

INSTITUTE	FACULTY OF TECHNOLOGY
PROGRAM	BACHELOR OF TECHNOLOGY (MECHANICAL ENGINEERING)
SEMESTER	4
COURSE TITLE	CREATIVITY PROBLEM SOLVING AND INNOVATION
COURSE CODE	01ME0406
COURSE CREDITS	1

Objective:

- 1 To develop creative thinking skill in the students using cone of learning components leading to understanding of various strategies for creativity, problem solving and innovation.

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

- 1 Students will be able to understand importance of creativity, problem solving and innovation while addressing science, engineering and social issues
- 2 Students will be able to demonstrate the ability to contextualize knowledge related to professional engineering practices
- 3 Students will be able to demonstrate the functioning effectively as an individual and team member
- 4 Students will be able to engage in life-long learning in the context of technological change

Pre-requisite of course: Nil

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
0	0	2	0	30	0	20	0

Contents : Unit	Topics	Contact Hours
Total Hours		

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	Phase 1 To introduce the subject of the course: this course as a needed skill for your future. Psychology of problem solving; Vertical versus Lateral thinking	2

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
2	Phase 2 Strategy of Questioning; Method of questioning; Importance of asking the right question. Who, what, when, where, why, how?	2
3	Phase 3 Learning and its importance; Sources of learning; Methods of learning. Purpose and value of education in future creativity in real life.	2
4	Phase 4 Strategy of Knowing how to see; Making your thought visible; Visualizing thinking; Mapping of mind, Fishbone diagram.	2
5	Phase 5 Strategy of Thinking Fluency; Generating all possibilities; more the better; Quantity without screening is helpful; SCAMPER technique; Creative or divergent idea generating thinking versus Critical or convergent idea selection thinking.	2
6	Phase 6 Strategy of Fusing of ideas; Making novel combinations; Connecting the unconnected.	2
7	Phase 7 Strategy of Looking at the other side, looking in other world, finding what you are not looking for and following it up.	2
8	Phase 8 Strategy of Play, Importance of play; Diversion; Unstructured activities for sheer joy, Activities for joy, Let subconscious figure it out, Various puzzles as play or fun.	2
9	Phase 9 Strategy of Awakening the collaborative spirit, Collaborative thinking, brain storming, Innovation requires collaboration to make it happen.	2
10	Phase 10 Review Strategies for Creative problem solving methods, Five building blocks as per Fogler & LeBlanc, Stanford D school approach.	2
11	Phase 11 Strategy for critical thinking for Choosing, Creative or divergent thinking needs follow up by Critical thinking or Convergent thinking in order to choose the solution for implementation, Kepner-Tregoe (K.T.) method with an example, Edward De Bono CoRT thinking process including PMI (Plus, Minus and Interesting), Also Edward de Bono method of decision making called Six thinking hats.	2
12	Phase 12 Edward de Bono explaining and teaching his ideas having evolved many years ago consisting as CoRT thinking tool, Lateral thinking and the decision making by Six thinking hats method.	2

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
13	Phase 13 Strategy for Making; From idea to innovation.	2
14	Phase 14 Individual presentation	2
Total Hours		28

Textbook :

- 1 Zig Zag, The surprising path to greater creativity, R. Keith Sawyer, Willey, 2013
- 2 Creative Confidence: Unleashing the Creative Potential Within Us All, Tom Kelly and David Kelly, Crown Publishing Group, 2013

References:

- 1 The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail, The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail, Clayton M. Christensen, Harvard Business Review Press, 2016
- 2 Thinking, Fast and Slow, Thinking, Fast and Slow, Daniel Kahneman, Farrar, Straus and Giroux, 2011
- 3 Creativity, Inc.: Overcoming the Unseen Forces That Stand in the Way of True Inspiration, Creativity, Inc.: Overcoming the Unseen Forces That Stand in the Way of True Inspiration, Ed Catmull and Amy Wallace, Random House, 2014
- 4 Creative problem solving An Introduction, Creative problem solving An Introduction, Donald J. Treffinger, Scott G Isaksen and K. Brian Stead Dorval, Taylor and Francis, 2006
- 5 The Myths of Innovation, The Myths of Innovation, Scott Berkun, O'Reilly, 2010

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 and evaluation					
Remember / Knowledge	Understand	Apply	Analyze	Evaluate	Higher order Thinking / Creative
10.00	10.00	20.00	20.00	20.00	20.00