

School of Engineering & I.T.

MATS University

Raipur



Syllabus Scheme
(VIIIth Semester)
For
Bachelor of Technology
In
Mining Engineering



MATS UNIVERSITY

ARANG, RAIPUR (C.G.)



Scheme of Teaching & Examination

VIII - Semester

S.N.	code	Subject	Periods per week			Scheme of marks		Total Credit
			L	T	P	ESE	IM	
1.	BT860	Strata Control	4	0	-	70	30	4
2.	BT861X	Professional Elective – III	4	0	-	70	30	4
3.	BT862X	Open Elective – III	3	0	-	70	30	3
4.	BT863	Strata Control Lab	-	-	2	30	20	1
5.	BT864	Major Project Work	-	-	18	120	80	12
		Total	11	0	20	470	230	24

L – Lecture, T – Tutorial, ESE – End Semester Examination,
P – Practical, IM – Internal Marks (Include Class Test & Teacher's Assessments)

Professional Elective :

Subject Code	Subject Name
BT8611	Application of Computer, Geographical Information System (GIS) and Remote Sensing (RS) in Mining.
BT8612	Supply Chain Management-Planning
BT8613	Rock Excavation Engineering
BT8614	Fire & Safety Engineering
BT8615	Production Drilling for Oil wells

Open Elective :

Subject Code	Subject Name
BT8621	Engineering System Analysis and Design
BT8622	Engineering System Design Optimization
BT8623	Engineering System Modeling and Simulation
BT8624	Game Theory with Engineering Applications
BT8625	Pollution Control in Mining

MATS UNIVERSITY
GULLU, ARANG, RAIPUR

Semester: B.Tech. VIIIth Sem.

Subject: - Strata Control

Total Theory Periods: - **40**

Total marks in end semester Exam: **100**

Minimum Number of Class test to be conducted: **02**

Branch: - Mining Engineering

Code : - BT 860

Total Tutorial Periods: **15**

Course Objective

To understand characteristics of various materials used as supporting material.

To be able to select the suitable support for any underground mine.

To be able to design support system for any underground mine.

To measure the subsidence for any underground mines.

To understand the ground movement and its controlling techniques.

Course outcomes:

Apply knowledge of strata control for understanding, formulating and solving strata control problem in any underground mine.

Identify, analyze and solve strata movement problems.

Acquire knowledge and hands-on competence in applying the concepts in the development of strata control.

UNIT I: SUPPORTS

Timber & steel supports, Examination of roof, Roof bolting, roof stitching, method of supporting roadways. Supporting under different conditions viz. Pit bottom, crossing, junctions, faulted area, longwall faces, depillaring areas and stoping areas, support loads.SSR, CTR, Support plan, Support withdrawal.

UNIT II: POWERED SUPPORTS

Powered supports - their principles of operation, Classification, designation, constructional features and applications, Hydraulic fluids.

UNIT III : STOWING

Principal methods of stowing, their relative merits and applicability, Hydraulic stowing,Pneumatic stowing, Mechanical stowing, Hand packing, face arrangements, pipe wear,pipe jams.

UNIT IV: STRATA CONTROL

Theories of ground movement, Rock pressure due to Narrow and Wide excavation, Frontabutment and back abutment, Failure of roof and floor, measurement of stratamovement, rock burst, bumps. gas outbursts, pot holes.

UNIT V: SUBSIDENCE

Theories of subsidence, damage and loss due to subsidence, vertical and lateral movements and their estimation, angle of fracture and angle of draw, factors affecting subsidence, subsidence control, protection of surface structures, design of protection pillars including shaft pillars. Pot holes.

References:

- 1 Strata control in mines : Chaing & Peng
1. Winning and Working of Coal : R. T. Deshmukh& D. J.Deshmukh
2. Modern Coal Mining Practices : R. D. Singh
3. D.G.M.S. Circulars (Tech.) 1995 onwards

MATS UNIVERSITY
GULLU, ARANG, RAIPUR

Semester: B.Tech. VIIIth Sem.

Subject: - Pollution Control Engg.

Total Theory Periods: - **40**

Total marks in end semester Exam: **100**

Minimum Number of Class test to be conducted: **02**

Branch: - Mining Engineering

Code : - BT 8625

Total Tutorial Periods: **15**

Course Objective

To learn various kind of pollutants and their causes and preventive measures.

To know the salient features of environmental laws in India.

To know the various types of occupational diseases in the mine.

To measure the level of pollution i.e. Noise level, air pollution level etc.

Course outcomes:

Apply knowledge of pollution control for understanding and solving different types of environmental pollution problem in any mine.

Identify, analyze, control and solve environmental pollution problems.

UNIT I: ENVIRONMENTAL POLLUTION

Introduction and classification of environmental pollution, ecological conservation. Salient features of the environmental laws in India and Occupational disease.

UNIT II: AIR POLLUTION

Air pollution due to various gases and suspended particulate materials, causes, consequences, preventive measures, dust sampling equipments.

UNIT III: WATER POLLUTION

Water pollution, its causes and preventive measures, acid-mine drainage, water pollution in mines and mineral beneficiation plants, water purification schemes in brief.

UNIT IV: LAND POLLUTION

Land scape pollution and land reclamation, methods of land reclamation.

UNIT V: NOISE POLLUTION

Pollution due to noise and its consequences, noise produced by different machinery, control and safety, measurement of noise levels.

Reference Books :

1. Air & Water Acts
2. Forest Conservation acts
3. Legislation in Indian Mines – A Critical appraisal by Rakesh and Prasad
4. Env. Impact of Mining By Down and Stokes

MATS UNIVERSITY
GULLU, ARANG, RAIPUR

Semester: B.Tech. VIIIth Sem.

Subject: - GIS & Remote Sensing in Mining

Total Theory Periods: - **40**

Total marks in end semester Exam: **100**

Minimum Number of Class test to be conducted: **02**

Course object : To improve knowledge about remote sensing, Hardwares and Softwares related to Remote Sensing, Raster based GIS ,Vector based GIS,Data Capture and Basic Operations of Spatial Analysis.

Branch: - Mining Engineering

Code : - BT 8611

Total Tutorial Periods: **15**

Course outcomes: learners know about , Electromagnetic Radiation, Remote ,Sensing Data Product ,Spatial Filtering ,Band Ratioing Image Classification GIS-Project Planning, Management and Implementation.

UNIT I:

Introduction to Remote Sensing: Terminology In Remote Sensing, Types Of Remote Sensing,Advantages And Disadvantages Of Remote Sensing Data, Electromagnetic Radiation, Atmospheric

Windows, Remote Sensing Platforms And Sensors Systems, Path-Row Referencing System, Remote Sensing Data Product, Procedure For Obtaining Satellite Data. Hardwares and Softwares related to Remote Sensing.

UNIT II:

Image Interpretation And Analysis: Elements of Visual Image Interpretation, Digital Image Pre-Processing, Radiometric Correction, Geometric Correction, Resolution Of Remote Sensing Data, Image Enhancement, Contrast Enhancement, Spatial Filtering, Band Ratioing Image Classification, SupervisedAnd Unsupervised Classification. Remote Sensing Applications in Forestry, Geology, Hydrogeology, Landuse and Land Cover Mapping.

UNIT III:

Fundamentals of GIS: Basic Concepts including Definition and History of GIS, Essential Elements of GIS, Uses and Users of GIS, General GIS Applications, Advantages of GIS. Geodesy, Grids, Datum's and Projection Systems, GIS Data Formats, GIS Layers and Digitization. Overview of GPS and its Applications. Hardwares and Softwares related to GIS.

UNIT IV:

Raster and Vector Based GIS: Raster based GIS, Definition and Concept of Raster Based GIS, Spatial Referencing, Definition and Representation of Raster Data. Vector based GIS, Definition and Concept ofVector Based GIS, Data Structures, Data Capture and Basic Operations of Spatial Analysis, Advantages and Disadvantages in Raster and Vector Based GIS, Introduction to Networks in GIS. GIS-ProjectPlanning, Management and Implementation.

UNIT V:

Application of computers in mining

Reference Books

Digital Image Processing - R.C. Gonzalez & R.E. Woods Pearson Edu. Asia

Principles of Geographical Information Systems- P.A. Burrough& R.A. McDonnell Oxford

Text Book of Remote Sensing - C.S.Agawal&P.K.Garg Wheeler

Remote Sensing of The Environment - J.R. Jensen Pearson Education

Dictionary of Remote Sensing - S. M. Rashid

Introduction to GIS - I. Heywood, S. Cornelius & S. Carver Pearson Edu. Asia
Introduction to GIS - Demers

Department of Mining Engineering

List of Experiment

Subject: Strata Control Lab
Code: BT-863
Maximum Marks: 50

List of Practical to be Performed:

1. Study of Conventional support systems.
2. Study of constructional features and working of Friction props
3. Study of constructional features and working of hydraulic props
4. Study of methods to support roof by roof bolts, roof stitching and cable bolts
5. Study of withdrawal of supports by Sylvester prop withdrawer
6. Study of methods to support junctions and faulted area
7. Study of constructional features and working of powered supports
8. Study of Hydraulic stowing System and the arrangement required for it
9. Study of pneumatic stowing System and the arrangement required for it
10. Study of Subsidence measurement techniques.

Department of Mining Engineering

List of Experiment

Subject: Major Project
Code: BT-864
Maximum Marks: 200

Guidelines

Allocation of project:

1. Information regarding broad area must be made available to the students well in advance (may be during previous semester).
2. Information must cover following parameters.
 - I. **Broad area:** Subject or expertise/application area.
 - II. **Required skills:** Knowledge of subject(s), software, tools & other characteristics.
 - III. **Type of project:** Hardware, software, design, survey, study based etc.
 - IV. **Guide available:** Name of Guide (S) from Department & Institute.
 - V. **Other related information** depending upon specific branch & institute.
3. It is also recommended to give proper counseling to pick up suitable project.
4. Students must get chance to select projects as per their choice or decided mutually between students and department faculty (HOD) concern.
5. One project group must contain maximum four students, however students can do project individually but it should be approved by department.
6. Compiled list of projects must be submitted to the University within 25 days of start of semester.
7. Compiled list may contain following parameters.

Sr. No.	Title of Project	Name of Students	Name of Guide

Name of HOD
Signature of HOD

Signature of Principal

Monitoring of project:

1. It is recommended to give projects as per the specializations of existing faculty of the department instead of outside person/agency.
2. Project must be allocated, developed and monitored by department / institution itself, but not by outside agencies.
3. Regular review by guide is recommended to ensure development & contribution of students.

Internal Evaluation & Submission of project:

1. Evaluation of project would be as per the examination scheme of the University, which is based on internal as well as external evaluation.
2. Internal assessment requires submission of project report for getting approved by the concern authority. However printing and binding would be as per the conventional format.
3. Evaluation will be based on Live demonstration / presentation and Viva.
4. Final submission of project is expected as,
 - Submission of a copy to the University,
 - One copy to the Institution central library,
 - One copy to the department.

External Evaluation:

External assessment of project would be like conduction of practical exams of University, and must be executed as per the norms of practical exams.

NOTE: Completion of Project outside the department/Institution should not be

MATS UNIVERSITY
GULLU, ARANG, RAIPUR

Subject: Fire & Safety Engineering

Code: BT-8614

Maximum Marks: 50

Unit I Introduction:

Safety management systems in Indian mining industry; Need for Mine safety; Mine safety statistics.

Unit II Risk Management:

Risk Management related terms and definitions; Basic concept of risk; Difference between hazards and risks; Risk components and types, Risk management objectives, Risk management process; Risk analysis objectives in hazardous system life cycle; Functions of a risk manager; Hazards Identification and Risk Assessment (HIRA).

Unit III Risk Analysis Methods:

Hazard and Operative (HAZOP) Analysis; Failure Mode and Effect Analysis (FMEA); Failure Mode Effect and Critical Analysis (FMECA); Job Safety Analysis (JSA); Preliminary Hazard Analysis (PHA); Appraisal of advanced techniques fault tree analysis.–

Unit IV Mine Accident Analysis:

In-depth study of accidents due to various causes; and Human Behavioral Approach in mine safety.
Safety audits and control:

Unit V

Safety audit methods;

Training of Miners

MATS UNIVERSITY
GULLU, ARANG, RAIPUR

Subject: ROCK EXCAVATION ENGINEERING

Code: BT-8613

Maximum Marks: 50

Unit I Introduction:

Scope and importance of rock excavation engineering in mining and construction industries; physico-mechanical and geotechnical properties of rocks vis-à-vis excavation method; selection of excavation method. Rock breaking processes: Primary, Secondary and Tertiary, Energy consumption computations

Unit II Drilling:

Advances in drilling equipment, pneumatic versus hydraulic, design and operating parameters of surface and underground drilling; evaluation of drill performance; mechanism of bit wear; bit selection; economics of drilling.

Unit III Blasting:

Explosives and their selection criteria for rock excavation; blast design for surface excavations and optimisation; advanced blast initiation systems; blast performance evaluation; cast blasting; techno-economic and safety aspects of surface and underground blasting; advances in blast design for underground excavations; contour blasting; computer aided blast designs. Under water drilling and blasting –

Unit IV Rock Cutting:

Theories of rock tool interaction for surface excavation machinery rippers, dozers, scrapers, BWE, continuous surface miners, auger drills; theories of ploughs, shearers, –rock tool interaction for underground excavation machinery roadheaders, continuous miners and tunnel boring machines; selection criteria for high pressure water jet assisted–cutting tools; advanced rock cutting techniques

Unit V Recent Developments

rock excavation machinery.