COURSE TITLE	**DESIGN THINKING AND PROBLEM SOLVING SKILLS**
COURSE CODE	**01CE1304**
COURSE CREDITS	**0**

Objective:

1 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.

2 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.

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

1 student will be able to understand the importance of Design Thinking.(Understand)

2 student will be able to evaluate the quality of your information and your emotions; keep thinking straight. (Evaluate)

3 student will be able to identify skills and personality traits of successful problem solving. (Understand)

4 student will be able to apply standard problem-solving heuristics to aid in problem solving. (Apply)

5 student will be able to apply problem-solving techniques to programming activities. (Apply)

6 student will be able to formulate and successfully communicate the solutions to problems.. (Create)

Pre-requisite of course:NA

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
0	0	2	0	0	0	25	25

Contents : Unit	Topics	Contact Hours
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

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Contents : Unit	Topics	Contact Hours
2	**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
3	**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
4	**Problem Solving Techniques** Deductive and hypothetical reasoning, computational problem solving; generating, implementing, and evaluating solutions, interpersonal problem solving	4
5	**Problem Solving Exercise** Group Activities based assignments related to problem solving skills will be given for better understanding and development of problemsolving skills	4
6	**Capstone Project** Mini project exercise based on understanding of modules contents	6
Total Hours		**24**

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	**Practical 1** Team Formation	2
2	**Practical 2** Problem Identification	2
3	**Practical 3** Understanding the Challenge	2
4	**Practical 4** Prepare Research	2
5	**Practical 5** Gather Inspiration	2
6	**Practical 6** Tell Stories	2
7	**Practical 7** Search for Meaning	2
8	**Practical 8** Frame Opportunities	2
9	**Practical 9** Generate Ideas	2
10	**Practical 10** Refine Ideas	2

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Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
11	**Practical 11** Make Prototype	2
12	**Practical 12** Synthesis	2
Total Hours		**24**

Textbook :

1 Effective Problem Solving, M. Levine, Prentice Hall, 1994

References:

1 Strategies for Creative Problem Solving, 2nd edition, Strategies for Creative Problem Solving, 2nd edition, H. S. Fogler and S. E. LeBlanc, Pearson, 2008

2 Problem Solving & Comprehension, 6th edition, Problem Solving & Comprehension, 6th edition, A. Whimbey and J. Lochhead, Lawrence Erlbaum, 1999

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery					
Remember / Knowledge	**Understand**	**Apply**	**Analyze**	**Evaluate**	**Higher order Thinking / Creative**
0.00	0.00	0.00	0.00	0.00	0.00

Instructional Method:

1 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.

2 The internal evaluation will be done based on continuous evaluation of students in the laboratory and classroom.

3 Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

4 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/proble m_solving.html

3 https://www.cs.vt.edu/undergraduate/courses/CS2104

4 https://ryanstutorials.net/problem-solving-skills/

Supplementary Resources:

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/978145716961 8/firstchapter