Course Title: Engineering Exploration
Total Contact Hours: 72
ESA Marks: 30
ISA Marks: 70

Course Outcomes (COs):
At the end of the course the student should be able to:
1. Explain the role of an Engineer as a problem solver.
2. Identify multi-disciplinary approach required in solving an engineering problem.
3. Build simple systems using engineering design process.
4. Use basics of engineering project management skills in doing projects.

Content

Module 1: Introduction to Engineering and Engineering Study
Introduction to Engineering and Engineering Study: Difference between science and engineering, scientist and engineer needs and wants, various disciplines of engineering, some misconception of engineering, Expectation for the 21st century engineer and Graduate Attributes.

Module 2: Engineering Design
Engineering Design Process, Multidisciplinary facet of design, Pair wise comparison chart, Introduction to mechatronics system, generation of multiple solutions, Pugh Chart, Motor and battery sizing concepts.

Module 3: Electronic Circuit Design And Electrical Machines
Voltage Regulators: Fixed and Adjustable IC voltage regulators (IC78XX, IC79XX, LM317)
Electrical Motors: AC & DC motors
AC Motors: Single phase AC motors and special purpose motors (working principle, selection criteria and ratings) DC Motor: DC motors and special purpose motors (working principle, selection criteria and ratings)
Battery Selection

Module 4: Mechanisms
Basic Components of a Mechanism, Degrees of Freedom or Mobility of a Mechanism, 4 Bar Chain, Crank Rocker Mechanism, Slider Crank Mechanism.

Module 5: Platform Based Development
Introduction to various platform based development (Arduino) programming and its essentials, Introduction to sensors, transducers and actuators and its interfacing with Arduino.

Module 6: Project Management
Introduction to Agile practices, Significance of team work, Importance of communication in engineering profession, Project Management Tools: Checklist, Timeline, Gantt Chart, Significance of documentation

Module 7: Course Project Reviews