RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA BHOPAL

Credit Based Grading System

Mining Engineering, VIII-Semester

MI8001 - 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, cavo loader, 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

MI8002 - COMPUTER APPLICATION IN MINING

UNIT I

Introduction to structure terminology and peripherals, algorithms, flow charts, programs Dedicated systems. Application in mining,

UNIT II

Exploration, rocket topographic models, bore hole compositinbg,ore reserve calculation,interpolation,geostatical models, open pit design,. Ultimate pit design, Introductotry Process control, Underground mine design.

UNIT III

Production scheduling: Operational Simulation: Introduction, simulation overview, objective Understand the role of modeling .Understanding the basic concept in simulation, example of simulation in mining aspects, simulation of machine repair problem.

UNIT IV

Concept of variability and prediction ,example with dumping time problem, fitting distribution with chi-square test, random number generation properties of random number ,pseudorandom number ,random variants generation.

UNIT V

Methods of random variants generation, inverse transform method, acceptance rejection method, composition method empirical method and rectangular approximation.

Simulation languages, GPPS and SIAM, logical flow diagram of different milling activities, coding with GPSS and SLAM of different mining problems. Computer control, remote control, automatic, applications and limitations of control.

COURSE OUTCOME:

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 skill to handle mining software is essential to be accepted by the industry. Application areas include rock engineering ,mine design ,slope stability, mining geo statics, financial analysis,valuation,risk analysis, feasibility etc .

TEXT BOOKS:

1. T.C.Bartee,digital computer fundamental,Mc Graw Hill, 4th edition 1984.
2. P.Malvino and D.P.leach digital principals and applications Mc Graw Hill 5th edition 1994.

REFERENCES:
R.V.RAMANI, application of computer methods in mineral industry

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.

PARTA

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.Enquiry Commands: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.

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Mining Engineering, VIII-Semester

Elective –V MI8003 (1) – 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 BJ. Bhattacharya

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Credit Based Grading System

Mining Engineering, VIII-Semester

Elective –V MI8003 (2) – GEOSTATISTICS

UNIT 1
Introduction to Classical statistics, Histrograms, mean, median, mode, skewness, Kurtosis, standard deviation, variance, confidence interval, normal and lognormal distribution.

UNIT 2
Different types of mineral reserves, estimation of grade and reserves, Different techniques of grade estimation, rule of nearest point , constant distance weighting technique and inverse distance weighting technique, method of triangles and polygonal method, bench compositing.

UNIT 3
Introduction to Geostastistics, theory of reigonalised variable, application of Geostastistics in mining, Covariogram and semivariogram, definitions and their estimation, Parameters of semivariogram, sill variance, nugget effect, range of influence, zonal and directional anisotropy.

UNIT 4
Mathematical representation of semivariogram and covariogram, Semivariogram models and their characterics, calculation, plotting and fitting of experimental semivariogram.

UNIT 5
Volume-Variance relationship, Extension variance and estimation variance, optimal valuation and kriging, Kriging estimator and kriging error, Kriging of a square block valued by two samples, Grade tonnage relationship.

Reference Books:
1. Geostatistics: Runge
2. Basic Geostatistics: Liu
3. Application of Geostatistics: Isobel Clark

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Mining Engineering, VIII-Semester

Elective –VI MI8004 (1) – 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, StartupMANAGEMNT OF SMALL BUSINESSMonitoring 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, EntreprenushiTATA McGraw hill, new Delhi,2001
2. s.s.khanka Entrepreneurship Development s.chand and company, new Delhi.

REFERENCES

1ARYA KUMAR, ENTREPRENURSHIP .PEARSON, 2012

Elective –VI MI8004 (2) – ROCK SLOPE ENGINEERING

COURSE OBJECTIVES:

To introduce the basic mechanics of rock slope failures. To learn the types of rock failure and its influencing parameters

unit I
BASIC MECHANICS OF ROCK SLOPE FAILURE
Rock slope economics ;continuum mechanics approach to slope stability ;slope parameters; effect of water pressure; factor of safety of slopes; slope height vs slope angle; design of slopes

Unit II
GEOLOGICAL AND ROCK STRENGTH PROPERTIES

Geological parameters affecting slope stability ; graphical representation of geological data; plotting and analysis of field measurements ; physic o –mechanical properties affecting slope stability ,shearing on incline plane ,determination of shear strength of rock and rock discontinuities ;Ground water flow in rock masses ;field measurement of permeability; measurement of water pressure.

UNIT III
PLANE FAILURE
Plane failure analysis ;graphical analysis of stability ;influence of ground water on stability; influence of tension crack ; analysis of failure on a rough plane; rock reinforcement of slopes .

UNIT IV
WEDGE FAILURE AND CIRCULAR FAILURE
Analysis of wedge failure; wedge analysis including cohesion and water pressure; wedge stability charts for friction only; case studies. Numerical problems Conditions for circular failure; derivation of circular failure analysis ;effect of ground water; circular failure charts ;Bishop's and Janbu's method of failure analysis ;case studies

UNIT V
 TOPPING FAILURE

.Types of topping failure ;secondary toppling modes ;analysis of topping failure; limit equilibrium analysis of toppling failures ;influence of slope curvature on stability; slope depressurization ;Protection of slopes ;control of rock falls; measurement and monitoring and interpretation of slope displacements. Numerical problems

ROCK SLOPE FAILURE MONITORING AND SLOPE STABILIZATION

Types of slope movement, Surface and Sub-surface monitoring methods including instrumentation and techniques and guidelines for monitoring programs. Causes of rock falls; Rock slope stabilization programs –stabilization by rock reinforcement and rock removal; protection measures against rock falls.

COURSE OUTCOME:

The students will know the fundamentals mechanics of rock slope failure, types of failure and its influencing parameters.

 TEXT BOOKS;

1 HOEK E AND BRAY, J.W.,Rock slope engineering,Instituion of mining and Metallurgy 1991.

 2 Goodman ,Re,Rock Mechanics john Wiley and sons,1989.

3 Singh R N and ghose ,A.K. Engineered Rock structures in mining and civil construction ,AAbalkema Netherlands,2006.