

4295 - MINING GEOLOGY									
Teaching Schedule Per Week			Progressive Assessment		Examination Schedule (Marks)				
Lectures	Practical	Credits			Theory		Practical Ex.	Total	
3	2	5	25	25	3 Hrs	100	50	200	
Pre-requisite		Source	Semester	Theory	Test	Total	TW	PR	Gr Total
4291		MIN		75	25	100	50	50	200

Rationale: The course content has been carefully structured to provide the basic knowledge of Mining Geology to Diploma Engineer which will help him in the field. The study of the occurrence, localisation and origin of mineral deposits and their relation to the enclosing rock has been included.

COURSE CONTENTS		Hrs	Mks
1. ELEMENTS OF ECONOMIC GEOLOGY		18	32
General objective: The student will be able to understand how the minerals are formed in nature and their geographical distribution in India.			
Ore minerals, Gangue minerals, Ore and Tenor of ores; National mineral resources and their statistics; Conservation and utilisation of mineral resources including coal; Metallogenic epochs, Metallogenic provinces; Classification of mineral deposits.			
A brief outline on the process of formation of mineral deposits- Magnetic Concentration; Contact metasomatism; Hydrothermal process; Sedimentation and evaporation; Residual and mechanical concentration; Oxidation and supergene enrichment; Metamorphic processes.			
Gossans and cappings, ore shoots and bonanza.			
Principal Indian Metalliferous deposits. A brief outline on their mode of occurrence, mode of origin, and distribution of major deposits in India; Iron, Manganese, Copper, Chromite, Gold, Lead & Zinc, Aluminium.			
2. MAJOR GEOLOGICAL FORMATIONS OF INDIA		9	20
General objective: To have basic knowledge of Indian Stratigraphy with emphasis on their economic importance. A brief review of their distribution, lithology, and classification with special emphasis on their economic importance. The Dharwar system; The Aravali system; The Cuddapah system; The Delhi system; The Gondawana system and the Deccan traps. An introduction to the stratigraphic succession of rocks in Goa. Distribution of minerals/building materials such as granite, basalt, dolerite, quartzite, clay, quartz, silica sand, lime shell, lime stone, building stone etc with specific reference to areas in and around Goa.			
3. GEOLOGY OF COAL		8	20
General objective: To provide insight into the geology of coal with special relation to Indian coal.			
What is coal? Physical properties of coal; Chemical composition of coal; Constitution of coal; Origin of coal and coal seams; Stages in coal formation; Varieties and ranks of coal; Important structural features of coal seams; Indian coals and list of important coal fields of India. State wise (Geology of individual coal fields excluded); Proximate and ultimate analysis.			
4. PALEONTOLOGY		4	12
General objective: To introduce the students to the importance of fossils.			
Fossils - What are fossils? Conditions which favour the preservation of fossils; Types of fossilisation; Uses of fossils; The index fossils; The nummulitic fossil; Understanding technical terms of different phylla.			

5. SAMPLING

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General objective: To have knowledge of various sampling techniques.

Definition and Principles of sampling; Errors in sampling; Size of sample; Types of sampling techniques; Collection and preservation of samples; Preparation of samples for assay; Sampling records; Assay maps; An outline knowledge on sample salting and accidental salting.

Total	48	100
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PRACTICALS:

1. Identification of some major economic (metallic & non-metallic) minerals with the help of their physical properties.
 - a) Iron:- Hematite, Magnetite, Limonite, Goethite, & Pyrite.
 - b) Manganese:- Pyrolusite, Psilomelane.
 - c) Copper:- Chalcopyrite, Malachite.
 - d) Lead:- Galena.
 - e) Zinc:- Sphalerite.
 - f) Chromium:- Chromite.
 - g) Aluminium:-Bauxite.
 - h) Other economic minerals.
 - i) Asbestos, Barytes, Beryl, Calcite, Coal (bituminous), Dolomite, Fluorite, Graphite.
 - j) Garnet, Gypsum, Lignite, Mica, Magnetite and Talc.
2. Sketching labelling & identification of fossils / shells.
 - a) Phylum: - Mollusca, Class Lamellibranchia - Meretrix, Arca, cardium, trigonia, Gryphea.
 - b) Phylum: Mollusca, Class Gastropoda - Turritella, Murex, Conus solarium, Cyprea.
 - c) Phylum: Mollusca, Class Cephalopoda, - Nautilus, Belemnite.
 - d) Phylum: Echinodermata, Class Echinoidea, - Schizaster, Micraster.
 - e) Phylum: Brachipoda, Class Articulata (inarticulata).
 - f) Phylum: Arthropoda, Class Trilobita- Phacops.
 - g) Plant fossils- Glossopteris, Neuropteris, Fossil wood.
3. Solution of geological maps.
 - a) Topographical map and geological map. 01
 - b) Important points in map reading and interpretation. 01
 - c) Maps on horizontal strata. 02
 - d) Maps on inclined strata. 02
 - f) Maps on unconformities. 02
 - g) Revision. 01
 - h) Some maps to be given for home assignments.

REFERENCE BOOKS:

1. Economic Mineral Deposits by Alan M. Bateman.
2. Elements of Mineral Exploration IBM Publication.
3. Introduction to India's Economic Minerals Ore Deposits of India by Gokhle & Rao.
4. India's Mineral Resources by S. Krishnaswamy.
5. Dana's Manual of Mineralogy by Cornelius S. Hurlbert.
6. Geology of India by D. N. Wadia.
7. Elements of Mineralogy by H. H. Reed.
8. Fundamentals of Historical Geology by Ravindra Kumar (Wiley Eastern edition)
9. Geology of India & Burma by M. S. Krishna, C. B. S. Publishers.
10. Courses in Mining Geology by R. N. P. Arogyaswamy (Oxford & IBH Pub)
11. Manual of Geological Maps by Gokhale, C. B. S. Publishers.
12. A book of Geological maps by Chada S. K., C. B. S. Publishers.
13. Mining Geology by H. E. Mekinsby, Asia Publishing House.

