RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA BHOPAL

Choice Based Credit System

Mining Engineering, IV-Semester

DRILLING AND BLASTING

Drilling of Rocks in Underground and Surface Mines Principles of rock drilling. Classification of drilling system. Rock drilling methods, parameters affecting the choice of drilling system, long hole drilling, ring drilling and rotary drilling methods for underground mines. Drilling bits. Blasting in Underground Mines Explosives. Initiation systems and accessories for blasting in the underground mines. Blasting off the solid. Blasting of cut faces. Mass-blasting system for heavy blasting in hard rock mines. Blasting in Surface Mines Principles of blast round design for single and multi-row. Blast round design in surface mines. Bulk explosives Initiation systems and accessories. Evaluation Methods, Nuisances and Mitigation Evaluation of drilling and blasting methods for underground and surface mines by use of state-of-art techniques and gadgets. Blasting nuisances and their mitigation for underground and surface mines.

EVALUATION

Evaluation will be continuous an integral part of the class as well through external assessment.
References :

1. Hustrulid, W. A. Blasting Principles of Open Pit Mining, Vol. 1- General Design Concept, A.A. Balkema, Rotterdam, 1999.

2. Jimeno, C.L., Jimeno, E.L, Carcedo, E.J. Drilling and Blasting of Rocks, A.A.Balkema, Rotterdam, 1995. 3. Clark, G.B., Principles of Rock fragmentation, Wiley Interscience Publication, 1987.

4. Konya, C.J. and Walter, E.J. Surface Blast Design, New Jersey, 1990.

5. Bhandari, Sushil, Engineering Rock Blasting Operations, A.A.Balkema, Rotterdam, 1997.

6. Per-Anders Persson, Roger Holmberg, and Jaimin Lee. Rock Blasting and Explosives Engineering, CRC Press, 1994.

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA BHOPAL

Choice Based Credit System

Mining Engineering, IV-Semester

GEOLOGY – II

Geological Time Scale Petrology Definition and scope, main classes of rocks forming minerals. Igneous, sedimentary and metamorphic rocks – origin, characteristics, classification, uses and mining importance. Significance of texture and structure of rocks on geomechanical properties of rock mass. Stratigraphy Definition and scope. Stratigraphic correlation. Standard stratigraphic scale. Fossils – conditions, mode of preservation and uses. Major geological formations of India – Dharwar, Cuddapah, Vindhyan, Gondwana, Tertiary & Quaternary systems and their economic significance. Fuel Geology Coal and lignite - origin, occurrences, petrography. Structural features of coal-seam. Grades of coal. Occurrences in India. Petroleum and natural gas – formation of gas and oil basins, traps and reservoirs, occurrences in India. Coal bed methane. Geohydrology Sources of water in mines. Classification of rocks based on porosity and permeability. Water table and types of ground water. Geological controls on ground water movement in mines. Environmental Geology Geological hazards and their management. Weathering of ore and overburden – environmental complications.

EVALUATION

Evaluation will be continuous an integral part of the class as well through external assessment.

References :

Parbin Singh. Geology for Engineers, IBH Publications, N. Delhi. 1991.

2. Arthur Holemess, Principles of Physical Geology, Thomas Nelson and Sons, USA, 1964.

3. Ford, W.E. Dana's Textbook of Minerology (4th edition), Wiley Eastern Ltd., N. Delhi, 1989

. 4. Winter, J.D. An Introduction to Igneous and Metamorphic Petrology, Prentice Hall, N. Delhi, 2001.

5. Billings, M.P. Structural Geology, Prentice Hall Ino., N. Jersey, USA, 1972

. 6. Krishnan M.S. Geology of India and Burma, 3rd Edition, IBH Publishers, N. Delhi, 1984.

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA BHOPAL

Choice Based Credit System

Mining Engineering, IV-Semester

UNDERGROUND COAL MINING

Coal and coal measure rocks. Classification of mining methods. Division of mine area into panels on district and level patterns. Factors influencing the choice of mining method. Bord and Pillar Method Size of headings, pillars and panels. Development of panels by drivage of group of headings to strike, dip and rise with V, diagonal and straight fronts. Cycle of operations, work-organisation and scheduling for drivage of heading groups by conventional and continuous methods. Depillaring of panels with V, straight and diagonal fronts. Conventional and mechanized depillaring schemes with emphasis on coal, water, air routes and supports. Simultaneous development and depillaring, partial extraction, room and pillar methods. Longwall Method Classification of longwalls, advancing and retreating methods, working in districts and levels (central and boundary ventilation) size of panel, development of panel with single and multiple heading gate roads, various orientations of longwall face, single and double unit longwalls. Extraction of longwall panels with conventional and fully mechanized methods, length of face, daily advance, cycle of operations, organisation, scheduling and layouts with special reference to coal, water and air routes. Bleeder ventilation scheme. Gate, goaf and face area support in conventional and fully mechanised longwalls. Room and Pillar Method Shortwall Method Stowing: Applicability conditions, classification and description of various methods of goaf stowing. Surface and underground arrangements and precautions with stowing, full bore stowing and problems associated with stowing at surface and below ground. Comparison of Various Mining Methods

EVALUATION

Evaluation will be continuous an integral part of the class as well through external assessment.

References :

1. Singh, R.D. Principles and Practices of Modern Coal Mining, New Age International (P) Ltd., Chennai, 1994.

2. Singh, T.N. Singh, Underground Winning of Coal – Oxford & IBH Publishing Co. Ltd., 1992.

3. Mathur, S.P., Coal Mining in India, M.S. Enterprises, Bilaspur, 1999.

4. Das S.K., Modern Coal Mining technology, Lovely Prakashan, Dhanbad 1994.

5. Singh T.N., Dhar, B.B. Thick Seam Mining, Problems and Issues, Oxford & IBH Publishers, 1992.

6. Mathur, S.P., Mining Planning for Coal., M.G. Consultants, Bilaspur, 1993.

7. Peng S.S., and Chiang, H.S., Longwall Mining, John Willey and Sons, New York, 1992.

8. Szwilski and Richards M.J., Underground Mining Methods and Technology, 1987. Internet: www.miningindia.com

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA BHOPAL

Choice Based Credit System

Mining Engineering, IV-Semester

MINING MACHINERY – I

Transmission of Power Belt, rope, chain, gear, hydraulic and electro-hydraulic transmission. Compressed Air Comparison with other sources of power. Air compressors – types, construction, installation and maintenance. Compressed air transmission and distribution, compressed air drills, pneumatic picks, air motors and other compressed air equipment. Wire Ropes Types, construction and uses. Rope deterioration and maintenance. Capping and splicing of rope. Haulage Rope haulages. Track, mine tubs and cars. Safety appliances on haulage roads. Locomotive haulage. Mono rail. Statutory Provisions

EVALUATION

Evaluation will be continuous an integral part of the class as well through external assessment.

REFERENCE s :

1. Cherkassky, B.M., Pumps, Fans, Compressors, MIR Publishers, 1980.

2. Deshmukh, D.J., Elements of Mining Technology, Vol. I and II EMDEE Publishers, Nagpur,1989.

3. Walker, S.C., Mine Winding and Transport, Elsevier, 1988.

4. Karelin N.T., Mine Transport, Orient Longmans, N. Delhi.

5. Mason, E., Coal Mining Series, Mining Machinery, Virtue and Company Ltd., London.

6. Statham, I.C.F., Coal Mining, Vol. I, II, III and IV, Caxton Eastern Agencies, Calcutta.

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA BHOPAL

Choice Based Credit System

Mining Engineering, IV-Semester

Computer Programming

C language alphabet set, identifiers, Variables and constants Data types, Builtin and user Defined Data types Arrays operators and expressions Simple assignment and Input-output statements, preprocessor directives writing simple 'C' programs, compiling and executing 'C' Programs.

Conditional statements and loops: IF statement IF–ELSE statement, SWITCH statement, FOR statement, WHILE and Do WHILE statement.

Function: Function declaration or prototype. Function definition, function calling: call by value, call by reference, Recursion.

Introduction to pointers, File processing: concept of files, file opening, editing, reading and writing.

Reference Books :

1. Programming in ANSI C, by Balagurusamy, Tata McGraw Hill
2. The C programming Language. By Brian W. Kernighan and Dennis M. Ritchie. Published by Prentice-Hall
3. Let us C by Y.Kanetkar, BPB Publication

Lab assignments :

1. Design and execute a 'C' program for multiplying two nXn matrics.
2. Design a 'C' program to calculate Average of 'n' numbers.
3. Design a 'C' program to add two numbers using call by value parameter passing mechanism.
4. Design a 'C' program to swap the contents of two variables using call by reference parameter passing mechanism.
5. Design a 'C' program to open a file and add contents to modify the file.

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA BHOPAL

Choice Based Credit System

Automobile Engineering, IV-Semester (Mathematics-III)

(Applicable to ME/AU/CM/FT/IP/Mining Branches)

COURSE OBJECTIVE- The objective of this course is to fulfill the needs of Engineers to understand the Applications of Fourier Series, Different Transforms, Complex Analysis & numerical methods in order to enable young technocrats to acquire Mathematical thinking of Formulating, Analyzing and Solving a wide range of Practical Problems Appearing in Science & Engineering.

Course Contents

Fourier Series: Fourier Series for Continuous & Discontinuous Functions, Expansion of odd and even periodic functions, Half-range Fourier series, Complex form of Fourier Series,

Integral Transforms:

Fourier Transform-Complex Fourier Transform, Fourier Sine and Cosine Transforms, Applications of Fourier Transform in Solving the Ordinary Differential Equation. **Laplace Transform-** Introduction of Laplace Transform, Laplace Transform of elementary Functions, Properties of Laplace Transform, Change of Scale Property, First and Second Shifting Properties, Laplace Transform of Derivatives and Integrals. Inverse Laplace Transform & its Properties, Convolution theorem, Applications of Laplace Transform in solving the Ordinary Differential Equations.

Functions of Complex Variables: Analytic functions, Harmonic Conjugate, Cauchy-Riemann Equations, Line Integral, Cauchy's Theorem, Cauchy's Integral Formula, Singular Points, Poles & Residues, Residue Theorem, Application of Residues theorem for Evaluation of Real Integrals.

Numerical Solution of Ordinary Differential equations: Picard's Method, Taylor's Series, Euler's Method, Modified Euler's Method, Runge-Kutta methods, Milne's and Adam's Bashforth Methods.

COURSE OUTCOMES- The curriculum of the Department is designed to satisfy the diverse needs of students. Coursework is designed to provide students the opportunity to learn key concepts of Fourier Series, Different Transforms, Complex Analysis & Numerical Methods for Solving Ordinary Differential Equations of First Order.

EVALUATION- Evaluation will be continuous, an integral part of the class as well as through external assessment.

References:

1. Erwin Kreyszig: Advanced Engineering Mathematics, Wiley India.
2. H C Taneja: Advanced Engineering Mathematics, I.K. International Publishing House Pvt. Ltd.
3. B.S. Grewal: Higher Engineering Mathematics , Khanna Publication.
4. S S Sastri: Engineering Mathematics, PHI
5. Ramana: Advance Engg. Mathematics, TMH New Delhi
6. Engineering Mathematics By Samnta Pal and Bhutia, Oxford Publication

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA BHOPAL

Choice Based Credit System

Mining Engineering, IV-Semester

System Engineering

COURSE OBJECTIVE

This course in systems engineering examines the principles and process of creating effective systems to meet application demands. The course is organized as a progression through the systems engineering processes of analysis, design, implementation, and deployment with consideration of verification and validation throughout.

COURSE CONTENT

What is System Engineering, Origin, Examples of Systems requiring systems engineering,Systems Engineer Career Development Model, Perspectives of Systems Engineering, Systems Domains, Systems Engineering Fields, SystemEngineering Approaches.

Structure of Complex Systems, System Building Blocks and Interfaces, Hierarchy of Complex Systems, System Building Blocks, The System Environment, Interfaces and Interactions, Complexity in Modern Systems.

Concept Development and Exploration, Originating a New System, Operations Analysis, Functional Analysis, Feasibility, System Operational Requirements, Implementation of Concept Exploration.

Engineering Development, Reducing Program Risks, Requirements Analysis, Functional Analysis and Design, Prototype Development as a Risk Mitigation Technique, Development Testing, Risk Reduction.

Integration and Evaluation, Integrating, Testing, And Evaluating The Total System, Test Planning And Preparation, System Integration, Developmental System Testing, Operational Test And Evaluation, Engineering For Production, Transition From Development To Production, Production Operations.

COURSE OUTCOME

After successful completion of the course, students would be able to Plan and manage the systems engineering process and examine systems from many perspectives (such as software, hardware, product, etc.) Students can distinguish critical functions, diagnose problems, and apply descoping strategies and judge the complexity of production and deployment issues.

EVALUATION

Evaluation will be a continuous and integral process comprising classroom and external assessment.

REFERENCES:

1. Alexander Kossiakoff, William N Sweet, “System Engineering Principles and Practice, Wiley India
2. Blanchard Fabrycky, Systems engineering and analysis, Pearson
3. Dennis M. Buede, William D.Miller, “The Engineering Design of Systems: Models & Methods” Wiley India
4. JeffreyL Whitten, Lonnie D Bentley, “System Analysis and Design Methods”
5. Richard Stevens, Peter Brook,” System Engineering – Coping with complexity, Prentice Hall