# IIPM SCHOOL OF ENGINEERING & TECHNOLOGY

**LESSON PLAN: 2020-21**

# Sub: Th.2- Mine Hazard and Safety (MHS)

## Branch : Mining

**Faculty name** **:** **Soumya Ranjan Dash**

## Semester : 5th

**Duration** **:** **64 hours**

## Objective :

* Testing of different mine gases. Physiological effect on miners, detection of fire damp by flame safety lamp, explains the method of gas testing by CO-detectors & methanometer.
* Explain how firedamp is emitted in mines.
* Explain causes of mine fires & spontaneous heating.
* Define explosion, explain causes & elaborate necessary steps required for prevention of coal dust & firedamp explosion.
* Define mine inundation, explain causes & elaborate necessary preventive measures required.
* Describe lighting arrangement, lighting standards explain glare & its effect
* Explain the effect of noise & vibration on miners & mine structures & other surface structure.
* Explain rescue and recovery work when mine hazard occurs.

**Learning Outcome:** As a Mining Engineer, one must be thoroughly conversant with various sources of mining hazards as also the remedial measures needed to be undertaken to avoid any mishap and able to understand total operation of rescue and recovery.

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| **Sl. No** | **Chapter** | **Proposed Week for Teaching** | **Lecture No.** | **Sub. Topic** | **Important Teaching Points** | **Content Source** |
| 01 | **I** | 1ST | 01 | Mine gases & gas testing | Different Hazards in Mines and summary of general safety measures in  underground mine | G B Mishra M A Ramlu |
| 02 | 02 | Mine gases & gas testing | Mine atmosphere, Properties & Physical effects different type of  Mine Gases | G B Mishra M A Ramlu |
| 03 | 03 | Mine gases & gas testing | Fire damp, black damp,  stink damp, white damp & after damp | G B Mishra M A Ramlu |

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| 04 |  |  | 04 | Mine gases & gas testing | Working principle of Flame Safety lamp | G B Mishra M A Ramlu |
| 05 | 2ND | 01 | Mine gases & gas testing | Accumulation &  percentage test by Flame safety lamp | G B Mishra M A Ramlu |
| 06 | 02 | Mine gases & gas testing | Precaution for gas testing | G B Mishra M A Ramlu |
| 07 | 03 | Mine gases & gas testing | Various parts of Flame safety lamp | G B Mishra M A Ramlu |
| 08 | 04 | Mine gases & gas testing | Limitation of Flame safety lamp | G B Mishra M A Ramlu |
| 09 | **II** | 3RD | 01 | Emission of firedamp in U/g workings | Gradual exudation, blower and outbursts of  firedamp in underground mine | G B Mishra M A Ramlu |
| 10 | **I & II** | 02 | Mine gases & gas testing and Emission of firedamp in U/g  workings | Revision Class and Group discussion (Chapter 1&2) | ---------- |
| 11 | 03 | Mine gases & gas testing and Emission of firedamp in U/g  workings | Unit Test I-II | -------------- |
| 12 | 04 | Mine gases & gas testing and Emission of  firedamp in U/g workings | Doubt Clearing Class (Chapter 1&2) | ------------- |
| 13 | **III** | 4TH | 01 | Mine fires & spontaneous heating | Formation of Fire, triangle of fire | G B Mishra M A Ramlu |
| 14 | 02 | Mine fires &  spontaneous heating | Incubation period | G B Mishra M A Ramlu |
| 15 | 03 | Mine fires & spontaneous  heating | Spontaneous heating and its causes | G B Mishra M A Ramlu |
| 16 | 04 | Mine fires &  spontaneous heating | Effects of spontaneous heating | G B Mishra M A Ramlu |
| 17 | 5TH | 01 | Mine fires & spontaneous heating | Preventive measures against spontaneous heating | G B Mishra M A Ramlu |
| 18 | 02 | Mine fires & spontaneous  heating | CO/O2 ratio | G B Mishra M A Ramlu |
| 19 | 03 | Mine fires &  spontaneous heating | CO2/O2 ratio | G B Mishra M A Ramlu |
| 20 | 04 | Mine fires & spontaneous  heating | Revision Class and Group discussion  (Chapter 3) | ------------- |

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| 21 |  | 6TH | 01 | Mine fires &  spontaneous heating | Unit Test- III | -------------- |
| 22 | 02 | Mine fires & spontaneous heating | Doubt Clearing Class (Chapter 3) | ------------- |
| 23 | **IV** | 03 | Mine Explosion | Coal dust explosion, causes & prevention | G B Mishra M A Ramlu |
| 24 | 04 | Mine Explosion | Fire damp explosion, causes & prevention | G B Mishra M A Ramlu |
| 25 | 7TH | 01 | Mine Explosion | Inflammability of coal dust & fire damp | G B Mishra M A Ramlu |
| 26 | 02 | Mine Explosion | Coward’s diagram | G B Mishra M A Ramlu |
| 27 | 03 | Mine Explosion | Prevention, suppression & treatment of dust | G B Mishra M A Ramlu |
| 28 | 04 | Mine Explosion | Sampling of dust | G B Mishra M A Ramlu |
| 29 | 8TH | 01 | Mine Explosion | Stone dust barrier | G B Mishra M A Ramlu |
| 30 | 02 | Mine Explosion | Revision Class and  Group discussion (Chapter 4) | ------------ |
| 31 | 03 | Mine Explosion | Unit Test- IV | -------------- |
| 32 | 04 | Mine Explosion | Doubt Clearing Class (Chapter 4) | ------------- |
| 33 | **V** | 9TH | 01 | Mine Inundation | Surface water sources & Underground water sources in mines and its  danger | G B Mishra M A Ramlu |
| 34 | 02 | Mine Inundation | Precaution against Inundation | G B Mishra M A Ramlu |
| 35 | 03 | Mine Inundation | Burnside safety boring apparatus. VOLSAFE-  500 | G B Mishra M A Ramlu |
| 36 | 04 | Mine Inundation | Precaution while approaching water logged area and provision for working  near water body. | G B Mishra M A Ramlu |
| 37 | 10TH | 01 | Mine Inundation | Water dams- its  construction & design and water danger plan. | G B Mishra M A Ramlu |
| 38 | 02 | Mine Inundation | Revision Class and Group discussion  (Chapter 5) | ----------- |
| 39 | 03 | Mine Inundation | Unit Test- V | ----------- |

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| 40 |  |  | 04 | Mine Inundation | Doubt Clearing Class (Chapter 5) | ---------- |
| 41 | **VI** | 11TH | 01 | Mine lighting & Illumination | Illumination and its units. | G B Mishra M A Ramlu |
| 42 | 02 | Mine lighting & Illumination | Intensity of light, Luminous efficiency, Reflection, MHCP,  MSCP | G B Mishra M A Ramlu |
| 43 | 03 | Mine lighting & Illumination | Lighting in Mines (On  surface & bellow ground) | G B Mishra M A Ramlu |
| 44 | 04 | Mine lighting & Illumination | Standard of lighting according to DGMS  circular | G B Mishra M A Ramlu |
| 45 | **VII** | 12TH | 01 | Noises & Vibration | Sources of noise | G B Mishra M A Ramlu |
| 46 | 02 | Noises & Vibration | Vibration effect | G B Mishra M A Ramlu |
| 47 | 03 | Noises & Vibration | effect of noise &  vibration on miners & mine structures | G B Mishra M A Ramlu |
| 48 | **VI & VII** | 04 | Mine lighting & Illumination and Noises &  Vibration | Revision Class and Group discussion (Chapter 6-7) | ------------ |
| 49 | 13TH | 01 | Mine lighting & Illumination and Noises &  Vibration | Unit Test- VI & VII | ------------ |
| 50 | 02 | Mine lighting & Illumination and Noises &  Vibration | Doubt Clearing Class (Chapter 6-7) | ------------- |
| 51 | **VII** | 03 | Mine Rescue and Recovery | Proto-IV | G B Mishra M A Ramlu |
| 52 | 04 | Mine Rescue and Recovery | Proto-V | G B Mishra M A Ramlu |
| 53 | 14TH | 01 | Mine Rescue and Recovery | Drager BG-174, special features of the Drager BG-174 | G B Mishra M A Ramlu |
| 54 | 02 | Mine Rescue and Recovery | Self rescuer, Smoke helmet, Gas mask | G B Mishra M A Ramlu |
| 55 | 03 | Mine Rescue and Recovery | Construction of Rescue brigade and their role in  rescue and recovery operation | G B Mishra M A Ramlu |
| 56 | 04 | Mine Rescue and Recovery | Mine Rescue rules 1985 | DGMS |
| 57 | 15TH | 01 | Mine Rescue and Recovery | Mine Rescue rules 1985 Continue. | DGMS |

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| 58 |  |  | 02 | Mine Rescue and Recovery | Revision Class and  Group discussion (Chapter 8) | ------ |
| 59 | 03 | Mine Rescue and Recovery | Unit Test- VIII | ------- |
| 60 | 04 | Mine Rescue and Recovery | Doubt Clearing Class (Chapter 8) | -------- |

**Books Suggested:**

* Mine Ventilation G B Mishra
* Mine Rescue M A Ramlu

Signature of

## Faculty Member HOD Principal/ Director