills.</p> <p>Students admitted to a specific engineering stream are required to select and successfully complete Applied Mathematics-I and Applied Chemistry courses that are aligned with their program stream. These courses are intended to reinforce the academic foundations and develop the professional competencies relevant to their chosen engineering discipline.</p> <p>Engineering Sciences Courses-I (ESC-I): These courses are designed to broaden the technical knowledge of students beyond their core area of study. These courses enable students to gain a foundational understanding of engineering principles from other stream courses. Students are required to select and complete two courses that are not belong to their admitted program stream. For example, a student admitted to the any programme of the Civil Engineering stream should not select Introduction to Building Sciences but any other two. One course shall select under ESC-I and another course under ESC-II. The two courses must be different from the other.</p> <p>For the course Interdisciplinary Project, it is mandatory to form a team comprising students from multiple engineering disciplines. For example, a project team may include students from Mechanical Engineering, Electronics and Communication Engineering (ECE), and Computer Science and Engineering (CSE), working collaboratively to design and implement the project.</p> <p>Computer-Aided Engineering Drawing: The courses under this category are stream-specific. Students must select and complete the course that corresponds to their admitted engineering stream.</p>									

Semester

Course Title	Differential Calculus and Linear Algebra						
Course Code	P25MACV101						
Category	COMMON TO CV STREAMS						
Scheme and Credits	Theory/Practical/Integrated					Total teaching hours	Credits
	L	T	P	SS	Total		
	3	0	2	-	04	(40HoursTheory+20Hours Practical)	04
CIE Marks:50	SEE Marks:50	Total Max. marks=100			Duration of SEE: 03 Hours		

Course Learning Objectives:

1	Apply foundational concepts of calculus and differential equations to analyze geometric properties of curves, solve first and higher-order ordinary differential equations, and model physical phenomena in science and engineering.
2	Apply the principles of linear algebra to solve systems of linear equations, determine Eigen values and eigenvectors, and analyze real-world problems such as traffic flow.
3	Demonstrate the applications of civil engineering and allied engineering science using modern ICT tools.

Unit	Syllabus content	No. of hours
I	Polar Curves and Curvature: Polar coordinates, Polar curves, angle between the radius vector and the tangent, angle between two curves. Pedal equations. Curvature and radius of curvature - Cartesian, parametric, polar and pedal forms. Self - study: Center and circle of curvature, evolutes and involutes.	8 hours
II	Series Expansion, Indeterminate Forms and Multivariable Calculus: Statement and problems on Taylor's and Maclaurin's series expansion for one variable. Indeterminate forms - L'Hospital's rule. Partial differentiation, total derivative –differentiation of composite functions, Jacobian, Maxima and minima for the function of two variables. Self - study: Euler's theorem and problems. Method of Lagrange's undetermined multipliers with single constraint.	8 hours
III	Ordinary Differential Equations of First Order: Linear and Bernoulli's differential equation. Exact and reducible to exact differential equations with integrating factors $\frac{1}{N} \left(\frac{\partial M}{\partial y} - \frac{\partial N}{\partial x} \right)$ and $\frac{1}{M} \left(\frac{\partial N}{\partial x} - \frac{\partial M}{\partial y} \right)$. Orthogonal trajectories, Law of natural growth and decay. Self - study: Newton Law of Cooling.	8 hours
IV	Ordinary Differential Equations of Higher Order: Higher-order linear ordinary differential equations with constant coefficients, homogeneous and non-homogeneous equations (e^{ax} , $\sin(ax+b)$, $\cos(ax+b)$, x^n only), Method of variation of parameters, Cauchy's and Legendre's homogeneous differential equations. Applications: Solving governing differential equations of Mass Spring. Self - study: Formulation and solution of Cantilever beam. Finding the solution by the method of undetermined coefficients.	8 hours
V	Linear Algebra: Elementary row transformation of a matrix, Rank of a matrix. Consistency and Solution of system of linear equations - Gauss-elimination method and approximate solution by Gauss-Seidel method. Eigen values and Eigen vectors, Rayleigh's power method to find the dominant Eigen value and Eigen vector. Applications: Traffic flow. Self-Study: Solution of a system of linear equations by Gauss-Jacobi iterative method.	8 hours

	Inverse of a square matrix by Cayley- Hamilton theorem.	
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COURSE OUTCOMES: On completion of the course, student should be able to:

CO1: Apply foundational concepts of calculus and differential equations to analyze geometric properties of curves, solve first and higher-order ordinary differential equations, and model physical phenomena in science and engineering.

CO2: Apply the principles of linear algebra to solve systems of linear equations, determine Eigen values and eigenvectors, and analyze real-world problems such as traffic flow.

CO3: Demonstrate the applications of civil engineering and allied engineering science using modern ICT tools.

Suggested Learning Resources :(Textbook/Reference Book):

Textbooks:

1. B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 44th Ed., 2021.
2. E. Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, 10th Ed., 2018.
3. Gilbert Strang, Linear Algebra and its Applications, Cengage Publications, 4th Ed., 2022.

Reference books:

1. B. V. Ramana, Higher Engineering Mathematics, McGraw-Hill Education, 11th Ed., 2017.
2. Srimanta Pal & Subodh C. Bhunia, Engineering Mathematics, Oxford University Press, 3rd Ed., 2016.
3. N.P. Bali and Manish Goyal, A Text book of Engineering Mathematics, Laxmi Publications, 10th Ed., 2022.
4. H.K. Dass and Er. Rajnish Verma, Higher Engineering Mathematics, S. Chand Publication, 3rd Ed., 2014.
5. David C Lay, Linear Algebra and its Applications, Pearson Publishers, 4th Ed., 2018.

CO – PO Mapping												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2										
CO2	2	3										
CO3	3	2										
Strength of correlation: Low-1, Medium-2, High-3												

Academic Year: 2025-2026	Semester: I/II	Scheme: P25
Course Title: Applied Chemistry for Advanced Metal Protection and Sustainable Energy Systems		
Course Code: P25CHME102/202	CIE Marks: 50	CIE Weightage: 50
Teaching hours/week (L:T:P) 3:0:0	SEE Marks: 50	SEE Weightage:50
Teaching hours of Pedagogy: 40	Exam Hours: 03	
Credits: 03		
Prerequisite:		

- A foundation in **materials science, physical and inorganic chemistry, electrochemistry, solid-state chemistry, and environmental science.**
- **A basic understanding of nanotechnology, corrosion mechanisms and sensor technology**

Course learning Objectives:

CLO1: To bring adaptability to the concepts of chemistry and to acquire the required skills to become a perfect engineer.

CLO2: To enable students to acquire knowledge on principles of chemistry for engineering applications.

CLO3: To develop an intuitive understanding of chemistry by emphasizing the related branches of engineering.

CLO4: To provide students with a solid foundation in analytical reasoning required to solve societal problems.

CLO5: To acquire the skills pertaining to analytical techniques and to apply them for Engineering field.

UNIT 1: Corrosion Science and Coating Technologies

Hrs: 08

Corrosion: Introduction, electrochemical theory of corrosion, types of corrosion-differential metal and differential aeration corrosion, corrosion control-metal coating; galvanization, surface conversion coating; anodization and cathodic protection; sacrificial anode method, corrosion penetration rate (CPR) - Introduction and numerical problems.

Coating Technologies: Introduction, technological importance, electroplating - electroplating of chromium; hard, electro-less plating - electroless plating of Nickel, difference between electroplating and electroless plating.

Self-Study Content: monitoring and detection of corrosion, Pitting and crevice corrosion, organic and nano coatings.

Textbook:

Corrosion Engineering, M .G. Fontana, N. D. Greene, McGraw Hill Publications, New York, 3rd Edition, 1996.

“Hand book on Electroplating with Manufacture of Electro chemicals”, ASIA PACIFIC BUSINESS PRESS Inc., 2017. Dr. H. Panda,

Teaching Learning Process: chalk and talk method, Use of online platforms for assignments / Notes/ Quizzes

UNIT 2: Sustainable Green Fuels

Hrs: 08

Fuels: Introduction, calorific value, determination of calorific value using bomb calorimeter, numerical problems on GCV and NCV. Knocking in internal combustion engines - knocking mechanism in IC engines and anti-knocking agents - methyl tertiary butyl ether (MTBE) and ethyl tert-butyl ether (ETBE), importance of octane and cetane rating of fuel.

Green Fuels: Introduction, power alcohol – properties, applications and its limitations, biodiesel - synthesis by trans-esterification method, advantages and its applications. Production of green hydrogen by photocatalytic water splitting and its advantages, hydrogen storage – introduction, advantages and limitations of metal hydride and ammonia as chemical hydrogen carriers.

Self-Study Content: Hybrid fuel system, properties of biodiesel, waste to fuel conversion technologies.

Textbook: Applied Chemistry for Mechanical Engineering and Allied Branches, C Manasa, Vrushabendra B, Srikantamurthy N. ISBN: 978-93-58380-90-3, Astitva Prakashan Engineering Chemistry, Satyaprakash & Manisha Agrawal, Khanna Book Publishing, Delhi	
Teaching Learning Process: chalk and talk method, Use of ICT–Online videos, online courses	
UNIT 3: Materials for Energy Systems	Hrs:08
Nanomaterials: Introduction, synthesis of TiO ₂ nanoparticles by sol-gel method and its uses in catalytic converter applications, size-dependent properties of nanomaterial-surface area, catalytical, electrical and thermal conductivity. Graphene - Synthesis by chemical vapor deposition method, properties and engineering applications, role of carbon nanotubes (CNTs) in energy devices.	
Energy Systems: Batteries - Introduction, classification of batteries, characteristics-capacity, power density, cell balancing and cycle life, construction, working and applications of Li-ion battery. Fuel cells - Introduction, construction and working of solid oxide fuel (SOFCs) for auxiliary power units (APUs) applications, difference between fuel cell and battery, solar photovoltaic cells (PV cells) - construction, working, advantages and limitations.	
Self-Study Content: Hydrothermal and solvothermal methods for metal oxide nanoparticles. Solid state batteries, Organic PV cells.	
Textbook: Linden's Handbook of Batteries, Kirby W. Beard, Fifth Edition, McGraw Hill, 2019 Nanotechnology A Chemical Approach to Nanomaterials, G.A. Ozin & A.C. Arsenault, RSC Publishing, 2005.	
Teaching Learning Process: chalk and talk method, Use of ICT–Online videos, online courses	
UNIT 4: Materials for Engineering Applications	Hrs: 08
Engineering Polymers: Introduction, molecular weight of polymers - number average and weight average molecular weight, numerical problems, synthesis, properties and engineering applications of chlorinated polyvinyl chloride (CPVC), and polymethyl methacrylate (PMMA), relationship between the polymers' structure and properties in regard to chain architecture. Glass transition temperature (T _g), factor affecting T _g and its significance.	
Polymer Composites: Introduction, fiber-reinforced polymers (FRPs); Kevlar – Synthesis, properties and industrial applications. Carbon-fiber - Preparation from Polyacrylonitrile (PAN), properties and industrial applications.	
3D Printing materials: Introduction, synthesis, properties and applications of polylactic acid (PLA) resin.	
Self-Study Content: Polymer Degradation & Stability, Nano composites, composite 3D Printing Materials.	
Textbook: Polymer Science, V R Gowariker, N V Viswanathan, Jayadev, Sreedhar, New age Int. Publishers, 4 th Edition, 2021. Chemistry for Engineering Students, B. S. Jai Prakash, R. Venugopal, Sivakumaraiah & Pushpa Iyengar., Subash Publications, 5th Edition, 2014	
Teaching Learning Process: chalk and talk method, Use of ICT–Online videos, online courses	
UNIT 5: Fluid Technology and Smart Sensors	Hrs:08

Lubricants: Introduction, classification, ideal properties and applications. Lubricant testing; experimental determination of viscosity using Ostwald's viscometer.
Industrial Coolants: Introduction, types-water and oil-based coolants, properties and industrial applications.
Industrial effluents: Introduction, determination of COD and numerical problems.
Sensors: Introduction, potentiometric sensor - principle and its application in the estimation of iron in steel industry effluent, conductometric sensor - principle and its application in the estimation of acid mixture in electrochemical bath effluent. pH sensor - principle and its application in the estimation of pKa of acid electrolyte.
Self-Study Content: coolant additives, Sensor Calibration & Data Interpretation, Amperometric sensors, optical sensors, biosensors, gas sensors.
Teaching Learning Process: chalk and talk method, Experiments in laboratories shall be executed in blended mode

Textbook:

Expanding the Vision of Sensor Materials. National Research Council 1995, Washington, DC: The National Academies Press. doi: 10.17226/4782.

Instrumental Methods of Analysis, Dr. K. R. Mahadik and Dr. L. Sathiyarayanan, Nirali Prakashan, 2020.

Course Outcomes: At the end of the course students should be able to:

CO1: Understand the principles, types, control methods of corrosion and the fundamentals of electroplating and electroless plating technologies.

CO2: Apply the concepts of fuel calorific value, engine knocking, green fuels, and hydrogen production and storage to solve practical problems and evaluate fuel performance.

CO3: Analyze the synthesis, properties, and applications of nanomaterials, and evaluate batteries, fuel cells, and photovoltaic systems for energy conversion and storage.

CO4: Evaluate the synthesis, properties, structure–property relationships, and engineering applications of polymers, polymer composites, and 3D printing materials.

CO5: Analyze the properties, testing methods, and applications of lubricants and examine the principles and applications of different analytical techniques.

Suggested Learning Resources:**Textbooks:**

Sl.no	Title	Author	Year & Edition	Publisher
1	A Text book of Engineering Chemistry	S S Dara	15 th Edition, 2020.	S Chand & Company Ltd
2	"Chemistry for Engineering Students"	B. S. Jai Prakash, R. Venugopal, Sivakumaraiah & Pushpa Iyengar.	10 th Edition, 2020	Subash Publications
3	Text Book of Polymer Science	F. W. Billmeyer	15 th Edition, 2020	John Wiley & Sons

Reference Books:

1.	A Text Book of Engineering Chemistry	R.V.Gadag and Nityananda Shetty	2 nd Edition, 2016.	I.K. International Publishing house
2	Nanotechnology A Chemical Approach to Nanomaterials	G.A. Ozin & A.C. Arsenault	2005.	RSC Publishing
3	Engineering Chemistry	PC Jain & Monica Jain	2015-16thEdition.	Dhanpat Rai Publication.0
Web links and Video Lectures (e-resources)				
1.	https://www.vtutesource.com/post/1570/News/Bomb-calorimeter-construction-working-vtu-chemistry.html?utm_source			
2.	https://pubs.acs.org/doi/10.1021/acsomega.3c00963?utm_source			
3.	https://www.youtube.com/watch?v=ygtbo5KDXeIhttps://youtu.be/y-7t-GdRTKA			
4.	https://pmc.ncbi.nlm.nih.gov/articles/PMC11085161/?utm_source			
Active Based Learning (Suggested Activity in Class)/ Practical Based Learning (Example)				
1.	Project-Based Learning (PBL): Students gain knowledge by working on complex, real-world projects over time. Example: Building prototypes, developing community solutions, research presentations.			
2.	Flipped Classroom: Students learn theoretical content at home (videos, readings) and engage in problem-solving or discussions in class.			

Academic Year: 2025-26	Semester: I	Scheme: P25
Course Title: Computer Aided Engineering Drawing for CV Stream		
Course Code: P25ESC1031	CIE Marks:50	CIE Weightage:50%
Teaching hours/week (L:T:P): 2:0:2	SEE Marks:50	SEE Weightage:50%
Teaching hours of Pedagogy:40 Hours	Exam Hours: 3 Hrs	
Credits:03		
Course Outcomes:		
At the end of the course, the student will be able to:		
CO 1. Generate orthographic projections of points, lines, planes, and solids manually and with computer aided tools.		
CO 2. Develop the lateral surfaces of solids for real-world applications.		
CO 3. Draw isometric views and convert isometric drawings to orthographic views.		
CO 4. Create 3D models of basic building components.		
Unit 1:		Hrs:8
Introduction: Significance of Engineering drawing, BIS Conventions of Engineering Drawing, Free hand sketching of engineering drawing, Scales. Introduction to Computer Aided Drafting software, Co-ordinate system and reference planes HP, VP, RPP & LPP of 2D/3D environment. Selection of drawing sheet size and scale. Commands and creation of Lines, coordinate points, axes, polylines, square, rectangle, polygons, splines, circles, ellipse, text, move, copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet and curves.		
Orthographic Projections of Points, Lines and Planes: Introduction to Orthographic projections, Orthographic projections of points in 1 st and 3 rd quadrants. Orthographic projections of lines (Placed in First quadrant only as per BIS) Orthographic projections of planes: triangular, square, rectangular, pentagonal, hexagonal and circular lamina (Placed in First quadrant only using change of position method).		
Unit 2:		Hrs:8
Orthographic Projection of Solids: Orthographic projection of right regular solids (Resting on HP only and inclined to both the planes); Prisms, Pyramids, Cylinders & Cones.		
Unit 3:		Hrs:8
Section of Solids: Introduction, Section planes, Sectional views: apparent shapes and true shapes, Sections of right regular prisms, pyramids, cylinders and cones resting with their base on HP. (Concepts only and No Problems for practice).		
Development of Lateral Surfaces of Solids: Development of lateral surfaces of right regular Prisms, Pyramids, Cylinders & Cones and their frustums and truncations. Problems on applications of development of lateral surfaces like funnels and trays.		
Unit4:		Hrs:8
Isometric Views: Introduction to Isometric views, Isometric projections, Isometric scale. Isometric view of hexahedron (cube), right regular prisms, pyramids, cylinders, cones and spheres, Isometric view of combination of two simple solids, step block. Conversion of simple isometric drawings into orthographic views: Problems on conversion of Isometric view of simple objects / engineering components into orthographic views.		
Unit 5:		Hrs:8
Building Components Drafting (For CIE Only): Modeling Basic Building Components: foundations, columns, beams, slabs, walls, doors windows, staircase, assigning materials and rendering building components. Drafting a 2D floor plan for a simple single-storey residential/commercial building, Converting the floor plan into 3D model with walls, openings, and roof structure. Concept of building drawing.		
Suggested Learning Resources:		
Textbooks:		

Sl.No.	Title	Author	Year & Edition	Publisher										
1	A Textbook of Computer Aided Engineering Drawing	K. Gopalakrishna, R. & Sudhir Gopalakrishna	2017, 39th Edition,	Subash Stores, Bangalore.										
2	Engineering Drawing: Plane and Solid Geometry	Bhatt, N.D	2023, 53rd Edition	Charotar Publishing House Pvt. Limited.										
Reference Books:														
1.	Engineering Visualisation	S. N. Lal and T. Madhusudhan	2022, 1st Edition	Engage Learning India Pvt. Ltd.										
2.	Computer Aided Engineering Drawing	P.J. Shah	2021	S. Chand Publishing										
3.	Engineering Drawing	M. B. Shah & B.C. Rana	2009, Revised Edition	Pearson Education										
4.	A Course in Civil Engineering Drawing	V.B. Sikka,	2024, 11th Edition	S.K. Kataria & Sons										
Web links and Video Lectures (e-resources)														
<ul style="list-style-type: none">• https://nptel.ac.in/courses/112104172• https://nptel.ac.in/courses/112102304• https://nptel.ac.in/courses/112105294• https://www.coursera.org/courses?query=3d%20modeling&utm• https://www.g sourcedata.com/a-guide-to-the-world-of-civil-engineering-drawings-the-architectural-atlas/														
Teaching-Learning Process (Innovative Delivery Methods)														
<p>The following are sample strategies that educators may adopt to enhance the effectiveness of the teaching learning process and facilitate the achievement of course outcomes.</p> <ul style="list-style-type: none">• Flipped Classroom• Case-Based Teaching• Simulation and Virtual Labs• Partial Delivery of course by Industry expert/ industrial visits• ICT-Enabled Teaching														
Course Articulation Matrix														
Course Outcomes		Program Outcomes										PSO		
		1	2	3	4	5	6	7	8	9	10	11	1	2
CO1	Generate orthographic projections of points, lines, planes, and solids manually and with computer aided tools.	3	2	2	1	2								
CO2	Develop the lateral surfaces of solids for real-world applications.	3	2	2		1								
CO3	Draw isometric views and convert isometric drawings to orthographic views.	3	2	2		2								

CO4	Create 3D models of basic building components.	3	2	3	2	3								
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P25 Scheme

Academic Year: 2025-26		Semester: I		Scheme: P25	
Course Title: Introduction to Mechanical Engineering					
Course Code: P25ESC1044		CIE Marks:50		CIE Weightage:50%	
Teaching hours/week (L:T:P): 3:0:0		SEE Marks:50		SEE Weightage:50%	
Teaching hours of Pedagogy:40 Hours		Exam Hours: 3 Hrs			
Credits:03					
Course Outcomes:					
At the end of the course, the student will be able to:					
1. Recognize the significance of mechanical engineering principles to solve the problems of social relevance.					
2. Understand the working of I.C. engines, power transmission elements and future mobility vehicles.					
3. Discuss the properties and applications of engineering materials, composite materials and smart materials.					
4. Describe the working principles and applications of various manufacturing processes.					
5. Explain the advances in mechanical engineering					
Unit 1:				Hrs:8	
Introduction: Streams in mechanical engineering and their relevance/significance, role of mechanical engineers in solving the real case problems (with examples), careers in mechanical engineering. Realization of some of the engineering solutions through principles of mechanical engineering (with a schematic diagram).					
Energy conversion: Introduction and basic working principles of Pelton Turbine and Centrifugal pump.					
Vehicle systems: Identification of parts of vehicle systems such as steering system, brake system, gear system, working principle of Power steering.					
Flying machines: Classification, basic parts involved in drone making, working principle of Drones.					
Refrigeration and air conditioning principles.					
Unit 2:				Hrs:8	
Engines: Introduction, petrol engine, diesel engines, Working of four Stroke engines, applications.					
Insight into Future Mobility: Electric and Hybrid Vehicles, Components of Electric and Hybrid Vehicles.					
Advantages and disadvantages of EVs and Hybrid vehicles.					
Power Transmission systems: Classification of gears, simple & compound gear trains, concepts of automatic and CVT transmission.					
Unit 3:				Hrs:8	
Engineering materials: Introduction, Classification, Ferrous and Non-Ferrous metals: Types, Properties and their applications.					
Composite materials: Introduction, Constituents of a composite, Classification, Types of Matrix and Reinforcement materials, Advantages, Disadvantages and Applications of composite materials.					
Smart materials: Introduction, Types - Piezoelectric materials, MR fluids, Shape memory alloys and Advantages, Disadvantages and Applications					
Unit4:				Hrs:8	
Manufacturing overview, classification of manufacturing processes, process selection criterion.					
Principles of Welding, soldering, brazing. Introduction to machine tools – lathe, drilling and milling machine. Lathe operations: Turning, facing, knurling, Drilling machine operations: Drilling, reaming, tapping. Milling machine operations: End milling, face milling. Introduction to CNC, components, advantages and applications. Basic principles of 3D printing					
Unit 5:				Hrs:8	
Advances in mechanical engineering Automation technology: Definition of automation, types of automation, basic elements of automation. Mechatronic systems: Definition of mechatronics, elements of mechatronics systems, examples. Elementary sensors: Working principle and applications of Potentiometer, capacitive sensor and optical encoders. Integrated system: Need for integration of technologies, ADAS (Advanced Driver Assistance System).					
Suggested Learning Resources:					
Textbooks:					
Sl.No.	Title	Author		Year &	Publisher

			Edition	
1	Elements of Mechanical Engineering	K R Gopala Krishna	2008	Subhash Publications
2	An Introduction to Mechanical Engineering	Jonathan Wickert and Kemper Lewis	2012, 3rd Edition	Publication
Reference Books:				
1.	Manufacturing Technology- Foundry, Forming and Welding	P.N.Rao	2003, 3rd Ed.	Tata McGraw Hill
2.	Materials Science & Engineering, An Introduction	William D. Callister	2010	John Wiley & Sons Inc
3.	Internal Combustion Engines,	V. Ganesan,	2017, 4th edition.	Tata McGraw Hill Education
4.	Robotics	Appu Kuttan KK K.	volume 1	International Pvt Ltd
5.	Automation, production systems, and computer integrated manufacturing	Groover M. P	2008, 3rd ed.	Prentice Hall
6.	Introduction to Internet of Things: A Practical Approach	Dr SRN Reddy, Rachit Thukral and Manasi Mishra		ETI Labs

Web links and Video Lectures (e-resources)

- <https://nptel.ac.in/courses/112104526>
- <https://nptel.ac.in/courses/112104616>
- <https://nptel.ac.in/courses/112104769>
- <https://theconstructor.org/practical-guide/pelton-turbine-parts-working-designaspects/2894/>
- <https://www.mechstudies.com/centrifugal-pump/>
- <https://cfdflowengineering.com/working-principle-and-components-of-drone/>
- <https://youtu.be/i1ojp09VXHY>
- <https://www.theengineerspost.com/automatic-transmission/>
- <https://learnmech.com/continuously-variable-transmission-components-working-types/>

Teaching-Learning Process (Innovative Delivery Methods)

The following are sample strategies that educators may adopt to enhance the effectiveness of the teaching-learning process and facilitate the achievement of course outcomes.

- Flipped Classroom
- Simulation and Virtual Labs
- Partial Delivery of course by Industry experts
- ICT-Enabled Teaching
- Video demonstration

Course Articulation Matrix

Course Outcomes		Program Outcomes											PSO	
		1	2	3	4	5	6	7	8	9	10	11	1	2
CO1	Recognize the significance of mechanical engineering principles to solve the problems of social relevance.	3	2					3				2		
CO2	Understand the working of I.C. engines, power transmission	3	2					2						

	elements and future mobility vehicles.													
CO3	Discuss the properties and applications of engineering materials, composite materials and smart materials.	3	2					2						
CO4	Describe the working principles and applications of various manufacturing processes.	3		2		2								
CO5	Explain the advances in mechanical engineering	3		2		3						3		

Academic Year: 2025-26	Semester: I	Scheme: P25
Course Title: Introduction to C Programming		
Course Code: P25PLC1051	CIE Marks:50	CIE Weightage:50%
Teaching hours/week (L:T:P): 3:0:0	SEE Marks:50	SEE Weightage:50%
Teaching hours of Pedagogy:40	Exam Hours: 3 Hrs	
Credits:3		
Course learning Objectives:		
At the end of the course, the student will be able to: CO1: Explain the fundamental structure of a C program and primitive constructs. CO2: Apply decision-making and iterative control structures to solve simple computational problems. CO3: Develop programs using arrays and string operations to solve real-world problems. CO4: Construct user-defined functions to modularize the solution to the given problems. CO5: Build programs using structures and pointers for complex data representation and access.		
Unit 1		8 Hours
Flowchart and Algorithms: Art of Programming through Algorithms & Flowcharts. Overview of C: History of C, Importance of C, Basic Structure of C Programs, Programming Style, Compiling and Executing a 'C' Program. Constants, Variables and Data Types: Character Set, C Tokens, Keywords and Identifiers, Constants, Variables, Data Types, Declaration of Variables, Assigning Values to Variables, Defining Symbolic Constants, Declaring a Variables as Constants and Volatile, Input/Output Statements in C.		
Textbook Map: Chapter 1. 6, 2.1, 2.2, 2.8, 2.9, 2.10, Chapter 3.2 to 3.14, Chapter 5.1 to 5.5		
Unit 2		8 Hours
Operators: Introduction to Operators, Arithmetic Operators, Relational Operators, Logical Operators, Assignment Operators, Increment and Decrement Operators, Conditional Operators, Precedence of Arithmetic Operators. Decision Making, Branching, Looping: Introduction, Decision Making with IF Statement, Simple IF Statement, The IF..ELSE Statement, Nesting of IF..ELSE Statements, The ELSE IF Ladder, The Switch Statement, The ?: Operator, The GOTO Statement, WHILE, DO, FOR, Jumps in LOOPS.		
Textbook Map: Chapter 4.1 to 4.7, 4.12, Chapter 6.1 to 6.9, Chapter 7.1 to 7.5		
Unit 3		8 Hours
Arrays and Strings: Introduction, Declaration and Initialization of One-dimensional and Two-Dimensional Arrays, Declaring and Initializing String Variables, Example programs using arrays ,Reading Strings from Terminal, Writing Strings to Screen, Arithmetic Operations on Characters, Comparison of Two Strings, String-handling Functions.		
Textbook Map: Chapter 8.1 to 8.6, Chapter 9.2 to 9.5, 9.7, 9.8		
Unit 4		8 Hours
User-defined Functions: Introduction, Need for User-defined Functions, A Multi-functional Program, Elements of User-defined Functions, Definition of Function, Return Values and their Types, Function Calls, Function Declaration, No Arguments and no Return Values, Arguments but no Return Values, Nesting of Functions.		
Textbook Map: Chapter 10.1 to 10.8, 10.10 to 10.14		
Unit 5		8 Hours
Structures and Pointers: Introduction, defining a Structure, Declaring and Accessing Structure Variables and Members, Structure Initialization, Copying and Comparing Structure Variables, Array of Structures, Arrays within Structures. Pointers: Introduction, Understanding Pointers, Accessing the Address of Variable, declaring pointer variables, initialization of pointers, accessing variables through its pointer.		
Textbook Map: Textbook 1: Chapter 7		
Textbooks: Chapter 11.1 to 11.6, 11.8, 11.19, Chapter 12.1 to 12.6		

Suggested Learning Resources:				
1	Programming in ANSI C	9e, E Balaguruswamy		Tata McGraw Hill Education
Reference Books:				
1.	PROGRAMMING IN C	Reema Thareja, Oxford University	3 rd Edition	2023
2	The 'C' Programming Language	Brian W. Kernighan and Dennis M. Ritchie	2 nd Edition	Prentice Hall of India, 2015
Web links and Video Lectures (e-Resources):				
1. elearning.vtu.ac.in/econtent/courses/video/BS/15PCD23.html 2. https://nptel.ac.in/courses/106/105/106105171/ MOOC				
Courses can be adopted for more clarity in understanding the topics and verities of problem-solving methods. <ul style="list-style-type: none"> • https://www.tutorialspoint.com/what-is-an-algorithm-and-flowchart-in-c-language • https://www.tutorialspoint.com/cprogramming/c_data_types.htm • https://www.tutorialspoint.com/cprogramming/c_operators.htm • https://www.ccbp.in/blog/articles/decision-making-statements-in-c • https://www.tutorialspoint.com/cprogramming/c_arrays.htm • https://www.geeksforgeeks.org/variables-in-c/ • https://www.w3schools.com/c/c_arrays.php • https://www.programiz.com/c-programming/c-strings • https://www.programiz.com/c-programming/c-pointers • https://www.scaler.com/topics/c/structures-c/ 				

Academic Year: 2025-26		Semester: I	Scheme: P25
Course Title: Introduction to C Programming Laboratory			
Course Code: P25PLCL1061		CIE Marks:50	CIE Weightage:50%
Teaching hours/week (L: T:P): 0:0:2		SEE Marks:50	SEE Weightage:50%
Teaching hours of Pedagogy:24		Exam Hours: 3	
Credits:1			
PRACTICAL COMPONENT			
1.	Develop a program to calculate the temperature converter from degree to Fahrenheit.		
2.	Develop a program to find the roots of quadratic equations.		
3.	Develop a program to find whether a given number is prime or not.		
4.	Develop a program to find key elements in an array using linear search.		
5.	Given age and gender of a person, develop a program to categorize senior citizen (male & female).		
6.	Generate Floyd's triangle for given rows.		
7.	Develop a program to find the transpose of a matrix.		
8.	Develop a program to concatenate two strings, find length of a string and copy one string to other using string operations.		
9.	Develop a modular program to find GCD and LCM of given numbers.		
10.	Develop a program to declare the structure of employees and display the employee records with higher salary among two employees.		
11.	Develop a program to add two numbers using the pointers to the variables.		
12.	Develop a program to find the sum of digits of a given number.		
13.	Develop a program to perform Matrix Multiplication.		
14.	Develop a program to create an array of structures to store book details and check whether a specific book, as requested by the user, is available or not.		

Academic Year: 2025-2026	Semester: I/II	Scheme: P25
Course Title : Applied Chemistry for Sustainable Structures & Material Design		
Course Code: P25CHCVL107/207	CIE Marks: 50	CIE Weightage: 50
Teaching hours/week (L:T:P) 0:0:2	SEE Marks: 50	SEE Weightage: 50
Teaching hours of Pedagogy: 20	Exam Hours: 02	
Credits: 01		
Prerequisite: Know basic chemistry concepts, handle chemicals and instruments safely, measure and record accurately.		
Course learning Objectives:		
CL01: To bring adaptability to the concepts of chemistry and to acquire the required skills to become a perfect engineer.		
CL02: To enable students to acquire knowledge on principles of chemistry for engineering applications.		
CL03: To develop an intuitive understanding of chemistry by emphasizing the related branches of engineering.		
CL04: To provide students with a solid foundation in analytical reasoning required to solve societal problems.		
CL05: To acquire the skills pertaining to analytical techniques and to apply them for Engineering field.		
FIXED SET OF EXPERIMENTS		
1. Estimation of acid mixture using conductometric sensor 2. Estimation of iron in rust sample using potentiometric sensor 3. Determination of pKa value of vinegar solution using pH sensor 4. Estimation of iron in TMT bar using optical sensor 5. Determination of viscosity coefficient of polycarboxylate ether (PCE) based admixture using Ostwald's viscometer. 6. Colorimetric determination of phenolic content in wastewater using smartphone. 7.Estimation of total hardness of given water sample by EDTA method 8.Determination of chemical oxygen demand (COD) of industrial effluents 9.Estimation of iron in TMT bar by diphenyl amine indicator method 10.Determination of alkalinity of water using standard NaOH solution 11.Estimation of percentage of CaO in cement by EDTA method 12. Determination of pka of a weak acid and its interpretation using origin software.		
Course Outcomes: At the end of the course students should be able to :		
CO1: Apply titrimetric and redox-based analytical techniques for the analysis of the constituents.		
CO2: Analyze the experimental data using a suitable sensor to interpret the results obtained.		

Course Title:	Communicative English – I (Common to all branches)		
Course Code:	P25ENG108	CIE Marks	50
	Theory	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P:S)	0:2:0:2	Exam Hours	02 Theory
Total Hours of Pedagogy	30 hours	Credits	01
Module-1: Introduction to Communication Skills			6 Hours
Introduction to communication, Meaning and process, Channels of communication, Elements of communication, Barriers to effective communication. Activities - Making introductions, Sharing personal information, Describing feelings and opinions.			
Module-2: Listening Skills I			4 Hours
Hearing vs. Listening, Types of listening, Determinants of good listening, Active listening process, Barriers to listening, Activities - Listening for pronunciation practice, listening for personal communication, Listening for communication - language functions			
Module-3: Speaking Skills I			6 Hours
Basics of speaking, Elements and Functions of speaking, structuring your speech, Focusing on fluency, Homographs and Signpost words. Activities – Free Speech and Pick and Speak			
Module-4: Reading Skills I			4 Hours
Developing reading as a habit, Building confidence in reading, improving reading skills, Techniques of reading - skimming and scanning. Activities - understanding students' attitudes towards reading, countering common errors in reading, developing efficiency in reading.			
Writing Skills I			4 Hours
Improving writing skills, Spellings and punctuation, Letter and Paragraph writing. Activity – Writing your personal story			
Module-5: Body Language and Presentation Skills			6 Hours
Elements of body language, Types, Adapting positive body language, Cultural differences in body language. 4 Ps in presentations, Overcoming the fear of public speaking, Effective use of verbal and nonverbal presentation techniques. Activity – Group presentations			
<p>Course Outcomes: On completion of this course, students will be able to,</p> <p>CO1: Understanding elements of communication, barriers to effective communication, and channels of communication.</p> <p>CO2: Learning determinants of good listening, active listening processes, and types of listening.</p> <p>CO3: Mastering basics of speaking, structuring speeches, focusing on fluency, and overcoming fear of public speaking.</p> <p>CO4: Developing efficiency in writing, understanding common errors, and practicing letter and paragraph writing</p>			

Textbooks and Reference Books:

1. Communication Skills by Sanjay Kumar and Pushpa Lata, Oxford University Press - 2015.
2. Everyday Dialogues in English by Robert J. Dixon, Prentice-Hall of India Ltd., 2006.
3. Developing Communication Skills by Krishna Mohan & Meera Banerjee (Macmillan)

4. The Oxford Guide to Writing and Speaking, John Seely, Oxford.
5. English Language Communication Skills - Lab Manual cum Workbook by Rajesh Kumar Singh, Cengage learning India Pvt Limited – 2018

CO – PO – PSO Matrix

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11		PSO1	PSO2	PSO3
CO1								1	3		2				
CO2									3		1				
CO3								1	3		2				
CO4					1				3		2				
CO															

SEMESTER - I

Innovation and Design thinking [As per Choice Based Credit System (CBCS) & OBE Scheme]			
Course Code:	P25IDT109	Credits:	01
Teaching Hours/Week (L: T:P):	1:0:1	CIE Marks:	50
Total Number of Teaching Hours:	-	SEE Marks:	50
Course objectives: <ol style="list-style-type: none"> 1) Understand a community-based challenge and perform research to analyze the problem. 2) Generate and evaluate solution ideas based on the problem analysis and select a feasible concept for prototyping. 3) Learn and apply appropriate rapid prototyping tools and techniques (e.g., Arduino, 3D printing, Figma, On-shape, etc.) to build a Proof of Concept (PoC). 4) Demonstrate their prototype solution through a structured presentation or demo, explaining the design decisions, functionality, and potential impact. 			
Unit - 1 <u>Problem Definition & Ideation</u> <ul style="list-style-type: none"> • Problem Immersion & 5W1H Mind Mapping • Root Cause (Fishbone) & User Journey Mapping • Ideation (Design Sprint principles & SCAMPER). 			6 Hrs
Unit - 2 <u>Product Roadmap & PoC Design</u> <ul style="list-style-type: none"> • Low-Fidelity Wireframing & Information Architecture (IT) • High-Fidelity Prototyping (IT) • CAD Design - Part 1 (2D Sketching) (Circuit branches, Mech, Civil) • CAD Design - Part 2 (3D Part modelling & Assembly) (Circuit branches) 			6 Hrs
Unit - 3 <u>PoC Development</u> <ul style="list-style-type: none"> • UI Design using Figma (IT) • Backend Setup (Supabase) & Database Design (IT) • Frontend Development - Flutter flow (IT) • Basic Electronics and Simulation (Circuit branches) • Arduino Basics (Circuit branches) • Arduino Sensor integration (Circuit branches) • Digital fabrication using Laser cutting and 3D printing (Mech/civil) • woodworking (Mech/Civil) 			6 Hrs
Unit - 4 <u>Prototype Demonstration</u> <ul style="list-style-type: none"> • Prototype building Hackathon and Demo day. 			
Students are given a community-based problem statement on which the students work in teams to analyse the problem using design thinking methodology and build PoC to showcase their solution.			

Indian Constitution			
Course Code	P25ICO110	CIE Marks	100
Teaching Hours/Week (L: T:P: S)	1:0:0	SEE Marks	---
Total Hours of Pedagogy	01Hours/Week	Total Marks	100
Credits	00	Exam Hours	-
Course objectives: This course will enable the students 1. To know about the basic structure of the Indian Constitution. 2. To know the Fundamental Rights (FRs), DPSP's, and Fundamental Duties (FD's) of our constitution. 3. To know about our Union Government, political structure & codes, and procedures. 4. To know the State Executive & Elections system of India. 5. To learn the Amendments and Emergency Provisions, other important provisions given by the constitution.			
Module - 1			
Introduction to Indian Constitution: The Necessity of the Constitution, The Societies before and after the Constitution adoption. Introduction to the Indian constitution, The Making of the Constitution, The Role of the Constituent Assembly. The Preamble of Indian Constitution & Key concepts of the Preamble. Salient features of India Constitution.			
Module - 2			
FR's, FD's and DPSP's: Fundamental Rights and its Restriction and limitations in different Complex Situations. Directive Principles of State Policy (DPSP) and its present relevance in our society with examples. Fundamental Duties and its Scope and significance in Nation building.			
Module - 3			
Union Executive: Parliamentary System, Union Executive - President, Prime Minister, Union Cabinet, Parliament - LS and RS, Parliamentary Committees, Important Parliamentary Terminologies. Supreme Court of India, Judicial Reviews and Judicial Activism.			
Module - 4			
State Executive & Elections, Amendments and Emergency Provisions: State Executive, Election Commission, Elections & Electoral Process. Amendment to Constitution (How and Why) and Important Constitutional Amendments till today. Emergency Provisions.			
Module-5			
Professional Ethics: Ethics & Values. Types of Ethics. Scope & Aims of Professional & Engineering Ethics. Positive and Negative Faces of Engineering Ethics. Clash of Ethics, Conflicts of Interest. The impediments to Responsibility. Trust & Reliability in Engineering, IPRs (Intellectual Property Rights), Risks, Safety and liability in Engineering.			
Teaching-Learning Process These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes and make Teaching -Learning more effective: Teachers shall adopt suitable pedagogy for effective teaching - learning process. The pedagogy shall involve the combination of different methodologies which suit modern technological tools. <ul style="list-style-type: none"> (i) Direct instructional method (Low/Old Technology), (ii) Flipped classrooms (High/advanced Technological tools), (iii) Blended learning (Combination of both), (iv) Enquiry and evaluation-based learning, (v) Personalized learning, (vi) Problems based learning through discussion. Apart from conventional lecture methods, various types of innovative teaching techniques through videos, animation films may be adapted so that the delivered lesson can progress the students in theoretical applied and practical skills.			
Course outcome (Course Skill Set) :			
At the end of the course the student will be able to :			
C01: Analyse the basic structure of Indian Constitution.			

C02: Remember their Fundamental Rights, DPSP's and Fundamental Duties (FD's) of our constitution.	
C03	know about our Union Government, political structure & codes, procedures.
C04	Understand our State Executive & Elections system of India.
C05	Remember the Amendments and Emergency Provisions, other important provisions given by the constitution.