Pimpri Chinchwad Education Trust's

Pimpri Chinchwad College of Engineering

Course Outline

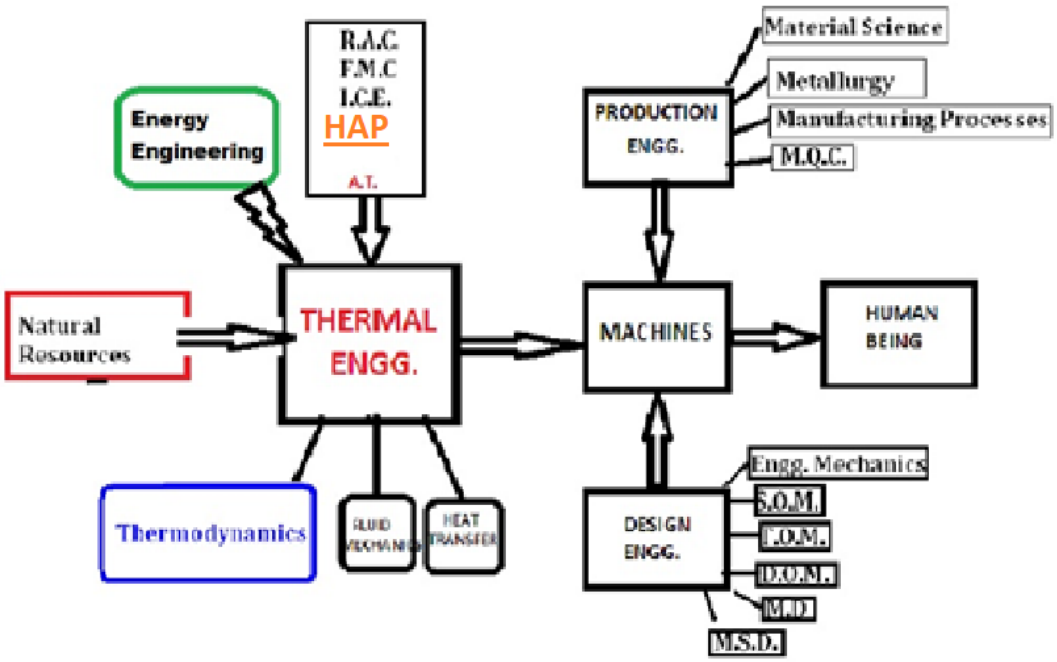
Department: Mechanical **Academic Year:** 2021 - 2022 **Sem.** I **Date**: 28-06-2021

Subject: Hydraulics and Pneumatics

Details:

1. About the Course:

Fluid power plays an important role in industry. Uses of fluid power include machine tools, off-highway vehicles, aviation control, material testing systems etc. This course is a course for final year students of Mechanical Engineering. Various aspects of Fluid power are covered in this course which starts with emphasis on fluid mechanics and governing laws. Then, pumps and motors are discussed with its performance calculations. This will be followed by a discussion on actuators. Once this framework is established, students will then be exposed to fundamentals and specific cases of control valves such as Direction, Pressure and Flow control. Students will also be familiarized with Servo and Electro hydraulic valves briefly. Finally, the course will finish with emphasis hydraulic and pneumatic circuits design and control.



2. Prerequisite:

Fluid Mechanics, Manufacturing Processes and Machines, Mechatronics

3. Teaching and examination scheme:

Teaching Scheme: Lectures/week: 3hrs,

Practical's/week: 2hrs,

Examination Scheme: Theory: 100 Marks (30 marks –In sem, 70 marks - End sem), TW: 25 Marks, Oral Exam: 25 Marks

4. Course outcomes with method of assessments:

- CO1:-Student will be able to apply the fluid power basics and analyse pump performance.
  Internal- UT I, Assignment no. 1, Experiment no.4,
  External-Insem-Ensem
- CO2:-Student will be able to identify the actuators and to analyse performance of actuators and power units.
  Internal- UT I, Experiment No.6,
  External-Insem-Ensem
- CO3:-Student will be able to select control valves as per applications.
  Internal- UT II, Experiment no.7
- CO4:-Student will be able to create various types of hydraulic circuit.
  Internal- UT II, Experiment no.4
  External-Endsem
- CO5:- Student will be able to create various types of Pneumatic circuit.
  Internal- Experiment no.8- with quiz
  External-Endsem
- CO6:-Student will be able to design Hydraulic/pneumatic system for various applications.
  Internal- Experiment no. 10,11- with numerical

5. Assignments:

- Assignment No. 1 on ISO symbols for Fluid Power System. (Brainteaser Type)
- Assignment No. 2 on Standard specifications of hydraulic/ pneumatic components using manufacturer's catalogues:- PPT recording by the students.

6. Activity/Visits/Mini projects/Posters planed:

- PPT presentation.
- Industrial Visit to VR Coating, Talawade (conditional).

7. Topic Beyond syllabus:

Explanation of Fluid power system associated with Aeroplane landing gear /
Explanation of fluid power system in the heavy construction equipment like JCB.

8. Reference books:

- Esposito A, Fluid Power with application, Prentice Hall
- Majumdar S.R, Oil Hydraulic system- Principle and maintenance ,Tata McGraw Hill
- Majumdar S.R, Pneumatics Systems Principles and Maintenance ,Tata McGraw Hill
- Stewart H. L, Hydraulics and Pneumatics , Taraporewala Publication
- Pipenger J.J, Industrial Hydraulics, McGraw Hill
- Pinches, Industrial Fluid Power, Prentice Hall
- Yeaple, Fluid Power Design Handbook
- Andrew A. Parr, Hydraulics and Pneumatics, Elsevier Science and Technology Books
- ISO - 1219, Fluid Systems and components, Graphic Symbols
- Standard Manufacturer's Catalogues
-

9. Online content (Website):

- The National Fluid Power Association (NFPA)
  https://www.nfpa.com/home/About-NFPA.htm
- International Fluid power Society (IFPS)
  https://www.ifps.org
- https://nptel.ac.in/courses/112/106/112106175/#

10. Research journals:

- International Journal of Fluid Power:-
  https://www.tandfonline.com/toc/tjfp20/current

11. Online courses available:

- Mechatronics and Manufacturing Automation:-
  https://nptel.ac.in/courses/112/103/112103174/
- Fluid Power Control:- https://nptel.ac.in/courses/112/106/112106175/
- Fundamentals of Fluid Power:- https://www.coursera.org/learn/fluid-power

12. Teaching Faculties

Mrs.S.V.Patil
Mr.G.G.Momin
Mrs.G.V.Phadtare