IIPM SCHOOL OF ENGINEERING AND TECHNOLOGY

***LESSON PLAN: 2023-24***

**Subject :** Mine Machinery  **– I**

**Semester : 5th**

**Faculty name : Deeptikant Sharma**

**Branch : Mining**

**Duration : 60 hours**

**SYLLABUS: -**

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| **Unit -1** | **Wire Ropes**   * State the types of wire ropes used in Mines. * Describe constructional features of wire ropes & lay of wire ropes. * Define factor of safety to wire ropes nominal & actual factor of safety of wire ropes. * State factors influencing the F.O.S. * State efficiency of rope construction, space factor & cross-sectional area rope. * State factors affecting deterioration of ropes. * Describe care & maintenance of ropes. * State & describe testing & examination of wire ropes. * Give the procedure of splicing of wire rope * Describe rope capel for haulage winding & recapping. |
| **Unit -2** | **Rope Haulage**   * Transportation in mines by rope haulage. * State type of rope haulage. * Describe various types of rope haulage with simple sketches. * State & describe different type of safety devices on rope haulage roadways. * State & describe different types of clips & couplings. |
| **Unit – 3** | **Headgear**   * State function of headgear. * Describe constructional features of headgear pulley. * Define angle of fleet. |
| **Unit – 4** | **Cage and shaft fittings**   * Describe cage, cage suspension gear, detaching hooks & its function, safety catch at headgear & keps. State types of guide. * State & describe rigid guide, flexible shoes, guide rope suspension & tensioning arrangement. |
| **Unit – 5** | **Winding drum**   * State different profiles of winding Drum. * Describe different types of winding brake. * Describe various types of safety devices on winding system. |
| **Unit – 6** | **Friction Winding**   * State & describe principle & constructional features of ground-mounted & tower-mounted koepe winder. * State advantages & disadvantages of koepe winding. * Describe multirope system of koepe winding. |
| **Unit – 7** | **Skip winding**   * Describe constructional features bottom discharge skip, Top discharge skip. * Compare skip winding cage winding. |
| **Unit - 8** | **Pit top & Pit bottom circuit layout**   * State factors affecting pit top & pit bottom layouts. * Describe different types of pit top & pit bottom car/tub circuit layouts. |

**SYLLABUS: -**

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| **Si no** | Title of the Book | Name of Authors |
| **1** | Mine Hoisting | M A Ramulu |
| **2** | SME Mining Engg Handbook |  |
| **3** | Material Handling in Mines,IIT KGP |  |
| **4** | EMT III |  |
| **5** | Mine Transport | D.J.Desmukh |
| **6** | UMS Volume | N.T Kerlin |

OBJECTIVE: -

* On completion of the subject, students will be able to:
* Describe type & construction of wire, their uses, maintenance & related calculation.
* Describe different types of transportation methods in mines. Explain headgear’s functions & its design factors.
* Describe constructional & safety features of cage and shaft.
* Describe different profiles of winding drum, various safety devices & related calculations.
* Describe different types of friction winding & its function.
* Explain skip-winding arrangements.
* Draw various arrangements at pit top & pit bottom layouts.

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| **Sl.No** | **Chapter** | **Proposed Week for Teaching** | **Lecture No.** | **Sub. Topic** | **Important Teaching Points** | **Content Source** |
| 1 |  | 1ST | 1 | State the types of wire ropes used in Mines. | Wire Ropes  Wire Ropes | Internet |
| 2 |  | 2 | Describe constructional features of wire ropes & lay of wire ropes. | Internet |
| 3 |  | 3 | State types of drill rods & drill bits used in electric coal drill | Internet |
| 4 |  | 4 | State efficiency of rope construction, space factor & cross-sectional area rope. | Internet |
| 5 |  | 2ND | 1 | State factors influencing the F.O.S.  State efficiency of rope construction, space factor & cross-sectional area rope. | Internet |
| 6 |  | 2 | State factors affecting deterioration of ropes. | Internet |
| 7 |  | 3 | Describe care & maintenance of ropes. | Internet |
| 8 |  | 4 | State & describe testing & examination of wire ropes. | Internet |
| 9 |  | 3RD | 1 | Give the procedure of splicing of wire rope | Internet |
| 10 |  | 2 | Describe rope capel for haulage winding & recapping. | Internet |
| 11 |  | 3 | Describe physical maintenance rope | Internet |
| 12 |  | 4 | Describe physical rope observation. | Internet |
| 16 |  | 4TH | 1 | Introduction | Rope Haulage  Rope Haulage | Internet |
| 14 |  | 2 | Transportation in mines by rope haulage. | Internet |
| 15 |  | 3 | Types of  Rope Haulage | Internet |
| 16 |  | 4 | Explain types of rope haulage | Internet |
| 17 |  | 5TH | 1 | Direct Rope haulage  Advantages | Internet |
| 18 |  | 2 | Endless rope haulage  Advantages of endless haulage  Disadvantages of endless haulage | Internet |
| 19 |  | 3 | Main and tail rope haulage | Internet |
| 20 |  | 4 | Gravity haulage | Internet |
| 21 |  | 6TH | 1 | State & describe different type of safety devices on rope haulage roadways | Internet |
| 22 |  | 2 | Monkey or back catch  Stop-block  Backstay  Drop Warwick | Internet |
| 23 |  | 3 | A combined stop block and runaway switch | Internet |
| 24 |  | 4 | Hydraulic tub retarder | Internet |
| 25 |  | 7TH | 1 | State & describe different types of clips & coupling. | Internet |
| 26 |  | 2 | Screw clip  Smallman Clip  Cam clip | Internet |
| 27 |  | 3 | Introduction | Headgear | Internet |
| 28 |  | 4 | State function of headgear. | Internet |
| 29 |  | 8TH | 1 | Calculate height of headgear | Internet |
| 30 |  | 2 | Describe constructional features of headgear pulley. | Internet |
| 31 |  | 3 | Define angle of fleet. | Internet |
| 32 |  | 4 | Describe cage, cage suspension gear. | Cage and shaft fittings | Internet |
| 33 |  | 9th | 1 | detaching hooks | Internet |
| 34 |  | 2 | its function, safety catch at headgear & keps | Internet |
| 35 |  | 3 | State types of guides. | Internet |
| 36 |  | 4 | State & describe rigid guide, flexible shoes | Internet |
| 37 |  | 10th | 1 | guide rope suspension | Internet |
| 38 |  | 2 | tensioning arrangement. | Internet |
| 39 |  | 3 | Introduction Winding Drum | Winding drum | Internet |
| 40 |  | 4 | Describe different types of winding brake. | Internet |
| 41 |  | 12th | 1 | Advantages of winding drum | Internet |
| 42 |  | 2 | Explain different types of winding brake. | Internet |
| 43 |  | 3 | Dynamic braking: | Internet |
| 44 |  | 4 | Regenerative braking | Internet |
| 45 |  | 13th | 1 | Friction winding / Koepe Winding | Friction Winding | Internet |
| 46 |  | 2 | State & describe principle & constructional features of ground mounted koepe & tower mounted moepe. | Internet |
| 47 |  | 3 | State advantages & disadvantages of Koepe winding. | Internet |
| 48 |  | 4 | Disadvantages of Koepe Sinding | Internet |
| 49 |  | 14th | 1 | Describe multirope system of koepe winding: | Internet |
| 50 |  | 2 | Advantages of multi rope winders | Internet |
| 51 |  | 3 | Introduction skip winding | Skip winding | Internet |
| 52 |  | 4 | Describe constructional features bottom discharge skip | Internet |
| 53 |  | 15th | 1 | Top discharge skip. | Internet |
| 54 |  | 2 | skip winding. | Internet |
| 55 |  | 3 | cage winding. | Internet |
| 56 |  | 4 | Compare skip winding cage winding. | Internet |
| 57 |  | 16th | 1 | Introduction Pit top & Pit bottom circuit layout: | Pit top & Pit bottom circuit layout | Internet |
| 58 |  | 2 | State factor affecting pit top and pit bottom layout | Internet |
| 59 |  | 3 | Factor affecting design of pit-top car circuit: | Internet |
| 60 |  | 4 | Minimum car circulation time | Internet |
| 61 |  | 17th | 1 | The design of pit top and pit bottom layout is done with the following objects in view  Pit bottom circuit**:** | Internet |
| 62 |  | 2 | Non-circular type circuits  Back shunt circuit  Turn table circuit | Internet |

Signature of

Faculty Member HOD Principal/ Director