Year / Semester: II B.Tech IV Semester   **Regulation: R23**

Subject and Code: DESIGN THINKING& INNOVATION & 23ESC241I

SYLLABUS

UNIT – I INTRODUCTION TO DESIGN THINKING
Introduction to elements and principles of Design, basics of design-dot, line, shape, form as fundamental design components. Principles of design. Introduction to design thinking, history of Design Thinking, New materials in Industry.

UNIT – II DESIGN THINKING PROCESS
Design thinking process (empathize, analyze, idea & prototype), implementing the process in driving inventions, design thinking in social innovations. Tools of design thinking - person, costumer, journey map, brainstorming, product development
Activity: Every student presents their idea in three minutes, Every student can present design process in the form of flow diagram or flow chart etc. Every student should explain about product development.

UNIT – III INNOVATION
Art of innovation, Difference between innovation and creativity, role of creativity and innovation in organizations- Creativity to Innovation- Teams for innovation- Measuring the impact and value of creativity.
Activity: Debate on innovation and creativity, Flow and planning from idea to innovation, Debate on value-based innovation.

UNIT – IV PRODUCT DESIGN
Problem formation, introduction to product design, Product strategies, Product value, Product planning, product specifications- Innovation towards product design- Case studies
Activity: Importance of modelling, how to set specifications, Explaining their own product design.

UNIT – V DESIGN THINKING IN BUSINESS PROCESSES
Design Thinking applied in Business & Strategic Innovation, Design Thinking principles that redefine business – Business challenges: Growth, Predictability, Change, Maintaining. Relevance, Extreme competition, Standardization. Design thinking to meet corporate needs Design thinking for Startups- Defining and testing Business Models and Business Cases Developing & testing prototypes.
Activity: How to market our own product, About maintenance, Reliability and plan for startup.

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(AUTONOMOUS)

QUESTION BANK

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Max Marks: 10

S.No.	CO	Questions	BT
		Unit I: (INTRODUCTION TO DESIGN THINKING)	
1	1	**a.** Illustrate the design thinking process and its application in solving complex problems. **b.** Develop a case study of a successful design thinking project.	L2 L3
2	1	Demonstrate the principles of design such as balance, contrast, emphasis, and movement, proportion, unity and variety with examples.	L2
3	1	Illustrate the properties and applications of graphene, nanomaterials, and smart materials. How are these materials transforming various industries?	L2
4	1	Explain the impact of new materials in industrial design and their role in shaping sustainable practices.	L2
5	1	What is Design Thinking, and how does it influence to problem-solving and innovation?	L5
6	1	Explain the fundamental components of design and their role in visual composition.	L2
7	1	Explain the role of prototyping in design thinking. How can prototyping help designers refine their ideas and create innovative solutions?	L2
8	1	**a.** Explain the importance of empathy in design thinking. **b.** Explain the importance of prototyping in design thinking.	L2 L2
9	1	**a.** In what ways can designers utilize empathy to develop effective user-centered solutions? **b.** Illustrate the design thinking process and its applications in solving complex problems.	L3 L2
10	1	**a.** Summarize how the elements of Design Thinking help in problem-solving. **b.** Explain the history of Design Thinking.	L2 L2

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S.No.	CO	Questions	BT
		Unit II: (DESIGN THINKING PROCESS)	
1	2	**a.** List and Construct Five stages of Design Thinking process.	**L3**
		b. Explain Five stages of Design Thinking with suitable Examples.	**L2**
2	2	**a.** Illustrate about Personas in Design Thinking.	**L2**
		b. Survey the importance of customer Journey maps in understanding user experience.	**L4**
3	2	Explain the role of brainstorming in the design thinking process.	**L2**
4	2	Discuss a real-world case study where Design Thinking was used for a social innovation.	**L6**
5	2	Apply the Design Thinking process to solve social innovation. Provide examples.	**L3**
6	2	Illustrate how brainstorming and journey mapping can be used in product development.	**L3**
7	2	Formulate a new product idea using Design Thinking tools.	**L6**
8	2	Assess the effectiveness of design thinking in product development with case studies.	**L5**
9	2	Why is the Empathize stage crucial in Design Thinking, and how does it impact the final solution?	**L2**
10	2	Demonstrate the essential steps involved in implementing a structured innovation process within an organization?	**L2**
11	2	Critically evaluate the role of Design Thinking in modern product development.	**L5**

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S.No.	CO	Questions	BT
Unit III: (INNOVATION)			
1	3	**a.** Explain the concept of the art of innovation.	L2
		b. Demonstrate the key principles of art of innovation.	L2
2	3	**a.** Define creativity and innovation with suitable examples.	L3
		b. Distinguish between creativity and Innovation.	
3	3	Explain the importance of creativity and innovation in achieving organizational success, with examples.	L4
4	3	Demonstrate the role of collaboration in the creativity and innovation process. Provide examples.	L3
5	3	Illustrate how teams can be used to promote innovation in an organization.	L3
6	3	Assess the role of innovation in organizational success.	L5
7	3	Assess the effectiveness of different metrics used to measure innovation success within organizations.	L5
8	3	Evaluate the effectiveness of current practices used by companies to measure creativity and innovation outcomes.	L5
9	3	**a.** Explain the role of Creativity and Innovation in organizations.	L2
		b. Describe how creativity leads to innovation.	L2
10	3	Develop a framework to measure the value of creativity and innovation.	L6

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S.No.	CO	Questions	BT
		Unit IV: (PRODUCT DESIGN)	
1	4	**a.** List four benefits of proper Problem Formation. **b.** Explain how Innovation leads to effective Product Design.	**L1** **L3**
2	4	Describe the steps involved in problem formation and its importance in product design.	**L3**
3	4	Evaluate the relationship between Product Design, Planning, and Value Creation in achieving business success.	**L5**
4	4	**a.** List any five steps involved in Product Planning. **b.** Explain the role of customer needs in determining Product Value.	**L1** **L2**
5	4	**a.** Describe the concept of Product Value with suitable examples. **b.** State the role of innovation in modern product development.	**L2** **L1**
6	4	**a.** Discuss the stages involved in Product Planning. **b.** Mention four parameters used in writing Product Specifications.	**L2** **L1**
7	4	**a.** List the key elements involved in Product Specifications. **b.** Compare Product Value and Product Strategy.	**L1** **L4**
8	4	Discuss the importance of Product Planning and Product Strategies in developing customer-oriented products.	**L2**
9	4	Compare and contrast different product strategies used by companies.	**L4**
10	4	Analyze a case study where innovation transformed a product or industry.	**L3**

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S.No.	CO	Questions	BT
Unit V: (DESIGN THINKING IN BUSINESS PROCESSES)			
1	5	**a.** Summarize the role of Design Thinking in startup business model development. **b.** Differentiate between the use of Design Thinking in corporate organizations and startups.	L2 L4
2	5	Describe the future of design thinking in business and strategic innovation?	L3
3	5	Compare and contrast the application of design thinking in large organizations versus startups. How does each benefit from this approach?	L4
4	5	Make use of design thinking to define and test business models? Explain the process with case studies.	L3
5	5	Evaluate the impact of Design Thinking in solving business growth challenges.	L5
6	5	Analyze how design thinking helps businesses navigate extreme competition and adapt to market changes. Provide real-world examples.	L4
7	5	**a.** Apply the design thinking process in driving business and strategic innovation. **b.** What are the key principles of design thinking that redefine businesses and Provide examples?	L3 L2
8	5	Make use of design thinking to define and test business models? Explain the process with case studies.	L3
9	5	Businesses often struggle with balancing standardization and innovation. Evaluate How does design thinking provide a solution to this challenge?	L5
10	5	Evaluate the effectiveness of Design Thinking in solving change management challenges in modern organizations.	L5

Note: L1-Remembering, L2-Understanding, L3-Applying, L4-Analyzing, L5-Evaluating, and L6-Creating

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Instruction to Faculty Members:

The Six Levels of Bloom's Taxonomy:

1. **Remembering:** Retrieving, recognizing, and recalling relevant knowledge from long-term memory (e.g., list, define, name, locate).

2. **Understanding:** Constructing meaning, explaining ideas, or concepts (e.g., summarize, interpret, classify, compare).

3. **Applying:** Using information in new situations or implementing procedures to solve problems (e.g., solve, use, demonstrate, implement).

4. **Analyzing:** Breaking material into constituent parts, determining how the parts relate to one another and to an overall structure (e.g., contrast, categorize, distinguish, diagram).

5. **Evaluating:** Making judgments based on criteria and standards through checking and critiquing (e.g., judge, critique, justify, defend, argue).

6. **Creating:** Putting elements together to form a coherent or functional whole; reorganizing elements into a new pattern or structure (e.g., design, construct, develop, formulate).