Department of <u>Mechanical Engineering</u>
Course Outcomes [CO'S]

CLASS: THIRD YEAR
SUBJECT/CODE: DESIGN OF MACHINE ELEMENTS – I [302041]

1. Ability to identify and understand failure modes for mechanical elements and design of machine elements based on strength.
2. Ability to design Shafts, Keys and Coupling for industrial applications.
3. Ability to design machine elements subjected to fluctuating loads.
4. Ability to design Power Screws for various applications.
5. Ability to design fasteners and welded joints subjected to different loading conditions.
6. Ability to design various springs for strength and stiffness.

SUBJECT/CODE: HEAT TRANSFER [302042]

1. Analyze the various modes of heat transfer and implement the basic heat conduction equations for steady one dimensional thermal system.
2. Implement the general heat conduction equation to thermal systems with and without internal heat generation and transient heat conduction.
3. Analyze the heat transfer rate in natural and forced convection and evaluate through experimentation investigation.
4. Interpret heat transfer by radiation between objects with simple geometries.
5. Analyze the heat transfer equipment and investigate the performance.

SUBJECT/CODE: THEORY OF MACHINES-II [302043]

1. Student will be able to understand fundamentals of gear theory which will be the prerequisite for gear design.
2. Student will be able to perform force analysis of Spur, Helical, Bevel, Worm and Worm gear.
3. The student to analyze speed and torque in epi-cyclic gear trains which will be the prerequisite for gear box design.
4. Student will be able to design cam profile for given follower motions and understand cam Jump phenomenon, advance cam curves.
5. The student will synthesize a four bar mechanism with analytical and graphical methods.

6. a. The student will analyze the gyroscopic couple or effect for stabilization of Ship Aeroplane and Four wheeler vehicle.

   b. Student will choose appropriate drive for given application (stepped / step-less).

SUBJECT/CODE: METROLOGY AND QUALITY CONTROL [302044]

1. Understand the methods of measurement, selection of measuring instruments / standards of measurement, carryout data collection and its analysis.
2. Explain tolerance, limits of size, fits, geometric and position tolerances and gauge design.
3. Understand and use/apply Quality Control Techniques/ Statistical Tools appropriately.
4. Develop an ability of problem solving and decision making by identifying and analyzing the cause for variation and recommend suitable corrective actions for quality improvement.

SUBJECT/CODE: HYDRAULICS AND PNEUMATICS [302045]

1. Working principle of various components used for hydraulic & pneumatic systems.
2. Identify various components of hydraulic & pneumatic systems.
3. Ability to select appropriate components required for hydraulic and pneumatic systems.
4. Ability to design hydraulic and pneumatic system for industrial applications.
5. Ability to understand industrial applications of hydraulic and pneumatic system.
6. Troubleshooting of hydraulic & pneumatic circuits.

SUBJECT/CODE: SKILL DEVELOPMENT [302046]

1. To develop the skill for required in shop floor working.
2. To have knowledge of the different tools and tackles used in machine assembly shop.
3. Use of theoretical knowledge in practice.
4. Practical aspect of the each component in the assembly of the machine.

SUBJECT/CODE: NUMERICAL METHODS AND OPTIMIZATION [302047]

1. Use appropriate Numerical Methods to solve complex mechanical engineering problems.
2. Formulate algorithms and programming.
3. Use Mathematical Solver.
4. Generate Solutions for real life problem using optimization techniques.
5. Analyze the research problem.

SUBJECT/CODE: DESIGN OF MACHINE ELEMENTS -II [302048]

1. To understand and apply principles of gear design to spur gears and industrial spur gear boxes.

2. To become proficient in design of helical and bevel gear

3. To develop capability to analyse rolling contact bearing and its selection from manufacturer's catalogue.

4. To learn a skill to design worm gear box for various industrial applications.

5. To inculcate an ability to design belt drives and selection of belt, rope and chain drives.

6. To achieve an expertise in design of sliding contact bearing in industrial applications.

SUBJECT/CODE: TURBO MACHINES [302049]

1. Ability to design and calculate different parameters for turbo machines

2. prerequisite to cfd and industrial fluid power courses

3. Ability to formulate design criteria

4. Ability to understand thermodynamics and kinematics behind turbo machines.

SUBJECT/CODE: MECHATRONICS [302050]

1. Identification of key elements of mechatronics system and its representation in terms of block diagram

2. Understanding the concept of signal processing and use of interfacing systems such as adc, dac, digital i/o.

3. Interfacing of sensors, actuators using appropriate daq micro-controller.

4. Time and frequency domain analysis of system model (for control application).

5. PID control implementation on real time systems.

6. Development of plc ladder programming and implementation of real life system.

SUBJECT/CODE: MANUFACTURING PROCESS-II [302051]

1. Student should be able to apply the knowledge of various manufacturing processes.

2. Student should be able to identify various process parameters and their effect on processes.

3. Student should be able to figure out application of modern machining.

4. Students should get the knowledge of Jigs and Fixtures for variety of operations.

SUBJECT/CODE: MACHINE SHOP -II [302052]

1. Ability to develop knowledge about the working and programming techniques for various machines and tools.

SUBJECT/CODE: SEMINAR [302053]

1. Establish motivation for any topic of interest and develop a thought process for technical presentation.
2. Organize a detailed literature survey and build a document with respect to technical publications.
3. Analysis and comprehension of proof-of-concept and related data.
4. Effective presentation and improve soft skills.
5. Make use of new and recent technology (e.g. Latex) for creating technical reports.