

MINE LEGISLATION [As per Choice Based Credit System (CBCS) scheme] SEMESTER – VIII (Mining Engineering)			
Sub Code	15MN81	IA Marks	20
Number of LectureHours/week	04(L)	Exam Hours	03
Total Number of Lecture Hours	50	Exam Marks	80
Credit = 04			
Modules			Teaching Hours
MODULE- 1:Introduction and the mines Act, 1952			
Brief historical perspective legislation in Indian Mines. Preliminary, Inspectors and Certifying surgeons, committee, mining operations and management of mines. Provisions to health and safety. Hours and limitations of employment Leave with wages, Regulations and bylaws, penalties and procedures.			10 Hours
MODULE- 2: Mines Rules,1955			
Preliminary, committee, court of enquiry, certifying surgeons, Medical Examination of persons employed. Workmen’s inspector and safety committee, health and sanitation provision, first aid and medical appliance. Employment of persons, leave with wages and overtime. Welfare amenities, registers and notices.			10 Hours
MODULE- 3: Metalliferous mines regulation,1961 and Coal mines regulations,2017			
Preliminary returns, notices and records, inspectors and mine officials, duties and responsibilities of work men, plans and sections, means of access, ladders and ladder ways, transport of men and materials, winding in shafts, transport of men and material haulage, mine workings, precaution against dangers from fire, dust gas and water, ventilation, lighting and safety lamps, Explosives and shot firing, machinery, plants and equipments.			10 Hours
MODULE- 4: Mines and Minerals (Development and Regulation) Act, 1952 and related rules			
Mines and Minerals (Development & Regulation) Act, 1957, Mineral Concession Rules, 1960and Mineral conservation and Development Rules. Salient provisions of the mines.			
MODULE- 5: Miscellaneous			
Salient Features of: The Mines Creche Rules, 1966, Maternity Benefit Act and Rules; Indian electricity Rules, 1956 and Coal Mines Provident Fund Act and Rules.			10 Hours
Question Paper Pattern:			

- The question paper will have ten questions.
- Each full Question consisting of 16 marks
- There will be 2 full questions (with a maximum of four sub questions) from each module. Each full question will have sub questions covering all the topics under a module.
- The students will have to answer 5 full questions, selecting one full question from each module.

TEXT BOOKS:

1. Mines Act 1952, Mines Rules 1955, Universal Law Publishing, Pvt. Ltd., 1999.
2. Metalliferous Mines Regulations 1961, Universal Law Publishing Pvt. Ltd., 1999.
3. Coal Mines Regulation 1957, Universal Law Publishing Pvt. Ltd., 1999
4. MM (R & D) Act, 1957
5. MCDR, MCR, 1960

REFERENCE BOOKS:

1. Legislation in Indian Mines – A critical Appraisal Prasad and Rakesh, 5th edition Tara Printing Works, varanasi, 1990.
2. Maternity Benefit Act, & Mines Crèche Rules, Universal Law Publishing Pvt. Ltd., 1999.
3. Encyclopedia of Mining Law – D.D. Seth. Law Publishers (India) Pvt. Ltd., Allahabad, 1999.
4. Mine Management Legislation and General Safety, S. Ghatak, Coal Field Publishers, Asansol, 1999.

MINE MANAGEMENT [As per Choice Based Credit System (CBCS) scheme] SEMESTER – VIII (Mining Engineering)			
Sub Code	15MN82	IA Marks	20
Number of Lecture Hours/week	04(L)	Exam Hours	03
Total Number of Lecture Hours	50	Exam Marks	80
Credit = 04			
Course objectives: This course will enable students to:			
<ol style="list-style-type: none"> 1. To describe various environmental pollutions due to Mining industry and its monitoring and prevention measures 2. To explain the environmental pollutions controlling measures. 3. To prepare EIA and EMP 			
Modules			Teaching Hours
MODULE- 1: Brief History of Management			
Evolution of Management, traditional management, Scientific management, Contribution of pioneers to scientific management, Functions of management, Principles of Management. Mine management: Duties and responsibilities of mines manager.			08 Hours
MODULE- 2: Organization and Industrial Ownership			
Characteristics of Organization, Principles of organization, types of organization, management of conflict, management by exception, management by objective (MBO). Mine organization: Opencast and underground mines. Industrial ownership: Definition, types of ownership, single ownership, partnership, Joint Stock Companies, co-operatives organization and State and central government owned. Mine ownership: duties and responsibilities of mine owner.			09 Hours
MODULE- 3: Personal Management, Industrial Psychology and Human Relation			
Personal Management: Functions of personnel management, recruitment and selection of employees. Education and training: mines vocational training center. Communication: formal and informal communication, barriers in communication and techniques to overcome barriers and improve communication. Industrial Psychology and Human Relation: Definition, scope of industrial psychology, aims of industrial psychology. Group Dynamics. Motivation: definition, characteristics of motivation, kinds of motivation, factors affecting motivation, motivational techniques, theories of motivation. Maslow's hierarchy of needs, Theory X and Y, Hawthorne experiment.			12 Hours

MODULE- 4: Industrial Relations and Legislation	
Introduction, basic requirement of industrial –relation programme. Trade unions: definition, functions of trade unions. Industrial disputes: causes, settlement of industrial disputes, handling of workers’ grievances. Workers participation in management, work of ILO. Necessity of labour legislation, principles of labour legislation. Important provisions of factories act, payment of wages act, Workmen’s Compensation act, Employee state insurance Act.	10 Hours
MODULE- 5: Work Study and Management Information System (MIS)	
Definition, productivity and work study, position of work study department in the organization, work study man, work study and the workers, work study and the management. Motion Study: Definition, aims of motion study, procedure for motion study, micro motion study, motion economy. Time Study: Definition, uses of time study, procedure, performance rating number of cycles to be timed, allowances, uses of time study data for wage incentives. Standard Data: Advantages, Methods for determining Standard Data, Work factor system, Method Time Measurement (MTM), Basic Motion Time Study. Management Information System (MIS): Introduction, Need for Information System, Characteristics of Good MIS, Sources of Information, application of MIS, design of MIS, development, Implementation of MIS.	11 Hours
Question Paper Pattern:	
<ul style="list-style-type: none"> • The question paper will have ten questions. • Each full Question consisting of 16 marks • There will be 2 full questions (with a maximum of four sub questions) from each module. Each full question will have sub questions covering all the topics under a module. • The students will have to answer 5 full questions, selecting one full question from each module. 	
TEXT BOOKS:	
<ol style="list-style-type: none"> 1. Mine Management, Legislation and General Safety, S. Ghatak, Coal Field Publishers, Asansol, 1999. 2. Management by Harold Koontz and Heinz Wehrich, Mc Graw Hill Company, 1990. 	
REFERENCE BOOKS:	
<ol style="list-style-type: none"> 1. Industrial Organization and Engineering Economics, Banga and Sharma, Khanna Publication, New Delhi, 1999. 2. Legislation in Indian Mines: A Critical Appraisal, Published by Vivek, P-8, New Medical Enclave, B.H.U., Varanasi, 1992. 3. Modern Production Management, Buffa, John Wiley and Sons, 1998. Industrial Management, O.P.Khanna, Dhanpat Rai and Sons, 1999. 4. Mine Management, V.N. Singh, Lovely Prakashan, 2003. 	

Professional Elective-V ENVIRONMENTAL IMPACTS OF MINING [As per Choice Based Credit System (CBCS) scheme] SEMESTER – VIII (Mining Engineering)			
Sub Code	15MN831	IA Marks	20
Number of Lecture Hours/week	03(L) + 01(T)	Exam Hours	03
Total Number of Lecture Hours	40	Exam Marks	80
Credit = 03			
Course objectives:			
This course will enable students to:			
<ol style="list-style-type: none"> 1. To describe various environmental pollutions due to Mining industry and its monitoring and prevention measures 2. To explain the environmental pollutions controlling measures. 3. To prepare EIA and EMP 			
Modules			Teaching Hours
MODULE- 1:			
Introduction: Sustainable development, environmental carrying capacity - concepts & principles; Environmental impacts of mining and associated activities.			08 Hours
Ecology: Introduction to ecology, ecosystem structures and functions.			
MODULE- 2:			
Air pollution: Atmospheric composition and meteorology; Sources of air pollution – point and non-point; Emission factors; Control measures – extraction, suppression and consolidation of dust.			08 Hours
MODULE- 3:			
Water pollution: Global hydrological cycle; Self-purification mechanism, sources of water pollution, important parameters–pH, turbidity, oil & grease, nitrates, DO, BOD, COD; Eutrophication, deoxygenating, acid mine drainage and heavy metal pollution– preventive and control measures.			08 Hours
MODULE- 4:			
Noise Pollution: Problems of noise, noise sources and levels, remedial measures; Ground vibration: Nature of ground vibration from blasting, measurement & recording, prediction of ground vibration levels, effects of ground vibrations.			08 Hours
MODULE- 5:			
Land environment: Land degradation due to mining; Physical and			08 Hours

<p>biological reclamation.</p> <p>Environmental administration: Laws related to mining environment; EIA of mining projects.</p> <p>Land Acquisition & Revenue: Concepts; Related laws and regulations.</p> <p>Corporate Social Responsibility: Concepts and principles.</p>	
<p>Course outcomes:</p> <p>At the end of the course students will be able to:</p> <ol style="list-style-type: none"> 1. Ability to describe various environmental pollutions due to Mining industry and its monitoring and prevention measures. 2. Ability to explain the environmental pollutions controlling measures. 3. Ability to prepare EIA and EMP. 	
<p>Question Paper Pattern:</p>	
<ul style="list-style-type: none"> • The question paper will have ten questions. • Each full Question consisting of 16 marks • There will be 2 full questions (with a maximum of four sub questions) from each module. Each full question will have sub questions covering all the topics under a module. • The students will have to answer 5 full questions, selecting one full question from each module. 	
<p>TEXT BOOKS:</p>	
<ol style="list-style-type: none"> 1. Environmental Impact of Mining, C.G. Down Ph.D. and J. Stock, Second Edition Applied Science Publishers Ltd. London, 1980. 2. Environmental management of Mining Operations, B.B. Dhar, Ashish Publishing House, New Delhi, 1986. 	
<p>REFERENCE BOOKS:</p>	
<ol style="list-style-type: none"> 1. Surface Mining Environment and Reclamation A. Hussain Samya, Standard Publishers, 1998. Mine Environment and Management (An Indian Scenario), A.B.Choudhury, Ashish Publishing House, New Delhi, 1992. 2. Environmental Pollution Control Engineering, C.S. Rao, Wiley Eastern Ltd. 1992. 3. Environmental Challenges C.K. Varshney D.R. Srdesai, Wiley Eastern Ltd. 1993. 4. Environmental Issues in Mineral Resources Development K.L. Rai, Gyan Publishing House, 1993. 5. The Impact of Mining on the Environment, Problems and Solutions, Oxford and IBH, New Delhi, 1994. 6. Water Pollution, Causes, effects and Control, P.K. Goel, New Age International Publishers, 1997. 	

Professional Elective-V DIMENSIONAL STONE MINING [As per Choice Based Credit System (CBCS) scheme] SEMESTER – VIII (Mining Engineering)			
Sub Code	15MN832	IA Marks	20
Number of Lecture Hours/week	03(L) + 01(T)	Exam Hours	03
Total Number of Lecture Hours	40	Exam Marks	80
Credit = 03			
Modules			Teaching Hours
MODULE- 1:			
Introduction: Definition, historical use of natural stones. Geology and occurrences: Classification of dimensional stones, composition, chemical and geo-chemical properties, various standards for normalization of dimensional stones.			08 Hours
MODULE- 2:			
Mining of dimensional stones: Various techniques of dimensional stone mining – block mining and slab mining; Manual mining; Mechanized mining – line drilling, in-situ sawing by wire saw, chain saw, portable circular saw, flame cutting.			08 Hours
Cutting / Sawing tools: Tool carrier – circular steel blade, steel wire rope, chain jib saw, physical and mechanical properties, elastic properties, tension etc.; Cutting tools – diamond segments, diamond pearls / bits, tungsten bits etc.; Process of manufacture, ingredients, brazing / fitting, wearing pattern and control; Cost of cutting.			
MODULE- 3:			
Handling of blocks and slabs: Equipment used - derrick crane, front loaders, fork-lifts, mobile cranes, trucks and trailers.			08 Hours
Quarrying machines for dimensional stones: Portable circular saw, wire saw, chain saw, line drills – special design features of the machines, their use and maintenance.			
Production monitoring: Recovery, waste generation, productivity, inherent defects, measurement and corrective actions, cost evaluation.			

MODULE- 4:	
<p>Environmental issues: Management of solid waste, slurry waste, soil land and water; Protection and rehabilitation.</p> <p>Health, safety and welfare: Protective care from abrasive dust, personal safety and welfare.</p>	08 Hours
MODULE- 5:	
<p>Application, processing and architecture in dimensional stone: Application – flooring, roofing, cladding, stairs, paving, facets; Processing and polishing – various techniques for sawing of blocks, shaping of edges, polishing and calibration; Fixing and installation – techniques of fixing of dimensional stones in various applications like flooring, cladding, faceds, stairs, roofing and paving; Care and maintenance of dimensional stones – techniques for post fixing care and maintenance of dimensional stones in various applications.</p>	08 Hours
Question Paper Pattern:	
<ul style="list-style-type: none"> • The question paper will have ten questions. • Each full Question consisting of 16 marks • There will be 2 full questions (with a maximum of four sub questions) from each module. Each full question will have sub questions covering all the topics under a module. • The students will have to answer 5 full questions, selecting one full question from each module. 	
TEXT BOOKS:	
<ol style="list-style-type: none"> 1. Rathore S. S., Bhardwaj G. S., Jain S. C.; “Dimensional Stone Technology” Himanshu Publication New Delhi. 2. Rathore S. S., Gupta Y. C., Parmar R. L.; “Recent Development in Machinery and Equipment for Dimensional Stone Mining” held Dec. 13-14, 2003 at Udaipur. 	
REFERENCE BOOKS:	
<ol style="list-style-type: none"> 1. Rathore S. S., Laxminarayana V.; “Safety and Technology in Marble Mining and Processing in New Millennium” Proc. of National Workshop held march 10-11 200 Udaipur. 2. India Stones, Business Magazine on Indian Stone Industry, Pub. ICONZ Communications, 203, Mahaveer Residency, 15 Main J. P. Nagar, 5th phase, Bangalore. 	

Professional Elective-V COAL BED METHANE [As per Choice Based Credit System (CBCS) scheme] SEMESTER – VIII (Mining Engineering)			
Sub Code	15MN833	IA Marks	20
Number of Lecture Hours/week	03(L) + 01(T)	Exam Hours	03
Total Number of Lecture Hours	40	Exam Marks	80
Credit = 03			
Course objectives: This course will enable students to: <ol style="list-style-type: none"> To understand the philosophy of coal bed methane production To interpret coal specific tests such as sorption tests, sorption isotherms and well tests To evaluate coal bed methane exploration and development opportunities To compute gas in the reservoirs and estimate ultimate recovery 			
Modules			Teaching Hours
MODULE- 1: Introduction:			
Overview of- coal bed methane (CBM) in India — CBM vs conventional reservoirs. Geological influences on coal formation of coals-Coal chemistry-Significance of rank-Cleat system and natural fracture. Sorption: Principles of Adsorption-The Isotherm construction-CH ₄ retention by coal seams-CH ₄ content determination in coal seams-The isotherm for recovery prediction model of the micro-pores-coal sorption of other molecular species.			08 Hours
MODULE- 2: Reservoir Analysis			
Coal as a reservoir-Permeability-Porosity-Gas flow-Reserve analysis-Well spacing and drainage area-Enhanced recovery. Well Construction: Drilling-Cementing. Completions: Open hole completions-Open hole cavitation process, Cased hole completions- Multi zone entry in cased hole.			08 Hours
MODULE- 3: Formation Evaluations, Logging			
Borehole environment-Tool measurement response in coal-wire line log evaluation of CBM wells-Gas-In-Place calculations-Recovery factor-Drainage area calculations-Coal permeability/ Cleating-Natural fracturing and stress orientation-Mechanical rock properties in CBM evaluation.			08 Hours

MODULE- 4: Hydraulic fracturing of coal seams	
Need for fracturing coals-Unique problems in fracturing coals-Types of fracturing fluids for coal-In situ conditions-Visual observation of fractures.	08 Hours
MODULE- 5: Water production and disposal	
Water production rates from methane wells-Chemical content-Environmental regulations-Water disposal techniques-Economics of coal bed methane recovery.	08 Hours
Course outcomes: At the end of the course students will be able to: 1. The student would be in a position to have knowledge of interpreting various techniques involved in enhancing the recovery of coal bed methane.	
Question Paper Pattern:	
<ul style="list-style-type: none"> • The question paper will have ten questions. • Each full Question consisting of 16 marks • There will be 2 full questions (with a maximum of four sub questions) from each module. Each full question will have sub questions covering all the topics under a module. • The students will have to answer 5 full questions, selecting one full question from each module. 	
TEXT BOOKS:	
<ol style="list-style-type: none"> 1. Coal Bed Methane: Principles and Practice, R. E. Roger, 3rd Edition, Prentice Hall, 1991. 2. Coal Bed Methane-Robert A. Lamarre, American Association of Petroleum Geologists, 2008. 	
REFERENCE BOOKS:	
<ol style="list-style-type: none"> 1. Fundamentals of Coal Bed Methane reservoir Engineering, John Seidle, Pennwell Corp., 2011. 2. Coal Bed Methane, Society of Petroleum, 1992. 3. A Guide to coal bed methane operations, B. A. Hollub. Society of petroleum 1992 	

Professional Elective-V MINING GEOSTATISTICS [As per Choice Based Credit System (CBCS) scheme] SEMESTER – VIII (Mining Engineering)			
Sub Code	15MN834	IA Marks	20
Number of Lecture Hours/week	03(L) + 01(T)	Exam Hours	03
Total Number of Lecture Hours	40	Exam Marks	80
Credit = 03			
Modules			Teaching Hours
MODULE- 1: Introduction to Geostatistics			
Definition, Schools of geostatistics. Estimation models for mine evaluation – average method, polygonal or triangular method.			06 Hours
MODULE- 2:Deterministic Mathematical Model			
Independent random model, trend with random noise, correlated random model and trend with correlated random residuals.			08 Hours
MODULE- 3:			
Correlated Random Theory-1: Semi Variogram: Definition of semi variogram, mathematical models of semi-variogram. Practical problems – Isotropy and anisotropy, stationarity, regularization, nugget effect.			09 Hours
MODULE- 4:			
Correlated Random Theory- 2: Extension Variance and Estimation Variance: Extension and estimation variance, calculation of estimation variance, the nugget effect and estimation variance, examples, auxiliary functions. Correlated Random Theory – 3: Kriging: Kriging and optimal valuation, kriging equations in general cases.			09 Hours
MODULE- 5:			
The Integrated Geological – Geostatistical System: Statistical analysis, comparative statistical analysis, geostatistical structural analysis, trend analysis, point kriging cross validation, block kriging, mineral inventory, grade – tonnage relations, examples to assess ore and metal recoveries. Example to calculate planning cut-off grade. Optimization of drilling programme. Misclassified tonnages – actual Vs estimated. Grade control.			08 Hours

Question Paper Pattern:

- The question paper will have ten questions.
- Each full Question consisting of 16 marks
- There will be 2 full questions (with a maximum of four sub questions) from each module. Each full question will have sub questions covering all the topics under a module.
- The students will have to answer 5 full questions, selecting one full question from each module.

TEXT BOOKS:

1. An Introduction to Applied Geostatistics, Issaks and Srivastava, Oxford, IBH, 1990.
2. Mining Geostatistics, Journel, A.G. and Huigbregts, Ch. J., John Wiley and Sons, 1978.

REFERENCE BOOKS:

1. An Introduction to Geostatistical Methods of Mineral Evaluation, Rendu J.M. John Wiley and Sons, 1981.
2. geostatistical Ore Reserve Estimation, Dravid, Michel, Mc. Graw Hill, 1977.

PROJECT PHASE – II

[As per Choice Based Credit System (CBCS) scheme]

SEMESTER –VIII (Mining Engineering)

Laboratory Code	15MN85	IA Marks	20
Number of Lecture Hours/week		Exam Hours	03
Total Hours	42	Exam Marks	80

Credit = 06

Course Objectives:

1. To encourage the students to work in a group so that they will develop team and leadership qualities.
2. To make the students to learn the preparation of a detailed project proposal, execution of the project and preparation and presentation of a final project report.
3. To develop in the students multi skills.
4. To develop in the students' communication skills.

Guide Lines for Project Work:

1. Project can be undertaken in-house or in an industry or in a research /service organization.
2. Generally a Project batch consists of a minimum of 2 students and a maximum of 4 students.
3. The Project Synopsis should be approved within a period of 15 days by a committee consisting of Head of the concerned department as a Chairman and two senior teachers of the department of which one may be the internal guide.
4. The topic of the project may be in the same branch in which the student is studying, or it may be multidisciplinary. It may involve investigation/ analytical study / experimental work / fabrication / Statistical study / simulation etc. it may also be field oriented. The project should be preferably be taken in the latest trends in Engineering and Technology.
5. There should be a project monitoring committee in each department consisting of Head of the Department and two senior teachers of the Department.
6. Attendance for Project Work will be treated on par with any other practical / practical course.
7. Laboratory slot of 4 hours / week as indicated in the scheme is to be provided by the department.
8. The staff members will be shown a load of 3 hours (1½ units) for guiding, generally 4 batches of students.