| Discipline: **Drilling Engineering** | Semester: **3rd Semester** | Name of the Teaching Faculty: **Er. Brushabhanu Sahoo, Lecturer Stage-I** | |
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| Subject(Theory): **EXPLORATORY DRILLING-I** Subject Code: **DEPC205** | No. of Periods /week: **03** | Session: **2026-27 (Winter 2026)** No. of weeks:**15** Semester from date **01.07.2026** to **05.11.2026** | |
| Week | Class Day | Theory Topics | Remarks |
| 1st | 1st | Introduction to surface exploratory drilling. Define terms like Drilling, Prospecting, Exploratory Drilling, Core, Stratified mineral deposits, Vein, Vug, Load, Placer, Overburden, Bed rock, Strata, Rig, Circulation, Annular space, Flushing medium, Feed pressure, Feed mechanism etc. | |
| | 2nd | Purposes of exploratory drilling for mining engineering and civil engineering work. | |
| | 3rd | Concept on deposits, types of bore holes, size of the bore holes, and depth of the bore holes. Define spacing and pattern. Various patterns for exploratory/core drilling. | |
| 2nd | 1st | Techniques of drilling. Principle of Rotary, Percussive and Percussive-rotary drilling techniques. | |
| | 2nd | Explain the operational procedures of various manual exploratory drilling methods and state their field of applications. | |
| | 3rd | State various percussive exploratory drilling methods indicating their field of applications. Explain with required sketch their working procedures, tools, equipment and accessories used in each method. | |
| 3rd | 1st | State different rotary core drills used for obtaining the core of the strata. Explain with suitable sketches their operational procedures indicating field of applications. | |
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| 4th | 1st | State the factors to be considered in the selection and application of core drilling for various types ground conditions. | |
| | 2nd | Rock disintegration. Types of rock disintegration. | |
| | 3rd | Various methods for disintegrating rocks. | |
| 5th | 1st | Theory of penetration. | |
| | 2nd | Theory of penetration. | |
| | 3rd | Various methods of drilling. | |
| 6th | 1st | Factors influence drilling and drill performance. | |
| | 2nd | Factors influence drilling and drill performance. | |
| | 3rd | Types of drilling procedure and their application. | |
| 7th | 1st | Types of drilling procedure and their application. | |
| | 2nd | Objective and working principle of conventional coring system. State the application of conventional core drilling for dry drilling. | |
| | 3rd | Explain the structure of bottom hole assembly. | |
| 8th | 1st | Objective and working principle of wireline coring system. | |
| | 2nd | Explain the structure of wire line core barrel assembly. | |
| | 3rd | Differentiate between conventional and wire line coring system. | |
| 9th | 1st | Concept of reverse circulation of drilling. Explain the mechanism of Jet Eductor. | |

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| | 2nd | Explain working principle of a standard reverse circulation drilling machine and conditions that favor the use of reverse circulation drilling. | |
| | 3rd | Explain the principle and mechanism involved with pumping the core to the surface in con-core process of coring operation. Compare and contrast between con-core and conventional system of coring operation. | |
| 10th | 1st | Problems encountered during progress of drilling through fissured or broken ground, cave in formations, soft and washable formation, soluble formation etc. | |
| | 2nd | Problems encountered during progress of drilling through fissured or broken ground, cave in formations, soft and washable formation, soluble formation etc. | |
| | 3rd | Problems encountered during progress of drilling through fissured or broken ground, cave in formations, soft and washable formation, soluble formation etc. | |
| 11th | 1st | State the effect of excessive temperature on diamonds and matrix and explain the coring operation of dry blocking drilling. | |
| | 2nd | State the precautions to be taken while using a new core bit. | |
| | 3rd | State the relationship of bit pressure, rotational speed and rate of penetration. | |
| 12th | 1st | State the effect rotational speed verses lineal travel on diamond wear. | |
| | 2nd | Explain the causes of bit wear and the process of controlling diamond wear. | |
| | 3rd | Deep hole problems and solutions. | |
| 13th | 1st | Deep hole problems and solutions. | |
| | 2nd | Drill pipe sticking and recovery methods. | |
| | 3rd | Drill pipe sticking and recovery methods. | |
| 14th | 1st | Formation problems and solutions. | |
| | 2nd | Formation problems and solutions. | |
| | 3rd | Fish, Fishing and Fishing principle. | |
| 15th | 1st | Fish, Fishing and Fishing principle. | |
| | 2nd | Fishing tools and their application. | |
| | 3rd | Fishing tools and their application. | |

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