

## LESSON PLAN (WINTER-2023), DRILLING MACHINERY-II

| Branch: <b>DRILLING ENGINEERING</b>   |      |          |                                 |   | Faculty:- <b>Tapas Sutar</b>  |  |   |         |  |
|---|------|----------|---------------------------------|---|---|--|---|---------|--|
| Subject: <b>Drilling Machinery-II (TH-03)</b>   |      |          | No of periods: <b>4hrs/week</b> |   | Total Period: 60<br>week: 15  |  | Total<br>End Sem exam: 80<br>Internal assesment: 20 |         |  |
| Scheduled Session: From <b>01.08.2023</b> to <b>30.11.2023 (Available Period: 58)</b> |      |          |                                 |   |   |  |   |         |  |
| Month   | Week | Date     | Period                          | Topics to be covered  |   |  |   | Remarks |  |
| A<br>u<br>g<br>u<br>s<br>t  | 1st  | 04.08.23 | 2P                              | Briefing and Introduction to Drilling Machinery-II                                |   |  |   |         |  |
|   |      |          |                                 | 1.0 Oil Well Drill Rig  |   |  |   |         |  |
|   | 2nd  | 07.08.23 | 2P                              | 1.1   | Give a brief description about different oil well drill rigs used in both offshore and onshore.   |  |   |         |  |
|   |      | 11.08.23 | 2P                              | 1.2   | Systems used in oil well drill rig. (Power generating & transmitting, Rotating and Feeding, Hoisting, Tubing, Circulating, Well head, Fishing etc.)               |  |   |         |  |
|   |      |          |                                 | 2.0 Power Generating & Transmitting System  |   |  |   |         |  |
|   | 3rd  | 14.08.23 | 2P                              | 2.1   | Explain the sources of power supply for oil well drill along with comparison between them   |  |   |         |  |
|   |      |          |                                 | 2.2   | Calculate power requirement of power plant for oil well drill rig   |  |   |         |  |
|   |      | 18.08.23 | 2P                              | 2.3   | Explain the type of drives for power transmission in oil well drilling  |  |   |         |  |
|   |      |          |                                 | 3.0 Rotating & Feeding Mechanism  |   |  |   |         |  |
|   | 4th  | 21.08.23 | 2P                              | 3.1   | Explain requirement rotating & feeding mechanisms in oil well drill rig   |  |   |         |  |
|   |      |          |                                 | 3.2   | State components in rotating & feeding system   |  |   |         |  |
|   |      | 25.08.23 | 2P                              | 3.3   | Explain the different systems of transmission of power to rotary table of oil well drill.   |  |   |         |  |
|   |      |          |                                 |   | 3.4   | Explain rotating and feeding mechanism in top drive system |   |         |  |
|   | 5th  | 28.08.23 | 2P                              | 3.5   | Explain different components in top drive system.   |  |   |         |  |
|   |      |          |                                 | 3.6   | Enumerate different feeding mechanism and explain such.   |  |   |         |  |
|   |      |          |                                 | 1st Class Test  |   |  |   |         |  |
|   |      |          |                                 | 4.0 Hoisting Mechanism  |   |  |   |         |  |
| S<br>e<br>p<br>t<br>e<br>m<br>b<br>e<br>r   | 1st  | 01.09.23 | 2P                              | 4.1   | Requirement of hoisting mechanism and Components in such (Derrick, Mast, Substructure, Hoisting line, Draw work, Travelling block, Swivel, Weight Indicator etc.) |  |   |         |  |
|   |      |          |                                 | 4.2   | Different types of Derrick & Mast along with field of application   |  |   |         |  |
|   | 2nd  | 04.09.23 | 2P                              | 4.3   | Factors consideration in designing derrick & derrick load calculation   |  |   |         |  |
|   |      |          |                                 | 4.4   | Calculate the mechanical advantages of block & tackle system.   |  |   |         |  |
|   |      | 08.09.23 | 2P                              | 4.5   | Hoisting power calculation.   |  |   |         |  |
|   | 4.6  |          |                                 | Components of draw work (Hoisting drum, cathead, clutch & break along with types) |   |  |   |         |  |
|   |      |          |                                 | 5.0 Drill String  |   |  |   |         |  |
|   | 3rd  | 11.09.23 | 2P                              | 5.1   | State the components of rotary drill string and explain their functions.  |  |   |         |  |
|   |      |          |                                 | 5.2   | Tubings   |  |   |         |  |
|   |      | 15.09.23 | 2P                              | 5.2.1   | Kelly, Drill pipe, Drill collar, Drill string auxiliaries along with types & functions.   |  |   |         |  |
|   | 4th  | 18.09.23 | 2P                              | 5.2.2   | Reason of drill pipe failure.   |  |   |         |  |
|   |      |          |                                 | 5.2.3   | Drill string design.  |  |   |         |  |
|   |      |          |                                 | 5.3   | Bits  |  |   |         |  |
|   | 5th  | 22.09.23 | 2P                              | 5.3.1   | State the different types of bits used in oil well drilling.  |  |   |         |  |
|   |      |          |                                 | 5.3.2   | Bit design features.  |  |   |         |  |
| 5.3.3   |      |          |                                 | Possible causes of bit dullness & remedies  |   |  |   |         |  |
| 5.3.4   |      |          |                                 | Bit selection methods   |   |  |   |         |  |
|   |      |          |                                 | 2nd Class Test  |   |  |   |         |  |
|   |      |          |                                 | 6.0 Casing & Well Head Fittings   |   |  |   |         |  |
| O<br>c<br>t<br>o<br>b<br>e<br>r   | 1st  | 06.10.23 | 2P                              | 6.1   | Casing  |  |   |         |  |
|   |      |          |                                 | 6.1.1   | State the different casing used in oil well drilling & their functions.   |  |   |         |  |
|   |      |          |                                 | 6.1.2   | Explain the different designs of well casings.  |  |   |         |  |
|   |      |          |                                 | 6.1.3   | Give the specifications of different casings.   |  |   |         |  |

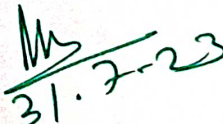


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|--------------------------------------|-----|----------|----|------------------------|--|--|
| O<br>c<br>t<br>o<br>b<br>e<br>r      | 2nd | 09.10.23 | 2P | 6.1.4                  | Enumerate the casing appliances used.  |  |
|                                      |     |          |    | Internal Assessment    |  |  |
|                                      |     | 13.10.23 | 2P | 6.1.5                  | Explain factors influence casing design & design criteria of casing.   |  |
|                                      |     |          |    | 6.2                    | Well head fittings.  |  |
|                                      | 3rd | 16.10.23 | 2P | 6.2.1                  | Explain the procedure of installation of wellhead fittings & function of wellhead fittings.                                |  |
|                                      |     | 20.10.23 | 2P | 6.2.2                  | State the different types of B.O.P. and explain the mechanism involved.  |  |
|                                      |     |          |    | 6.2.3                  | State the function of B.O.P.   |  |
|                                      | 5th | 30.10.23 | 2P | 6.2.4                  | Control mechanism of B.O.P.  |  |
|                                      |     |          |    | 6.2.5                  | Operational procedure of B.O.P.  |  |
|                                      |     |          |    | 7.0 Circulating system |  |  |
| N<br>o<br>v<br>e<br>m<br>b<br>e<br>r | 1st | 03.11.23 | 2P | 7.1                    | Equipments used in Circulating system  |  |
|                                      |     |          |    | 7.2                    | Classify the different types of pumps used in oil fields.  |  |
|                                      | 2nd | 06.11.23 | 2P | 7.3                    | Derive the formula for fluid pumping rate (GPM/Volume) of a duplex double action pump operating at 100% volume efficiency. |  |
|                                      |     |          |    | 7.4                    | Derive the formula for hydraulic H.P. of pump.   |  |
|                                      |     | 10.11.23 | 2P | 7.5                    | Derive the formula for the horsepower available for speedy digging of hole due to mud jetting action of bit.               |  |
|                                      | 3rd | 13.11.23 | 2P | 7.6                    | Work out some problems on size of pumps for lifting of drill cuttings efficiently.   |  |
|                                      |     |          |    | 7.7                    | Explain the steps to be taken against cavity and water hammer of reciprocating pump.                                       |  |
|                                      |     |          |    | 8.0 Fishing            |  |  |
|                                      |     | 17.11.23 | 2P | 8.1                    | Define Fish & Fishing.   |  |
|                                      |     |          |    | 8.2                    | Describe the probable causes of fishing in oil wells.  |  |
|                                      |     |          |    | 3rd Class Test         |  |  |
|                                      | 4th | 20.11.23 | 2P | 8.3                    | Enumerate the fishing tools used in oil well drilling.   |  |
|                                      |     | 24.11.23 | 2P | 8.4                    | Derive the formula of calculating the depth of a fish.   |  |
|                                      |     |          |    | 8.5                    | Explain the various techniques to be adopted for fishing operation.  |  |

  
 Prepared by:- Tapas Sutar, Lect

  
 HOD, DRILLING

  
 31.7.23  
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