D.K.T.E. Society's
Textile and Engineering Institute,
Rajwada, Ichalkaranji- 416115

(An Empowered Autonomous Institute Affiliated to Shivaji University, Kolhapur)

NAAC Accredited with A+ Grade, ISO 9001:2015 Certified

DEPARTMENT: Mechanical Engineering

CURRICULUM

Minor in "Product Design and Development"

With effect from 2024-25

BOS Chairman **Dean Academics** **Director**

Teaching and Evaluation Scheme for Minor in "Product Design and Development"

Sr. No	Course Code	Course Title	Semester	Teaching Scheme				Course Credits	Evaluation scheme					
				L	T	P	Contact Hrs/wk		Theory			Practical		Total
									CIE		SEE	CIE	SEE	
									SE-I	SE-II				
01	01MEMDL1201	Introduction to Product Design	III	2			2	2	25	25	50			100
02	01MEMDP1202	Introduction to Product Design Lab	III			2	2	1				50		50
03	01MEMDL1203	Materials and Manufacturing Processes for Product Design	IV	2			2	2	25	25	50			100
04	01MEMDP1204	Materials and Manufacturing Processes for Product Design Lab	IV			2	2	1				50		50
05	01MEMDL1301	CAD and Digital Prototyping	V	2			2	2	25	25	50			100
06	01MEMDP1302	CAD and Digital Prototyping Lab	V			2	2	1				50		50
07	01MEMDL1303	Product Lifecycle Management	VI	2			2	2	25	25	50			100
08	01MEMDP1304	Product Lifecycle Management Lab	VI			2	2	1				50		50
09	01MEMDP1401	Capstone Project	VII			4	4	2				50		50
			Total	8		12	20	14	100	100	200	250		650

L- Lecture T-Tutorial P-Practical SE-I: Semester Examination-I SE-II: Semester Examination-II
CIE – Continuous in Semester Evaluation SEE- Semester End Examination

Second Year B. Tech. (Mechanical) (Semester–III)							
Course Code	**01MEMDL1201**		**Course Name**	**Introduction to Product Design**			
Teaching Scheme					**Evaluation Scheme**		
L	T	P	Credits		SE-I Marks	SE-II Marks	SEE Marks
2			2		25	25	50

Course Objectives:	
01	To understand the principles of product design and their application in real-world scenarios.
02	To develop proficiency in using various tools and techniques for conceptualizing and prototyping products.
03	To cultivate critical thinking and problem-solving skills essential for successful product design.
04	To explore the relationship between design, technology, and user experience.
05	To gain insights into the ethical, environmental, and social implications of product design.

Course Outcomes:	
At the end of the course, students will be able to	
01	Demonstrate an understanding of the fundamental principles and processes of product design, including its historical context and interdisciplinary nature.
02	Utilize various ideation techniques to generate creative concepts and ideas, and evaluate and select concepts based on predefined criteria.
03	Demonstrate proficiency in using different prototyping materials and methods, including rapid prototyping technologies, to create physical prototypes of products.
04	Apply design thinking methodology to analyze complex problems, generate innovative solutions, and iterate through multiple design cycles to refine solutions.
05	Recognize and discuss ethical considerations, environmental impact, and social responsibility issues related to product design and development.

Course Contents		
Unit I	**< Introduction Product Design >**	**4 Hours**
Characteristics of Successful Product Development, Who Designs and Develops Products? Duration and Cost of Product Development, The Challenges of Product Development.		
Unit II	**< Development Processes and Organizations >**	**4 Hours**
The Product Development Process, Concept Development: The Front-End Process, Adapting the Generic Product Development Process		
Unit III	**< Opportunity Identification >**	**4 Hours**
What Is an Opportunity, Tournament Structure of Opportunity Identification, Opportunity Identification Process.		
Unit IV	**< Product Planning and Identifying Customer Needs >**	**4 Hours**
The Product Planning Process, Four Types of Product Development Projects and The Process. The Importance of Latent Needs, The Process of Identifying Customer Needs		
Unit V	**< Product Specifications and Concept Testing >**	**5 Hours**
What Are Specifications? When Are Specifications Established? Establishing Target, Specifications. Purpose of the Concept Test, Survey Population, Survey Format, Measure Customer Response		
Unit VI	**< Concept Generation and Concept Selection >**	**5 Hours**
The Activity of Concept Generation, What Is Industrial Design? Assessing the Need for Industrial Design, Concept Selection Is an Integral Part of the Product Development Process, All Teams Use Some Method for Choosing a Concept, A Structured Method Offers Several Benefits		

Reference Books:	
1	Product Design And Development by Karl T. Ulrich | Steven D. Eppinger, McGraw-Hill Education
2	Materials Science and Engineering by WILLIAM D. CALLISTER, JR and DAVID G. RETHWISCH

Second Year B. Tech. (Mechanical) (Semester–III)						
Course Code	**01MEMDP1202**		**Course Name**	**Introduction to Product Design Lab**		
Teaching Scheme					**Evaluation Scheme**	
L	T	P	Credits		CIE Marks	SEE Marks
--	--	2	1		50	---

Course Objectives:	
01	To introduce students to the various stages involved in product design and development, and to understand the significance of each stage in bringing a product to market.
02	To enable students to identify and evaluate market opportunities, and to understand the importance of market analysis in the product development process.
03	To equip students with the ability to create detailed product specifications based on identified customer needs and technical requirements, ensuring clarity and accuracy in product development.
04	To familiarize students with methods of testing product concepts with target audiences, gathering feedback, and iteratively improving product designs based on user insights.

Course Outcomes:	
At the end of the course, students will be able to	
01	Students will demonstrate an understanding of the stages involved in product design and development, and their role in bringing a product to market.
02	Students will be able to identify market opportunities and assess their potential for product development.
03	Students will develop skills in understanding customer needs and translating them into product requirements.
04	Students will be able to create detailed product specifications based on identified customer needs and technical requirements.

List of Experiments	
1	Conduct a case study analysis of a successful product from conception to market launch. (i.e. Researching and presenting on products like the iPhone, Tesla cars, or any other wellknown product. Analyze the stages involved, challenges faced, and strategies employed.)
2	Brainstorming sessions. Gather a group and identify potential opportunities within a given market or industry. (Use techniques like SWOT analysis, PESTEL analysis, or Porter's Five Forces to identify potential gaps or areas for improvement)
3	Conduct customer interviews or surveys. (Formulate questions to understand customers' pain points, preferences, and desires related to a particular product or service. Use the insights gathered to inform the product planning process.)
4	Develop a product specification document. (Divide participants into groups and assign each group a different product. Have them create detailed specifications including materials, dimensions, features, and performance requirements based on customer needs identified earlier.)
5	Create prototypes or mockups. (Develop prototypes of potential product concepts and test them with a focus group or target audience. Gather feedback on usability, functionality, and appeal to refine the concepts further.)

Reference Books:	
1	Product Design And Development by Karl T. Ulrich | Steven D. Eppinger, McGraw-Hill Education
2	Materials Science and Engineering by WILLIAM D. CALLISTER, JR and DAVID G. RETHWISCH

Second Year B. Tech. (Mechanical) (Semester–IV)								
Course Code	**01MEMDL1203**			**Course Name**	**Materials and Manufacturing Processes for Product Design**			
Teaching Scheme					**Evaluation Scheme**			
L	T	P	Credits		SE-I Marks	SE-II Marks	SEE Marks	
2			2		25	25	50	

Course Objectives:

01	To familiarize students with the properties and behavior of engineering materials used in product design.
02	To provide an overview of various manufacturing processes and their applications in producing functional components.
03	To understand the relationship between material properties, manufacturing processes, and product performance.
04	To develop skills in material selection based on design requirements and performance criteria.

Course Outcomes:

01	Demonstrate a comprehensive understanding of the properties, characteristics, and behavior of engineering materials commonly used in product design, including metals, polymers, ceramics, and composites.
02	Analyze mechanical properties such as stress, strain, hardness, and impact resistance, and correlate them with material selection and performance in product design applications.
03	Explain the principles, capabilities, and limitations of various manufacturing processes.
04	Apply material selection methodologies and criteria to choose suitable materials for specific design applications.

Course Contents

Unit I	**< Introduction to Materials for Product Design >**	**4 Hours**
Overview of engineering materials: metals, polymers, ceramics, composites Material properties and their significance in product design Material selection criteria and methodologies		
Unit II	**< Mechanical Properties of Materials >**	**4 Hours**
Stress, strain, and mechanical behavior of materials Tensile testing, hardness testing, and impact testing Factors influencing mechanical properties: microstructure, temperature, and processing		
Unit III	**< Manufacturing Processes Overview >**	**4 Hours**
Classification of manufacturing processes: casting, forming, machining, joining, additive manufacturing, Introduction to process parameters, capabilities, and limitations. Selection of manufacturing processes based on design requirements		
Unit IV	**< Forming Process >**	**4 Hours**
Sheet metal forming, forging, extrusion, stamping Process fundamentals and applications, Material flow, deformation characteristics, and tooling design.		
Unit V	**< Machining Process >**	**5 Hours**
Turning, milling, drilling, grinding, Cutting tool geometry, machining parameters, and surface finish Computer Numerical Control (CNC) machining and programming		
Unit VI	**< Joining Processes and Additive Manufacturing and Rapid Prototyping >**	**5 Hours**
Welding, brazing, soldering, adhesive bonding, Process principles, joint design considerations, and applications, on-destructive testing techniques for weld quality assessment. Principles of additive manufacturing (3D printing) Various additive manufacturing techniques: FDM, SLA, SLS, etc. Rapid prototyping applications and case studies.		

Reference Books:	
1	Manufacturing Engineering and Technology" by Serope Kalpakjian and Steven Schmid
2	Manufacturing Processes for Engineering Materials by by Serope Kalpakjian Steven R. Schmid Publisher Pearson Education.
3	Manufacturing Engineering and Technology by by Serope Kalpakjian (Author), Steven R. Schmid, Publisher Pearson Education
4	"Engineering Materials 1: An Introduction to Properties, Applications, and Design" by Michael F. Ashby and David R. H. Jones

Second Year B. Tech. (Mechanical) (Semester–IV)						
Course Code	**01MEMDP1204**		**Course Name**	**Materials and Manufacturing Processes for Product Design Lab**		
Teaching Scheme					**Evaluation Scheme**	
L	T	P	Credits		CIE Marks	SEE Marks
--	--	2	1		50	---

Course Objectives:	
01	To introduce students to the properties and characteristics of materials commonly used in product design, and development.
02	To familiarize students with mechanical testing methods and equip them with the skills to analyze and interpret the mechanical properties of materials, such as strength, stiffness, and ductility.
03	To provide students with an understanding of various manufacturing processes used in industry.
04	To educate students about additive manufacturing technologies for rapid prototyping and enable them to design and manufacture functional prototypes using 3D printing techniques

Course Outcomes:	
At the end of the course, students will be able to	
01	Students will be able to conduct mechanical tests to evaluate the properties of materials, interpret test results, and apply this knowledge to make informed decisions in material selection and design.
02	Students will develop an understanding of various manufacturing processes used in industry.
03	Students will acquire skills in using CNC machines to manufacture parts accurately and efficiently, and will be able to apply machining operations to achieve desired shapes.
04	Students will demonstrate competency in various joining techniques, particularly welding, and will be able to assemble metal components.
05	Students will gain knowledge of additive manufacturing technologies for rapid prototyping design and manufacture functional prototypes using 3D printing techniques

List of Experiments	
1	Material Testing. (Students conduct mechanical tests such as tensile, compression, and impact tests to measure properties like strength, stiffness, and ductility)
2	Welding Exercise
3	CNC Machining (Introduce students to a CNC milling machine or lathe).
4	3D Printing (Introduce students to a 3D printer and various additive manufacturing technologies)

Reference Books:	
1	Manufacturing Engineering and Technology" by Serope Kalpakjian and Steven Schmid
2	Manufacturing Processes for Engineering Materials by by Serope Kalpakjian Steven R. Schmid Publisher Pearson Education.
3	Manufacturing Engineering and Technology by by Serope Kalpakjian (Author), Steven R. Schmid, Publisher Pearson Education
4	"Engineering Materials 1: An Introduction to Properties, Applications, and Design" by Michael F. Ashby and David R. H. Jones

Second Year B. Tech. (Mechanical) (Semester–V)							
Course Code	**01MEMDL1301**		**Course Name**	**CAD and Digital Prototyping**			
Teaching Scheme					**Evaluation Scheme**		
L	T	P	Credits		SE-I Marks	SE-II Marks	SEE Marks
2			2		25	25	50

Course Objectives:	
01	To develop proficiency in using industry-standard CAD software for creating 2D and 3D models.
02	To introduce digital prototyping concepts and methodologies for simulating and analyzing engineering designs.
03	To prepare students for real-world engineering design challenges using CAD and digital prototyping tools.

Course Outcomes:	
01	Demonstrate proficiency in using industry-standard CAD software tools for creating 2D sketches, 3D models, and engineering drawings.
02	Create accurate and detailed 2D engineering drawings adhering to relevant standards and conventions, including dimensioning and annotations.
03	Utilize advanced 3D modeling techniques to create complex shapes and assemblies, incorporating features such as filleting, chamfering, and pattern creation.
04	Construct assemblies by mating components, applying constraints, and simulating motion to analyze mechanisms and ensure proper functioning.
05	Understand the concept of digital prototyping and its significance in product development for simulating and analyzing product behavior virtually.

Course Contents		
Unit I	**< Introduction to CAD >**	**4 Hours**
Overview of Computer-Aided Design (CAD) and its applications in engineering. Introduction to CAD software interface and basic functionalities. 2D sketching techniques and geometric constraints.		
Unit II	**< 2D Drafting and Detailing >**	**4 Hours**
Creating 2D technical drawings: orthographic projections, dimensions, and annotations. Dimensioning standards and practices. Hands-on exercises on creating engineering drawings.		
Unit III	**< 3D Modelling Basics >**	**4 Hours**
Introduction to 3D modeling concepts and techniques. Creating basic 3D shapes: extrusions, revolutions, sweeps. 3D modeling operations: filleting, chamfering, shell, and mirror. Advanced 3D modeling techniques: lofting, blending, and boolean operations.		
Unit IV	**< Assembly Design and Motion Simulation >**	**4 Hours**
Creating assemblies: mating components, constraints, and relationships. Motion simulation and animation of mechanical assemblies.		
Unit V	**< Introduction to Digital Prototyping >**	**5 Hours**
Overview of digital prototyping: concept, benefits, and applications. Introduction to Finite Element Analysis (FEA) Simulation-driven design: virtual testing and optimization.		
Unit VI	**< Project Work and Review >**	**5 Hours**
Integration of CAD and digital prototyping techniques in a design project. Design optimization based on simulation results. Final project presentation and review.		

Reference Books:	
1	"Auto cad 2014 for Engineers and Designers", Sham Tickoo, Dreamtech press, New Delhi,2014
2	"Auto Cad 2014", Ellen Finkelsten, Wiley India

3	Help Manuals and Tutorials of referred software
4	"Machine Drawing include AutoCAD", Ajit Singh, Tata McGraw Hill, 2nd Edition.
5	"Machine Drawing", N.D. Bhatt and V.M. Panchal, Charotar Publi. House, Anand, 42nd Ed., 2007
6	"Machine drawing", Basudeb Bhattacharyya, Oxford University Press

Second Year B. Tech. (Mechanical) (Semester–V)						
Course Code	**01MEMDP1302**			**Course Name**	**CAD and Digital Prototyping Lab**	
Teaching Scheme					**Evaluation Scheme**	
L	T	P	Credits		CIE Marks	SEE Marks
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Course Objectives:	
01	To introduce students to Computer-Aided Design (CAD) software and develop their proficiency in using basic tools and commands for creating and editing drawings.
02	To teach students the principles of 2D and 3D drafting and detailing, including proper dimensioning, annotation, and layer management, to create accurate and professional engineering drawings.
03	To enable students to create and manage assemblies of components using CAD software, ensuring proper mating, alignment, and clearance, and to understand the principles of assembly modeling.

Course Outcomes:	
01	Students will demonstrate proficiency in using CAD software, including familiarity with basic tools and commands for creating and editing drawings.
02	Students will be able to create accurate and professional engineering drawings in 2D and 3D, incorporating proper dimensioning, annotation, and layer management techniques.
03	Students will gain an understanding of digital prototyping concepts and tools available in CAD software
04	Students will apply CAD skills and knowledge to design projects, improve design proficiency and produce high-quality design solutions.

List of Experiments	
1	Introduce students to a CAD software (Students through the user interface, basic tools, and commands.)
2	2D Drawing Exercise (Provide students with engineering drawings or sketches of simple objects.)
3	3D Modeling Project (Simple 3D modeling project, such as modeling a basic geometric shape or a household object.)
4	Assembly Modeling
5	Design Project (Design project that integrates concepts learned in CAD, drafting, modeling, assembly design, and digital prototyping.)

Reference Books:	
1	"Auto cad 2014 for Engineers and Designers", Sham Tickoo, Dreamtech press, New Delhi, 2014
2	"Auto Cad 2014", Ellen Finkelsten, Wiley India
3	Help Manuals and Tutorials of referred software
4	"Machine Drawing include AutoCAD", Ajit Singh, Tata McGraw Hill, 2nd Edition.
5	"Machine Drawing", N.D. Bhatt and V.M. Panchal, Charotar Publi. House, Anand, 42nd Edi., 2007
6	"Machine drawing", Basudeb Bhattacharyya, Oxford University Press

Second Year B. Tech. (Mechanical) (Semester–VI)							
Course Code	**01MEMDL1303**		**Course Name**	**Product Lifestyle Management**			
Teaching Scheme					**Evaluation Scheme**		
L	T	P	Credits		SE-I Marks	SE-II Marks	SEE Marks
2			2		25	25	50

Course Objectives:	
01	To introduce students to the concept of Product Lifecycle Management (PLM) and its importance in modern engineering practices.
02	To provide an overview of the key stages of the product lifecycle and the role of PLM in each stage.
03	To develop skills in using PLM software tools for product data management, collaboration, and workflow automation.
04	To understand the significance of configuration management and change control in maintaining product integrity throughout the lifecycle.

Course Outcomes:	
01	Demonstrate a comprehensive understanding of the concepts, principles, and objectives of Product Lifecycle Management and its significance in modern engineering practices.
02	Identify and describe the key stages of the product lifecycle, including conception, design, manufacturing, deployment, and disposal, and understand the role of PLM in each phase.
03	Implement collaborative product development processes and workflow automation techniques using PLM tools to enhance cross-functional collaboration and streamline project execution.
04	Evaluate strategies for successful PLM implementation, including adoption challenges and mitigation strategies, and apply best practices for optimizing PLM processes and workflows.

Course Contents		
Unit I	**< Introduction to Product Lifecycle Management >**	**4 Hours**
Background, Overview, Need, Benefits, Concept of Product Lifecycle. Components / Elements of PLM, Emergence of PLM, Significance of PLM, Customer Involvement		
Unit II	**< Product Life Cycle Environment >**	**4 Hours**
Product Data and Product Workflow, Company's PLM vision, The PLM Strategy, Principles for PLM strategy, Preparing for the PLM strategy, Developing a PLM strategy, Strategy identification and selection, Change Management for PLM		
Unit III	**< Product Development Process & Methodologies >**	**4 Hours**
Integrated Product development process - Conceive - Specification, Concept design, Design - Detailed design, Validation and analysis (simulation), Tool design, Realize - Plan manufacturing, Manufacture, Build/Assemble, Test (quality check) , Service - Sell and Deliver , Use , Maintain and Support, Dispose. Bottom-up design, Top-down design, Front loading design workflow, Design in context, Modular design. Concurrent engineering - work structuring and team deployment - Product and process systemization - problem, identification and solving methodologies. Product Reliability, Mortality Curve.		
Unit IV	**< Product Modelling >**	**4 Hours**
Definition of concepts – Fundamental issues - Role of Process chains and product models -Types of product models - model standardization efforts-types of process chains - Industrial demands.		
Unit V	**< Types of Analysis Tools >**	**5 Hours**
FMEA - QFD - Design for product life cycle. Estimation of Manufacturing costs, Reducing the component costs and assembly costs, Minimize system complexity.		
Unit VI	**< Product Data Management (PDM) Technology >**	**5 Hours**
Product Data Management - An Introduction to Concepts, Benefits and Terminology, CIM Data. PDM functions, definition and architectures of PDM systems, product data interchange, portal integration, PDM		

acquisition and implementation. RECENT ADVANCES: Intelligent Information Systems - Knowledge based product and process models - Applications of soft computing in product development process - Advanced database design for integrated manufacturing.	
Reference Books:	
1	Product Design & Process Engineering, McGraw Hill - Kogalkusha Ltd., Tokyo, 1974.
2	Product Design & Development - by Kari Ulrich and Steven D. Eppinger, McGraw Hill International Edns, 1999.
3	Effective Product Design and Development - by Stephen Rosenthol, Business One Orwin, Homewood, 1992 ISBN 1-55623-603-4.
4	Burden, Rodger PDM: Product Data Management, Resource Pub, 2003. ISBN 0970035225

Second Year B. Tech. (Mechanical) (Semester–VI)						
Course Code	**01MEMDP1304**		**Course Name**	**Product Lifestyle Management Lab**		
Teaching Scheme					**Evaluation Scheme**	
L	T	P	Credits		CIE Marks	SEE Marks
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Course Objectives:	
01	To introduce the concepts, principles, and importance of Product Lifecycle Management (PLM) systems in managing product data, processes, and collaboration throughout the product lifecycle.
02	To educate on the environmental considerations and impacts associated with products throughout their lifecycle, and to develop their ability to conduct life cycle assessments (LCAs) to evaluate environmental performance.
03	To familiarize with product development processes and methodologies used in industry.
04	To introduce to Product Data Management (PDM) systems and technologies used for managing product data, documents, and processes, and development.

Course Outcomes:	
01	Students will demonstrate an understanding of the role and significance of PLM systems in managing product data, processes, and collaboration throughout the product lifecycle.
02	Students will develop proficiency in applying product development processes and methodologies, including design thinking, agile methodologies, and iterative prototyping,
03	Students will demonstrate the ability to create detailed and accurate 3D models of mechanical parts and assemblies using CAD software, employing parametric modeling techniques
04	Students will acquire the skills to configure, implement, and use PDM systems effectively for managing product data, documents, and processes

List of Experiments	
1	Introduce to PLM software
2	Life Cycle Assessment (LCA) : (Students research and gather data on the environmental impacts of the product throughout its life cycle stages, including raw material extraction, manufacturing, use, and end-of-life disposal.)
3	Design Sprint : (Guide teams through a design sprint process, including stages such as problem framing, ideation, prototyping, and testing.)
4	Parametric Modeling Project : (Instruct students to create parametric 3D models of simple mechanical parts or assemblies using CAD software.)
5	PDM System Implementation : (Provide students with a mock scenario of a company implementing a PDM system to manage product data. e.g role-play various stakeholders involved in the implementation process, including IT administrators, designers, engineers, and project managers.)

Reference Books:	
1	Product Design & Process Engineering, McGraw Hill - Kogalkusha Ltd., Tokyo, 1974.
2	Product Design & Development - by Kari Ulrich and Steven D. Eppinger, McGraw Hill International Edns, 1999.
3	Effective Product Design and Development - by Stephen Rosenthol, Business One Orwin, Homewood, 1992 ISBN 1-55623-603-4.
4	Burden, Rodger PDM: Product Data Management, Resource Pub, 2003. ISBN 0970035225

Second Year B. Tech. (Mechanical) (Semester–VI)						
Course Code	**01MEMDP1401**		**Course Name**	**Capstone Project**		
Teaching Scheme					**Evaluation Scheme**	
L	T	P	Credits		CIE Marks	SEE Marks
		4	2		50	--

Course Objectives:	
01	Apply engineering principles and methodologies to solve real-world problems.
02	Collaborate effectively in interdisciplinary teams.
03	Develop project management and time management skills.
04	Communicate technical ideas effectively through oral presentations and written reports.
05	Demonstrate creativity, innovation, and critical thinking in problem-solving.

Course Outcomes:	
01	Demonstrate the ability to apply engineering principles and methodologies to analyze real-world problems and propose innovative solutions.
02	Work effectively in interdisciplinary teams, demonstrating collaboration, leadership, communication skills to achieve project objectives.
03	Demonstrate creativity, innovation, and critical thinking in problem-solving, exploring alternative solutions, and adapting strategies based on project constraints and feedback.
04	Conceptualize, design, and develop a prototype solution, applying engineering principles, and iterative design methodologies to address identified problems effectively.
05	Plan and conduct testing and validation procedures to assess the functionality, reliability, and performance of the project solution, iteratively refining the design based on feedback and testing results.

Course Contents

Capstone Project is a culmination of the student's undergraduate education, providing an opportunity to apply theoretical knowledge and practical skills to a real-world engineering problem. Students will work in teams to identify, analyze, design, and implement a solution, culminating in a final project presentation and documentation.

- Project Proposal and Planning
- Literature Review and Research
- Design and Development
- Documentation and Presentation
- Final Project Presentation and Evaluation

The group should submit the synopsis in following format

Title of Project
Names of Students
Name of Guide
Relevance
Present Theory and Practices
Proposed work
Expenditure
References

2. The synopsis shall be signed by the each student in the group, approved by the guide and endorsed by the Head of the Department

3. Presentation: The group has to make a presentation in front of the Faculty members of department at the end of semester.

Project Phase I Report Format:

Project Phase I report should be of 25 to 30 pages (typed on A4 size sheets). For standardization of the project phase I reports the following format should be strictly followed.

Page Size: Trimmed A4
Top Margin: 1.00 Inch
Bottom Margin: 1.32 Inches
Left Margin: 1.5 Inches
Right Margin: 1.0 Inch
Para Text: Times New Roman 12 Point. Font
Line Spacing: 1.5 Lines
Page Numbers: Right Aligned at Footer. Font 12 Point. Times New Roman
Headings: Times New Roman, 14 Point, Bold Face
References: References should have the following format
For Books: "Title of Book", Authors, Publisher, Edition
For Papers: "Title of Paper, Authors, Journal/Conference Details, Year

Important Notes:

Project group should continue maintaining a diary for project and should write (a) Book referred (b) Company visited (c) Person contacted (d) Computer work done (e) Paper referred (f) Creative thinking. The Diary along with Project Phase I Report shall be assessed at the time of oral examination

One copy of the report should be submitted to Institute/ Department, One copy to Guide and one copy should remain with each student of the project group.