Department of Mineral Processing

PROGRAM OUTCOMES, PROGRAM SPECIFIC OUTCOMES, COURSE OUTCOMES

Department: Mineral Processing

	Master of Technology (M.Tech)
Programme Outcome	This course will provide a sound knowledge of ores and minerals and separation of valuable minerals from respective ores using various mineral processing unit operations. The programme also gives a handson and simulates their behaviour at laboratory and pilot scale. After completing this course one should be able to apply the knowledge gained in this subject to many other complex engineering systems/processes
Programme Specific Outcome	1. Graduates will demonstrate an ability to apply knowledge of Mineral engineering, mathematics, probability and statistics as it applies to the field of Mineral engineering. 2. Graduates will demonstrate in depth knowledge of topics, which are critical in separation of Minerals, sizing, classification and separation of valuable minerals from respective ores by various mineral processing methods etc. 3. Graduates will demonstrate the ability to function as a member of engineering and science laboratory teams, as well as on multidisciplinary design teams. 4. Graduates will demonstrate the ability to learn and work independently to identify and solve mineral engineering related problems by simulation and by taking plant trials. 5. Graduates will demonstrate an understanding of professional and ethical responsibilities. 6. Graduates will posses effective communication skills both orally and in writing. 7. Graduates will be truly educated and will have a point of view regarding global scenario of the impact of mining and mineral sector on society and especially on environment will demonstrate awareness of contemporary issues at large.

Course Outcome		
Course Code	**Course Title**	**Course Outcome**
MPHC1.1	Minerology	Students are able to understand and identify the various types of Minerals andtheir crystal Structure and the Properties of the minerals also the preparetion of minerological samples for microscopic studies
MPHC1.2	Petrology and Elements of Mining	Students are sable to study the different types rock formations termed as Petrology is next essential basic foundation course for mineral processing. and able to indentify and the brief the properties and formation of the rocks . the course is also gives the idea of the mining operations is a pre-processing step, the study of elements of mining helps the mineral processing engineer in an integrated mineral enterprise
MPHC1.3	Elements of Mechnaical Engineering	Students will come to know about the Fundamental aspects of mechnaics of machines and the machine elements and their usage in the assembly of machine also able to read the drawing of the machine
MPSC1.4	Elelments of Electrical Engineering	Able to understand the basic concepts of electrical circuits and their workinf nature at industrial level and also cousre briefs the theroy of elctrical methods to control and optmize the operations
MPSC1.5	Applied Mathematics and Statastics	Students will able solve the complex Linear equations of first degree, quadratic equations, solutions by factoring, system of simultaneous equations, analytical solution of a equation and also helps to model the mineral processing process / systems in the future semsters
MPHC2.1	Ore Geology	students are able to understand and identify the Ore deposits associated with metamorphism: Graphite, Asbestos, Talc, Soapstone, Andulasite, Sillimanite, Kyanite and Metallogenic epochs and provinces. Ore deposits related to plate tectonics, control of Ore localization.
MPHC2.2	Assaying	Studnets are exposed to various chemcial analysis methods for testing the ore quality and able to understand and tetsing methods for each groupof minerals
MPHC2.3	Mineral Processing 1	students are introduced to fundamentals of Mineral Processing techniques – Gravity methods, Physico-chemical methods and chemical processing.Analysis of separation processes- Thermodynamics, Kinetics, Determination of separatability curves, Separation efficiency and able think and choise the best route for beneficiation for group of minerals
MPSC2.4	Tetsing of Materials and Transport Phenomenon	Students will understand and able to work on various metalic operations and quantify the strength of materials by various the testing methods

MPSC2.5	Computer Basics and Programming in C and C++	students will able to understand and write the computer program for specific objectives for solving mineral based problems using computer programming
MPHC3.1	Ore Microscopy and Research Methology	Students can understand and report the microscopic obsservations of minerals and also write the report of interest
MPHC3.2	Mineral Processing -II	Student can able to work on settling tanks of different settling velocity of particles and can demonstrate and performs the gravity separation operations in mineral industries
MPHC3.3	Coal Preparetion and Fuel Technology	Student can able to perform the proximate and ultimate analysis of caol samples and also for other properties like gray king index , micum index and roga index etc.,
MPSC3.4	Surface Chemistry	Student can bale to identify the molicular structure and surfacila properties of the mineral as well as flotation reagents by various methods and suggest the group of reagents for mineral separation by flotation and other separation technique.
MPSC3.5	Mineral Deposits and Plant Flowsheets	Student can able to know and understand about Metallic and Non-metallic Mineral Deposits of India with reference to Origin Mode of occurrence, Mineralogy, Distribution, Production, Process Flow-sheets, Uses and Trades in India. Metallic deposits and also Fuel Minerals: Oil and Gas, Coal & Lignite. Definition, Composition, types and Ranks of Coals, Macerals and Lithotypes and their distribution. Distribution and Mode of Occurrence of Radioactive Minerals.
MPHC4.1	Mineral Processing -III	student will exposed to Flotation Machines: Basic machine features and function. Classification of flotation machines. Bubble generation. Design features of different machines. Like Denver flotation cell, Fagergren flotation cell, flotation cell, Column flotation, Jameson cell and Dual Extraction Column etc,. Study of Flotation circuits like roughing, scavenging and cleaning etc and also perform the flotation operation of minerals
MPHC4.2	Non Ferrous Extractive metallurgy	Studnets are able to understand the process and processing methods of lean grade non metallic ores and their extraction principles.
MPHC4.3	Mineral Processing IV	Student can perform the Magnetic separation studies on given ore samples and generate the products . Student can also perform the dewaterin studies on generated tailings or other mineral slurries
MPSC4.4	Mineral Processing Plant Design -I	Student are able to perform the activities like design and selelction of plant equipments such as crushing and grinding circuit design and selelction Process and plant design for Dense media separation. Metallurgical, Operating and Economic characteristics. Flow sheet development.
MPSC4.5	Process Control and Automation	Student can able to understand the control and optimization tools avalibale in the industry and also can suggest the better route for controlling process parameters in mineral industries

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MPHC5.1	Enviornmental Management and Mineral processing Economics	Student are able to understand the pros and cons of industrial pollutions and their impacts on environment and perform the new conceptual design to control and avoid the pollution caused by mineral industries
MPHC5.2	Agglomeration and Cement Making	Student can able to perform the pellletization , Brequetting and sintering of ore samples and also give inputs for cement making technology for enhancing the product quality
MPHC5.3	Ferrous Extractive Metallurgy	Student can able to perform the raw material tests for blast furnace for iron making and also understand the consequences of blast furncae design and operations to produce iron
MPSC5.4	Mineral Processing Plant Design -II	studnet will able to give valuable input for desiging of Belt conveyers: Design, Selection, Stackers and Reclaimers. Slurry transportation Operations: Design and Application of a Centrifugal slurry pump, Design and construction of Tailing ponds and water Reclamation facilities. Environmental considerations in mill sites. Dust collection systems – Electrostatic system design and Equipment applications. Design and construction of Modern Mineral Processing Plant and Flow Sheets.
MPSC5.5	Simulation and Modelling	Student Can able to perform the basic modellling and simulate the unit plant operations in mineral industry for effective utilization of equipments

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