

Subject Code: 01CE0304

Subject Name: Design Thinking and Problem Solving Skills

B.Tech. Year - II

Objective: The main objective of this course is to inculcate interdisciplinary engineering skills in students for taking real time engineering problem available in our society/industry and to come-up with the grass root innovation, can be helpful to all level of human beings.

Credits Earned: 1 Credit

Course Outcomes: After completion of this course, student will be able to

- Understand the importance of Design Thinking. (Understand)
- Evaluate the quality of your information and your emotions; keep thinking straight. (Evaluate)
- Identify skills and personality traits of successful problem solving. (Understand)
- Apply standard problem-solving heuristics to aid in problem solving. (Apply)
- Apply problem-solving techniques to programming activities. (Apply)
- Formulate and successfully communicate the solutions to problems. (Create)

Pre-requisite of course: Not Required.

Teaching and Examination Scheme

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE (E)	Mid Sem (M)	Internal (I)	Viva (V)	Term work (TW)	
0	0	2	1	0	0	0	25	25	50

Contents:

Units	Topics	Contact Hours
Module-1 Design Thinking Introduction	Introduction, Need of Design Thinking, Traditional Problem Solving versus Design Thinking, phases of Design Thinking, Tools for Design Thinking, Relevance of Design and Design Thinking in Engineering	3
Module-1 Team Formation, Documentation and Canvas	Team Building Domain Selection (Society/Industry project), Log Books-need, types of log book, preparation of log book, Importance of Documentation, Strategy Design	3
Module-1 Design Thinking Exercise	Formation of Team and aspects for the selection, Domain selection, Observation exercise, Design activities through Canvas, Brainstorming for the problem, Users Interview conduction, generation of records via logbooks	6
Module-2 Problem Solving Skills Introduction	Developing logical thinking. Introduction to Problem Solving in Computer Science domain, Errors in reasoning; verbal reasoning; analogy problems lateral thinking	4
Module-2 Problem Solving Techniques	Deductive and hypothetical reasoning; computational problem solving; generating, implementing, and evaluating solutions; interpersonal problem solving	4
Module-2 Problem Solving Exercise	Group Activities based assignments related to problem solving skills will be given for better understanding and development of problem solving skills	4



Module-3	Mini project exercise based on understanding of	6
Capstone Project	modules contents	
Total Hours		30

Note: Mentors are advised to take suitable project/activity to explore the above topics and make students understand the various concepts.

References:

1. H. S. Fogler and S. E. LeBlanc, Strategies for Creative Problem Solving, 2nd edition, Pearson, Upper Saddle River, NJ, 2008.
2. A. Whimbey and J. Lochhead, Problem Solving & Comprehension, 6th edition, Lawrence Erlbaum, Mahwah, NJ, 1999.
3. M. Levine, Effective Problem Solving, 2nd edition, Prentice Hall, Upper Saddle River, NJ, 1994

Instructional Method:

- a. The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.
- b. The internal evaluation will be done based on continuous evaluation of students in the laboratory and classroom.
- c. Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory.
- d. Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory

Supplementary Resources:

1. <https://www.coursera.org/learn/uva-darden-design-thinking-innovation>



2. http://www.cs.odu.edu/~cs381/cs381content/problem_solving/problem_solving.html
3. <https://www.cs.vt.edu/undergraduate/courses/CS2104>
4. <https://ryanstutorials.net/problem-solving-skills/>
5. <http://courses.cs.vt.edu/cs2104/Fall17Barnette/>
6. <https://www.k-state.edu/wwparent/programs/hero/hero-action.htm>
7. <http://proquest.safaribooksonline.com/book/programming/9781457169618/firstchapter>