FACULTY OF ENGINEERING & TECHNOLOGY

Effective from Academic Batch: 2020-21

Programme: **Bachelor of Engineering (Information Technology)**

Semester: **III**

Course Code: **900009901**

Course Title: **Creativity, Problem Solving and Innovation**

Course Group: **Skill Development**

Course Objectives:

To facilitate learners to:

- To gain familiarity with the mechanics of creativity and problem solving.
- To develop an attitude for innovation.
- To develop creative thinking skills using cone of learning components leading to understanding of strategies of creativity, problem solving and innovation.

To explore applications of the concepts of creativity and problem solving skills in personal, social, academic, and profession life.

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
				Theory		J/V/P*		Total
Lecture	Tutorial	Practical		Internal	External	Internal	External	
0	0	2	2	NA	NA	40/14	60/21	100 / 35

* **J**: Jury; **V**: Viva; **P**: Practical

Detailed Syllabus:

Sr.	Contents	Hours
1	**Introduction to Creativity, Problem Solving and Innovation** ● Definitions of Creativity and Innovation ● Need for Problem Solving and Innovation ● Scope of Creativity in various Domains ● Types and Styles of Thinking Strategies to Develop Creativity, Problem Solving and Innovation Skills	06

2	**Questioning, Learning and Visualization** ● Strategy and Methods of Questioning ● Asking the Right Questions ● Strategy of Learning and its Importance ● Sources and Methods of Learning ● Purpose and Value of Creativity Education in real life ● Visualization Strategies - Making thoughts Visible Mind Mapping and Visualizing Thinking	**06**
3	**Questioning, Learning and Visualization** ● Strategy and Methods of Questioning ● Asking the Right Questions ● Strategy of Learning and its Importance ● Sources and Methods of Learning ● Purpose and Value of Creativity Education in real life ● Visualization Strategies - Making thoughts Visible Mind Mapping and Visualizing Thinking	**06**
4	**Logic, Language and Reasoning** ● Basic Concepts of Logic ● Statement Vs. Sentence ● Premises Vs. Conclusion ● Concept of an Argument ● Functions of Language: Informative, Expressive and Directive ● Inductive Vs. Deductive Reasoning ● Critical Thinking & Creativity Moral Reasoning	**06**
5	**Contemporary Issues and Practices in Creativity and Problem Solving** ● Cognitive Research Trust Thinking for Creatively Solving Problems ● Case Study on Contemporary Issues and Practices in Creativity and Problem Solving	**06**
	Total	**30**

Instruction Methods and Pedagogy:
The course is based on practical learning. Teaching will be facilitated by Slides Presentations, Reading Material, Discussions, Case Studies, Puzzles, Ted Talks, Videos, Task-Based Learning, Projects, Assignments, and various Individual and Interpersonal activities like, Critical reading, Group work, Independent and Collaborative Research, Presentations, etc.

Evaluation:
There will be no formal university examinations. Students will be evaluated continuously in the form of internal as well as external evaluation. The evaluation is schemed as 40 marks for internal evaluation and 60 marks for external evaluation. The concerned teacher shall evaluate students distribute the marks (out of 40 as Internal and out of 60 as External) and submit them.

Evaluation Scheme:
The students' / participants performance in the course will be evaluated on a continuous basis through the following components:

Sr. No.	Component	Number	Marks per incidence	Total Marks
1	Attendance	100%	--	20
2	Individual Activity Participation	As stipulated by the Resource Person(s) in the Training		20
3	Group Activity Participation			20
4	Presentation			30
5	Feedback on Improvement			10
			Total	**100**

Learning Outcomes:
At the end of the course, learners will be able to:

- Demonstrate creativity in their day-to-day activities and academic output.
- Solve personal, social, and professional problems with a positive and an objective mindset.
- Think creatively and work towards problem solving in a strategic way.
- Initiate new and innovative practices in their chosen field of profession.

Reference Books:

1	R Keith Sawyer, Zig Zag, The Surprising Path to Greater Creativity, Jossy-Bass Publication 2013
2	Michael Michalko, Crackling Creativity, The Secrets of Creative Genus, Ten Speed Press 2001
3	Michael Michalko, Thinker Toys, Second Edition, Random House Publication 2006

4	Edward De Beno, De Beno's Thinking Course, Revised Edition, Pearson Publication 1994
5	Edward De Beno, Six Thinking Hats, Revised and Update Edition, Penguin Publication 1999
6	Tony Buzan, How to Mind Map, Thorsons Publication 2002
7	Scott Berkum, The Myths of Innovation, Expended and revised edition, Berkun Publication 2010
8	Tom Kelly and David Kelly, Creative confidence: Unleashing the creative Potential within Us all, William Collins Publication 2013
9	Ira Flatow, The all Laughed, Harper Publication 1992
10	Paul Sloane, Des MacHale & M.A. DiSpezio, The Ultimate Lateral & Critical Thinking Puzzle book, Sterling Publication 2002

Supplementary learning Material:	
1	Keith Sawer, Group Genius, The Creative Power of Collaboration, Basic Books Publication 2007
2	Edward De Beno, Lateral Thinking, Creativity Step by Step, Penguin Publication 1973
3	Nancy Margulies with Nusa Mall, Mapping Inner Space, Crown House Publication 2002
4	Tom Kelly with Jonathan Littman, The Art of Innovation, Profile Publication 2001
5	Roger Von Oech, A Whack on the Side of the Head. Revised edition, Hachette Publication 1998
6	Roger Von Oech, A Kick in the Seat of the Head, William Morrow 1986
7	Jonah Lehrer, Imagine How Creativity Works, Canongate Books Publication 2012
8	James M Higgins, 101 Creative Problem Solving Techniques, New Management Publication 1994
9	Soctt G Isaksen, K Brain Doval, Donald J Treffinger, Creative Approach to Problem Solving, Sage Publication 2000
10	Donald J Treffinger, scott G Isaksen, K Brain stead Dorval Creative Problem Solving An Introduction, Prufrock Press 2006
11	H Scott Fogler & Steven E. LeBlance, Strategies for Creative Problem Solving, Prentice Hall Publication 2008
12	Dave Gray, Sunni Brown and James Macanufo, Game Storming, O'reilly Publication 2010.
13	Howard Gardner, Creating minds, Basic Books Publication 1993

14	Mihaly Csikzentmihalyi, Creativity–Flow and Psychology of Discovery and Invention, Harper Publication 1996
15	Martin Gerdner, W. H., Ahal Insight, Freeman Publication 1978
16	Paul Sloane, Test Your Lateral Thinking IQ, Sterling Publication1994
17	Paul Sloane & Des Machale Intriguing, Lateral Thinking Puzzles, Sterling Publication 1996
18	Internet Search based May TED talks and other sources for videos, slide shares, problems, etc

Table A

Modules / Week	**Session(s)**	**Contents / Particulars**
1	1-2	Introduction of the Course: Teach this course as a needed skill for your future. Psychology of problem solving; Vertical versus Lateral thinking
2	3-4	Strategy of Questioning; Method of Questioning; Importance of Asking the Right Question. Who, What, When, Where, Why, How?
3	5-6	Learning and its Importance; Sources of Learning; Methods of Learning. Purpose and Value of Education in Future Creativity in Real Life
4	7-8	Strategy of Knowing How to See; Making Your Thought Visible; Visualizing Thinking; Mapping of Mind, Fishbone Diagram
5	9-10	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
6	11-12	Strategy of Fusing of Ideas; Making Novel Combinations; Connecting the Unconnected
7	13-14	Strategy of Looking at the Other Side, Looking in Other World, Finding What You are Not Looking for and Following it Up
8	15-16	Strategy of Play, Importance of play; Relaxation; Break; Diversion; Unstructured Activities for Sheer Joy. Stop Thinking and Do Activities for Joy. Let Subconscious Figure It Out. Sleep on it. Various Puzzles as Play or Fun
9	17-18	Strategy of awakening the collaborative spirit. Collaborative thinking, brain storming, Innovation requires collaboration to make it happen
10	19-20	Review Strategies for Creative problem-solving methods. Five building blocks as per Fogler & LeBlanc. Stanford D school approach shown as Video
11	21-22	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
12	23-24	This is Edward de Bono day for the Entire Two Hours with Himself 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
13	25-26	Strategy for Making; From Idea to Innovation
14	27-28	Individual Presentation for 75 Minutes by 15 Students / Participants (Five minutes per student). Remaining Time for the Same Students Providing their Feedback on the Course
15	29-30	Individual Presentation for 75 Minutes by 15 Students / Participants (5 minutes per student). Remaining time for the same students providing their feedback on the course

Curriculum Revision:	
Version:	1.0
Drafted on (Month-Year):	June-2020
Last Reviewed on (Month-Year):	-
Next Review on (Month-Year):	June-2025