# FACULTY OF ENGINEERING & TECHNOLOGY

## Effective from Academic Batch: 2022-23

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

**Semester:** **III**

**Course Code:** **900009901**

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

**Course Group:** **Value Added/Enhancement**

**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 | 2 | 0 | 02 | NA | NA | 50 / 18 | 50 / 17 | 100 / 35 |

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

**Detailed Syllabus:**

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

| | | |
|---|---|---|
| **2** | **Questioning, Learning and Visualization**<br>• Strategy and Methods of Questioning<br>• Asking the Right Questions<br>• Strategy of Learning and its Importance<br>• Sources and Methods of Learning<br>• Purpose and Value of Creativity Education in real life<br>• Visualization Strategies - Making thoughts Visible<br>• Mind Mapping and Visualizing Thinking | **06** |
| **3** | **Creative Thinking and Problem Solving**<br>• Creative Thinking and its need<br>• Strategy of Thinking Fluency<br>• Generating all Possibilities<br>• SCAMPER Technique<br>• Divergent Vs. Convergent Thinking<br>• Lateral Vs. Vertical Thinking<br>• Fusion of Ideas for Problem Solving<br>• Applying Strategies for Problem Solving | **06** |
| **4** | **Logic, Language and Reasoning**<br>• Basic Concepts of Logic<br>• Statement Vs. Sentence<br>• Premises Vs. Conclusion<br>• Concept of an Argument<br>• Functions of Language: Informative, Expressive and Directive<br>• Inductive Vs. Deductive Reasoning<br>• Critical Thinking & Creativity<br>• Moral Reasoning | **06** |
| **5** | **Contemporary Issues and Practices in Creativity and Problem Solving**<br>• Cognitive Research Trust Thinking for Creatively Solving Problems<br>• Case Study on Contemporary Issues and Practices in Creativity and Problem Solving | **06** |
| | **Total** | **30** |

**List of Practicals / Tutorials:**

| |
|---|
| NA |

**Text Books:**

| | |
|---|---|
| **1** | Michael Michalko, Thinker Toys, Second Edition, Random House Publication 2006 |
| **2** | Edward De Beno, De Beno's Thinking Course, Revised Edition, Pearson Publication 1994 |

**Reference Books:**

| | |
|---|---|
| **1** | Michael Michalko, Thinker Toys, Second Edition, Random House Publication 2006 |
| **2** | Edward De Beno, De Beno's Thinking Course, Revised Edition, Pearson Publication 1994 |
| **3** | Edward De Beno, Six Thinking Hats, Revised and Update Edition, Penguin Publication 1999 |
| **4** | Tony Buzan, How to Mind Map, Thorsons Publication 2002 |
| **5** | Scott Berkum, The Myths of Innovation, Expended and revised edition, Berkun Publication 2010 |
| **6** | Tom Kelly and David Kelly, Creative confidence: Unleashing the creative Potential within Us all, William Collins Publication 2013 |
| **7** | Ira Flatow, The all Laughed, Harper Publication 1992 |
| **8** | 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 Publication 1994 |
| **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 |


**Pedagogy:**

- Direct classroom teaching
- Audio Visual presentations/demonstrations
- Assignments/Quiz
- Continuous assessment
- Interactive methods
- Seminar/Poster Presentation

**Internal Evaluation:**

The internal evaluation comprised of combination of various components such as Certification courses, Assignments, Mini Project, Simulation, Model making, Case study, Group activity, Seminar, Poster Presentation, Unit test, Quiz, Class Participation, Attendance, Achievements etc.

**Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):**

| Distribution of Theory Marks in % | | | | | | **R**: Remembering; **U**: Understanding; **A**: Applying; **N**: Analyzing; **E**: Evaluating; **C**: Creating |
|---|---|---|---|---|---|---|
| **R** | **U** | **A** | **N** | **E** | **C** | |
| | | | | | | |

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

**Course Outcomes (CO):**

| Sr. | Course Outcome Statements | %weightage |
|---|---|---|
| **CO-1** | Demonstrate creativity in their day-to-day activities and academic output | |
| **CO-2** | Solve personal, social and professional problems with a positive and an objective mindset | |
| **CO-3** | Think creatively and work towards problem solving in a strategic way | |
| **CO-4** | Initiate new and innovative practices in their chosen field of profession | |

| **Curriculum Revision:** | |
|---|---|
| Version: | 2 |
| Drafted on (Month-Year): | June-2022 |
| Last Reviewed on (Month-Year): | |
| Next Review on (Month-Year): | June-2027 |