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|---------------------------------|--------------------------------------------|
| <b>Subject Code: 1ET4060401</b> | <b>Subject Title: Pump and Primemovers</b> |
| <b>Pre-Requisite</b>            | --                                         |

#### **RATIONALE:**

The students of petroleum engineering are mainly involved in survey of land for finding petroleum under the ground with various techniques. After finding the suitable land having worth amount of petroleum data will given to further drilling engineers for further process of drilling petroleum well. The actual petroleum production will start after drilling well and installation of the equipment for pumping the crude. Pump is the device used for pumping the mud and crude from earth. Prime movers are the devices used to supply the power to the all electrical appliances on the rig.

This course has been introduced at Diploma level in order to develop the skills in student so that they can understand the devices used for exploring the crude from earth like pump and prime movers.

#### **COMPETENCY:**

The course content should be taught and implemented with the aim to develop different types of skills so that students are able to acquire competency for oil well drilling.

#### **Course Objective:**

#### **COURSE OBJECTIVE:**

- To perform the simple tasks related to mechanical engineering so as to reduce the dependency on mechanical engineers and to achieve the reliability and quality of own branch's tasks.
- Demonstrate the various types of pump and practices of its use in exploring petroleum.
- Demonstrate the various types of primemovers and practices of its use

#### **TEACHING AND EVALUATION SCHEME:**

| <b>Teaching Scheme (Hours per week)</b> |                 |                  |               | <b>Evaluation Scheme (Marks)</b> |                              |                              |                              |
|-----------------------------------------|-----------------|------------------|---------------|----------------------------------|------------------------------|------------------------------|------------------------------|
| <b>Lecture</b>                          | <b>Tutorial</b> | <b>Practical</b> | <b>Credit</b> | <b>Theory</b>                    |                              | <b>Practical</b>             |                              |
|                                         |                 |                  |               | <b>University Assessment</b>     | <b>Continuous Assessment</b> | <b>University Assessment</b> | <b>Continuous assessment</b> |
| 3                                       | -               | 2                | 4             | 60                               | 40                           | 20                           | 30                           |

#### **DETAILS OF COURSE CONTENTS:**

| <b>UNIT</b> | <b>TOPIC</b>                                                                                                                                                        | <b>Total Hrs.</b> | <b>Weightage %</b> |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|--------------------|
| <b>1</b>    | Hydraulic pumps & prime movers<br>6.1 Concept and classification of pumps.<br>6.2 Detailed study(construction, working and applications) of<br>i. Centrifugal pump. | 12                | 30                 |

|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |    |    |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|
|          | ii. Reciprocating pump.<br>iii. Submersible pump.<br>iv. Rotary positive displacement type pumps like Gear pump and Van pump.<br>v. Vacuum pump.<br>6.3 Performance (efficiency, discharge, head, specific speed and power consumption) of centrifugal pump and reciprocating pump with simple numerical example.<br>6.4 Characteristic curves of centrifugal pump and reciprocating pump.<br>6.5 Need for priming of centrifugal pump.<br>6.6 Selection of pumps. |    |    |
| <b>2</b> | <b>Steam generation and prime movers.</b><br>Steam Boilers ,Prime movers.                                                                                                                                                                                                                                                                                                                                                                                          | 08 | 20 |
| <b>3</b> | <b>Internal combustion engines.</b><br>Internal combustion engines, Working of petrol engine, diesel engine and gas engine, Performance parameters, Main parts and functions, Applications, Common troubles and remedies.                                                                                                                                                                                                                                          | 12 | 30 |
| <b>4</b> | <b>Hydraulic and pneumatic devices.</b><br>Types, sketch, working, specifications, symbols and applications of hydraulic and pneumatic elements like:<br>i. Cylinder.<br>ii. Valve.<br>iii. Manifolds, etc.<br>Introduction to Air compressor, Types of Compressor, Performance parameters, Main Parts and Functions, Applications. Other hydraulic / pneumatic /hydro-pneumatic equipments.                                                                       | 10 | 20 |

### **COURSE OUTCOME:**

On completion of the course, student will be able to

- CO1 - Understand the basic concept of Mechanical Engineering
- CO2 - Know about the power transmission system and their applications
- CO3 - Explore different prime movers and about internal combustion engine.
- CO4 - Understand the basic concept of fluid flow, pump and water turbine.

### **List of Practical/Experiments:**

1. Study boiler, boiler mountings and boiler accessories.
2. Perform and study the effect of variation of load on fuelconsumptionof an I.C. engines (On petrolengine). Alsolocate the faults in a given petrol engine and suggestremedial measures.
3. Perform and study the effect of variation of load on fuelconsumptionof an I.C. engines (On dieselengine). Alsolocate the faults in a given diesel engine and suggestremedial measures.

4. Perform test on Air compressor.
5. Perform test on centrifugal pump.
6. Performance testing of reciprocating pump.
7. Finding the faults, reactions and remedies for C. F. pump.

**List of References:**

1. Theory of Machines, R.S.Khurmi and J.K.Gupta, S.Chand
2. Heat Engine, Shah & Pandya, Charotar Publishing House
3. Hydraulic machines, Jagdishlal, Metropolitan Book Company
4. Hydraulics, R.C.Patel, Acharya Book Depot
5. Pumps operation and Maintenance, Tyler and Hicks, Tata McGraw-Hill

**List of Software/Learning Websites:**

1. <http://www.youtube.com/watch?v=1cFu2bkZ7Vw&feature=related> (ic engine)
2. [http://www.youtube.com/watch?v=pCg1Ih\\_oVSA](http://www.youtube.com/watch?v=pCg1Ih_oVSA) (pump)
3. <http://www.youtube.com/watch?v=V3aPHmZ97yM&feature=related> (pump)
4. <http://www.youtube.com/watch?v=8GSUgwombdE&feature=related> (boiler)
5. <http://www.youtube.com/watch?v=8GSUgwombdE&feature=related> (boiler)
6. <http://homepages.cae.wisc.edu>
7. <http://en.wikipedia.org/wiki/Boiler>
8. <http://www.youtube.com/watch?v=ftdgB93QOD8&feature=related> (gear box)
9. <http://www.youtube.com/watch?v=XunM7yUC06M&feature=related> (gear drive)