

**RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL**

**New Scheme Based On AICTE Flexible Curricula**

**Mining and Mineral Processing, VIII-Semester**

**MM 801- MINING MACHINERY III**

**UNIT 1: FACE MACHINERY**

Coal and rock Drilling, their constructional details, their applications, operation and maintenance, jumbo drill machines, introduction to coal cutting machine.

**UNIT 2: LOADING AND TRANSPORTATION**

Rocker shovel, gathering arms loaders, LHD and SDL machines- their construction and operation and maintenance, , shuttle car and underground trucks, its construction, operation and application.

**UNIT 3: CUTTER LOADERS**

Different types of cutter loaders suitable for long wall and short wall faces, their constructions, operation and maintenance, winning methods different types of continuous miner & road headers their suitability, construction, operation and maintenance , mechanics of rock cutting, rock cutting tools and their performance.

**UNIT 4: COMPRESSED AIR**

Basic concept, compression process, working and constructional features of single stage and multistage compressor, unloading arrangement of compressor, layout of pipelines, transmission of compressed air, testing of compressor, safety features of compressor

**UNIT 5: USE OF ELECTRICITY IN MINES**

Flame proof enclosures & intrinsically safe apparatus, underground cables, drill panel, gate end box, circuit breakers, remote control (pilot circuit), installation of underground substation, earth leakage protection, cable joining, Electrical signaling provisions of IER related to mines

Reference books:

1. Elements of Mining Vol. III by D. J. Deshmukh
2. UMS Booklet
3. Winning and Working of Coal : R. T. Deshmukh & D. J. Deshmukh
4. Modern Coal Mining Practices : R. D. Singh
5. Longwall Mining : Syd. S. Chaing & Peng 6. Mine Winding & Transport by S.C.Walker

## **LIST OF PRACTICALS**

- 1 Study of Load Haul Dump (LHD)
- 2 Study of Side Discharge Loader (SDL)
- 3 Study of shuttle car
- 4 Study of jumbo drill machine
- 5 Study of coal cutting machine

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**Departmental Elective MM802 (A) - Mining Planning**

**UNIT 1:**

Coal reserves and their estimation, Geological and technological data needed for mine planning, Preparation of project and feasibility reports, project monitoring.

**UNIT 2:**

Planning and scheduling of various mining operations, linear programming, Simplex methods and transportation problem. Operation Research - Scope of application in mining, Linear programming, formulation and solution, Network planning with special reference to CPM/PERT, System approach for project scheduling.

**UNIT 3:**

Division of mine area into units and sub units, Area, Reserve, Life and Capacity of mine, Panel size, Design of long wall face.

**UNIT 4:**

Cost of various mining operations, Optimum size of mines, Mode of opening up of deposits, Choice of opening, Location and size of Development openings.

**UNIT 5:**

Mine Services Design of haulage, hoisting and drainage systems, Design of pit top and pit bottom, Coal handling plants, Railway siding, design of rapid loading system etc.

**Books Recommended**

1. Advance Coal Mining by R.T. deshmukh and V.S. Vorobjev
2. Mine Planning by S.P. Mathur
3. Mine Planning by B.J. Bhattacharya

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**Mining and Mineral Processing, VIII-Semester**

**Departmental Elective MM802 (B) - Innovative Mining Systems**

INNOVATIVE MINING SYSTEMS basic types, –Technological innovations: Technology, invention, innovation, research and development technology life cycle. System concepts: System concepts for innovative mining, methods for stimulating creativity in an organization and current technological needs; Basics of system dynamics, value engineering and just in possible applications.–time (JIT) Innovations in mining operations: Innovations in unit operations in surface and underground mining including high speed shaft sinking method; Developments in hard rock mining; New developments in longwall mining and Developments in mine ventilation systems. New frontiers of mining: Mining in deep sea, outer space and Antarctica; Oil mining; Extraction of coal bed methane. Remote monitoring of longwall support performance using telemonitoring device. Automation and robotic: Development of robotic systems, different types and possible contributions.

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**Open Elective MM803 (A) - ENTERPRENURSHIP**

**UNIT I**

ENTREPRENEURAL COMPETENCE Entrepreneurship concept-Entrepreneurship as a career- Entrepreneurial Personality Characteristics of Successful, Entrepreneur-Knowledge and skills of Entrepreneur.

**UNIT II**

ENTREPRENEURAL ENVIRONMENT Business Environment- Role of family and society- Entrepreneurship Development Training and other Support Organizational Services.

**UNIT III**

INDUSTRIAL POLICIES Central and State Government Industrial policies and Regulations – International Business

**UNIT IV**

BUSINESS PLAN PREPARATION Sources of product for business –Prefeasibility Study – Criteria for Selection of product – Ownership –Capital –Budgeting Project profile Preparation – Matching Entrepreneur with the Project –Feasibility Report Preparation and Evaluation Criteria

**UNIT V**

LAUNCHING OF SMALL BUSINESS Finance and Human Resource Mobilization Operation Planning-Market and Channel Selection – Growth strategies –product Launching –Incubation, Venture capital, IT, Startup MANAGEMNT OF SMALL BUSINESS Monitoring and Evaluation of Business –Preventing Sickness and Rehabilitation of Business Units-Effective management of small Business COURSE OUTCOME: STUDENTS will gain knowledge and skills needed to run a business.

## **TEXTBOOKS**

1. HISRICH, Entrepreneurship TATA McGraw hill, New Delhi, 2001
2. S.s.khanka Entrepreneurship Development s.chand and company, New Delhi

## **REFERENCES**

- 1ARYA KUMAR, ENTREPRENURSHIP .PEARSON, 2012

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**Open Elective MM803 (B) - COAL BED METHANE**

COAL BED METHANE Coalification process and coal grades. Methane generation and storage in coal; Geological control in Coal Bed Methane (CBM) exploration; Methane adsorption, desorption in coal. Coal as CBM reservoir: In-place methane estimation; Transport of methane in coal-bed. Drilling & Completion of a CBM hole/well. Identification and characterization of coal beds by hole/well logs. Hydraulic fracturing in coal beds. Production performance of a CBM hole/well; Water drainage & gas-water separation. Gas volume measurement. Compression & transport; Liquefaction and utilization. Enhanced recovery by CO<sub>2</sub> and N<sub>2</sub> adsorption methods.

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**MM 804- Computer Application in Mining**

**COMPUTER APPLICATION IN MINING LABORATORY COURSE OBJECTIVES:**

Providing basic introduction on cad applications, with reference to generation of basic CAD drawings for mine planning. Different types of drawing commands, editing, query based commands, for the preparation of CAD graphics.

**PART A**

1. Learning of the following commands using a CAD package
2. Drawing commands: Line, arc, circle, polygon, Donut, Solid, spline pline, text, M line, Ellipse, dimensioning, object snaps point, hatch, layers, and units.
- 3.Editing Commands: Limits ,erase,array,copy,move,offset,stretch,pedit,change properties, trim,extend,fillet,chamfer,break,mirror,scale,rotate,zoom,pan.EnquiryCommands:Id ,list,Dist,area,DB list, status selection sets ie window, crossing fence w polygon .plotting

**Part B 8 exercises (Mining Drawing) using any of the above commands**

. COURSE OUTCOME: The students will be provided with exposure on CAD graphics, to demonstrate these abilities in the form of CAD mine Drawings also basic knowledge of computer applications is essential in the mineral industry as most of the soft wares were already commercially available to meet different application areas of mining (opencast, underground methods).These software proven to be very effective and hence basic knowledge of computer and exposure to developments of computational skills to handle mining software is essential to be accepted by the industry Application areas include rock engineering ,mine design, slope stability, mining geostatics,financial analysis,valuation,risk analysis, feasibility etc.