# IIPM SCHOOL OF ENGINEERING & TECHNOLOGY

**LESSON PLAN: 2023-24**

# Sub: Th.1- Mine Geology-I (MG-I)

## Branch : Mining

**Faculty name : Soumya Ranjan Dash**

## Duration : 60 hours

**SYLLABUS:**

## Semester : 3RD

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| **UNIT-I** | 1. ***Physical Geology***    * **Define weathering and erosion.**    * **Explain with suitable sketches the erosional and depositional land forms produced by wind.**    * **Explain with neat sketches the erosional and depositional land forms produced by river.**    * **Differentiate between glacier and iceberg**    * **Describe the erosional and depositional features produced by glacier.**    * **Define moraine. Describe the different type of moraine with sketches.** |
| **UNIT-II** | 1. ***Petrology***    * **Define a Rock. Distinguish between a rock and a mineral.**    * **Define Igneous, Sedimentary and Metamorphic rocks.**    * **Describe the various textures and structures found in Igneous rocks.**    * **Describe some important structures of sedimentary rocks along with neat sketches.**    * **Describe various structure found in metamorphic rocks.** |
| **UNIT-III** | 1. ***Structural Geology***    * **Define Dip. Distinguish between true dip and apparent dip.**    * **Define strike.**    * **Define folds. Classify folds and describe them.**    * **Define faults. Describe the various types of fault.**    * **Define unconformity. Describe the various type of unconformity with neat sketches.**    * **Define joints. Describe various joints.** |
| **UNIT-IV** | 1. ***Element of Crystallography***    * **Define a crystal.**    * **Explain Miller’s indices.**    * **Describe the Symmetry elements and forms present in the normal class of isometric system.** |
| **UNIT-V** | 1. ***Elements of Mineralogy***    * **Define a mineral.**    * **Enumerate and describe the physical properties of minerals.**    * **Describe various optical properties of minerals.**    * **Explain briefly the silicate structures along with diagrams.**    * **Classify minerals.**    * **Describe mineralogy and physical properties of Olivine, Quartz, Feldspar and Pyroxene group of minerals.** |

**Books Suggested:**

* Textbook of Geology P.K Mukharjee
* Textbook of Geology
* Engineering Geology

G.B. Mohapatra K M Banger

## Objective :

* + Explain the dynamic natural agencies that are constantly moulding the landscape of earth. He will be able to visualize the erosional and depositional landforms created by natural agencies.
  + Distinguish between Igneous, Sedimentary and Metamorphic rocks and their texture and structures.
  + Distinguish and identify the various structures that one may encounter in the field.
  + Underline the importance of crystal structures in the identification and study of minerals.
  + Identify minerals based on their physical properties. They will possess a sound knowledge of silicate structures.

**Learning Outcome:** In majority of the cases, materials that need to be mined in order to reach the hidden treasure are rocks and minerals. It is therefore, essential for a mining engineer to have the basic knowledge of geology.

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| **Sl. No** | **Chapter** | **Proposed Week for Teaching** | **Lecture No.** | **Sub. Topic** | **Important Teaching Points** | **Content Source** |
| 01 | **I** | 1ST | 01 | Physical | Introduction to Geology |  |
| Geology |
| 02 | 02 | Physical | Description of | K.M. Banger, P27- |
| Geology | weathering and erosion of rocks and minerals in | 30  Savindra Singh, |
|  | nature | P247-256 |
| 03 | 03 | Physical | Erosional landforms | K.M. Banger, P33- |
| Geology | produced by wind activities | 34  G.B. Mahapatra, |
|  |  | P58-60 |
| 04 | 04 | Physical | Depositional landforms | K.M. Banger, P34- |
| Geology | produced by wind activities | 35  G.B. Mahapatra, |
|  |  | P60-62 |
| 05 | 2ND | 01 | Physical | Erosional landforms | K.M. Banger, P36- |
| Geology | produced by river and | 39 |

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|  |  |  |  |  | stream. | G.B. Mahapatra, |
| P52-56 |
| 06 | 02 | Physical | Depositional landforms | K.M. Banger, P39- |
| Geology | produced by river and stream | 42  G.B. Mahapatra, |
|  |  | P56-57 |
| 07 | 03 | Physical Geology | Differentiate between glacier and iceberg | Savindra Singh, P478 |
| 08 | 04 | Physical | Erosional landforms | K.M. Banger, P50- |
| Geology | produced by glacier | 52  G.B. Mahapatra, |
|  |  | P65-66 |
| 09 | 3RD | 01 | Physical | Depositional landforms | K.M. Banger, P53- |
| Geology | produced by glacier | 54  G.B. Mahapatra, |
|  |  | P66-67 |
| 10 | 02 | Physical Geology | Definition of moraine. | K.M. Banger, P53  Savindra Singh, P485-486 |
| 11 | 03 | Physical Geology | Description of different type of moraine | K.M. Banger, P53 Savindra Singh, P485-486 |
| 12 | 04 | Physical | Revision of Physical | --------- |
| Geology | Geology |
| 13 | 4TH | 01 | Physical Geology | Discussion and class presentation of Chapter 1 by students | --------- |
| 14 | 02 | Physical Geology | Unit Test (Chapter 1) | --------- |
| 15 | 03 | Physical Geology | Doubt Clearing Class (Chapter 1) | --------- |
| 16 | **II** | 04 | Petrology | Meaning of Petrology | P.K. Mukerjee, |
| and definition of Rock | P74-75  G.B. Mahapatra, |
|  | P183 |
| 17 | 5TH | 01 | Petrology | Distinguish between | P.K. Mukerjee, |
| Rock and minerals | P74-75  G.B. Mahapatra, |
|  | P183 |
| 18 | 02 | Petrology | Rock formation and Rock cycle | K.M. Banger, P163 |
| 19 | 03 | Petrology | Study about Igneous, | K.M. Banger, |
| Sedimentary and Metamorphic Rocks | P163  Savindra Singh, |
|  | P140-141 |
| 20 | 04 | Petrology | Texture of Igneous | K.M. Banger, |
| Rock | P165-169  P.K. Mukerjee, |
|  | P89-96 |
| 21 | 6TH | 01 | Petrology | Structure of Igneous Rock | K.M. Banger, P165-169 |

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| 22 |  |  | 02 | Petrology | Structures of Sedimentary Rocks | K.M. Banger |
| 23 | 03 | Petrology | Structures of Sedimentary Rocks | K.M. Banger |
| 24 | 04 | Petrology | Various structure in Metamorphic Rock | K.M. Banger |
| 25 | 7TH | 01 | Petrology | Revision of Petrology | K.M. Banger |
| 26 | 02 | Petrology | Doubt Clearing and class presentation of  Chapter 2 by students | --------------------- |
| 27 | 03 | Petrology | Unit Test (Chapter 2) | --------------------- |
| 28 | **III** | 04 | Structural Geology | Defination of Dip & Strike. Difference between true dip and apparent dip. | K.M. Banger, G.B. Mahapatra |
| 29 | 8TH | 01 | Structural Geology | Classification of folds and their description | K.M. Banger  G.B. Mahapatra |
| 30 | 02 | Structural Geology | Description of various types of fault. | K.M. Banger  G.B. Mahapatra |
| 31 | 03 | Structural Geology | Description of various type of unconformity.  Description of various joints. | K.M. Banger  G.B. Mahapatra |
| 32 | 04 | Structural Geology | Doubt Clearing and  class presentation of Chapter 3 by students | ---------------- |
| 33 | 9TH | 01 | Structural Geology | Unit Test (Chapter 3) | -------------- |
| 34 | **IV** | 02 | Element of Crystallography | Introduction to crystallography | K.M. Banger  G.B. Mahapatra |
| 35 | 03 | Element of Crystallography | Definition of crystal and nomenclature of  different elements present in a crystal | K.M. Banger  G.B. Mahapatra |
| 36 | 04 | Element of Crystallography | Symmetry elements | K.M. Banger  G.B. Mahapatra |
| 37 | 10TH | 01 | Element of Crystallography | Parameter and Indices | K.M. Banger  G.B. Mahapatra |
| 38 | 02 | Element of Crystallography | Miller’s Indices | K.M. Banger  G.B. Mahapatra |
| 39 | 03 | Element of Crystallography | Different types of crystal system | K.M. Banger  G.B. Mahapatra |
| 40 | 04 | Element of Crystallography | Symmetry Elements of Isometric system | K.M. Banger  G.B. Mahapatra |

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| 41 |  | 11TH | 01 | Element of Crystallography | Forms present in Isometric system | K.M. Banger  G.B. Mahapatra |
| 42 | 02 | Element of Crystallography | Revision of Crystallography | -------------- |
| 43 | 03 | Element of Crystallography | Discussion and class presentation of Chapter 4 by students | --------------- |
| 44 | 04 | Element of Crystallography | Unit Test (Chapter 4) | ---------------- |
| 45 | 12TH | 01 | Element of Crystallography | Doubt Clearing Class (Chapter 4) | ---------------- |
| 46 | **V** | 02 | Elements of Mineralogy | Introduction to Mineralogy and definition of Mineral | K.M. Banger  G.B. Mahapatra |
| 47 | 03 | Elements of Mineralogy | Description of physical properties of minerals. | K.M. Banger  G.B. Mahapatra |
| 48 | 04 | Elements of Mineralogy | Description of physical properties of minerals. | K.M. Banger  G.B. Mahapatra |
| 49 | 13TH | 01 | Elements of Mineralogy | Optical properties of minerals. | K.M. Banger  G.B. Mahapatra |
| 50 | 02 | Elements of Mineralogy | Silicate structures (Neso, soro, Cyclo) | K.M. Banger  G.B. Mahapatra |
| 51 | 03 | Elements of Mineralogy | Silicate structures (Ino, Phylo, Tekto) | K.M. Banger  G.B. Mahapatra |
| 52 | 04 | Elements of Mineralogy | Classification of  Minerals into different groups | K.M. Banger  G.B. Mahapatra |
| 53 | 14TH | 01 | Elements of Mineralogy | Olivine | K.M. Banger  G.B. Mahapatra |
| 54 | 02 | Elements of Mineralogy | Quartz | K.M. Banger  G.B. Mahapatra |
| 55 | 03 | Elements of Mineralogy | Feldspar | K.M. Banger  G.B. Mahapatra |
| 56 | 04 | Elements of Mineralogy | Pyroxene | K.M. Banger  G.B. Mahapatra |
| 57 | 15TH | 01 | Elements of Mineralogy | Revision of Mineralogy | ---------------- |
| 58 | 02 | Elements of Mineralogy | Discussion and class presentation of Chapter 5 by students | --------------- |
| 59 | 03 | Elements of Mineralogy | Unit Test (Chapter 5) | ------------------ |
| 60 | 04 | Elements of Mineralogy | Doubt Clearing Class (Chapter 5) | ---------------- |

Signature of

## Faculty Member HOD Principal/ Director