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.
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| **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.
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| **Unit – 3** | **Headgear** * State function of headgear.
* Describe constructional features of headgear pulley.
* Define angle of fleet.
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| **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.
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| **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.
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| **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.
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| **Unit – 7**  | **Skip winding** * Describe constructional features bottom discharge skip, Top discharge skip.
* Compare skip winding cage winding.
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| **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.
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**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 RopesWire 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 HaulageRope 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 haulageAdvantages  | Internet  |
| 18 |  | 2 | Endless rope haulageAdvantages of endless haulageDisadvantages 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 catchStop-blockBackstayDrop 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 viewPit bottom circuit**:** | Internet  |
| 62 |  | 2 | Non-circular type circuitsBack shunt circuitTurn table circuit | Internet  |

Signature of

Faculty Member HOD Principal/ Director