Chhattisgarh Swami Vivekanand Technical University, Bhilai

SCHEME OF TEACHING AND EXAMINATION

B.E. VIII SEMESTER MINING ENGINEEERING

S. No.	Board of Study	Subject Code	Subject	Periods per week			Scheme of Exam			Total Marks	Credit L+(T+P)/2
				L	T	P	Theory/Practical				
							ESE	CT	TA		
1	Mining Engg.	339831 (39)	Mining Machinery - III	4	1	-	80	20	20	120	5
2	Mining Engg.	339832 (39)	Pollution Control in Mining	4	1	-	80	20	20	120	5
3	Mining Engg.	339833 (39)	Strata Control	4	1	-	80	20	20	120	5
4	Refer Table -2		Professional Elective -III	4	1	-	80	20	20	120	5
5	Refer Table -3		Open Elective - IV	4	-	-	80	20	20	120	4
6	Mining Engg.	339861 (39)	Mining Machinery – III Lab	-	-	2	40	-	20	60	1
7	Mining Engg.	339862 (39)	Strata Control Lab	-	-	2	40	-	20	60	1
8	Mining Engg.	339863 (39)	Pollution Control Lab	-	-	2	40	-	20	60	1
9	Mining Engg.	339864 (39)	Major Project	-	-	7	100	-	80	180	4
10	Mining Engg.	339865(39)	Report Writing & Seminar	-	-	2	-	-	40	40	1
11			Library	-	-	1	-	-	-	-	-
Total Periods of 40 per week				**20**	**04**	**16**	**620**	**100**	**280**	**1000**	**32**

L – Lecture, T – Tutorial, P – Practical, ESE- End Semester Exam, CT- Class Test,TA – Teacher's Assessment

Table –2

Professional Elective - III			
S.No.	**Board of Studies**	**Code**	**Name of Subject**
1	Mining Engg.	339841(39)	Surface Mining - II
2	Mining Engg.	339842(39)	Application of Computer, Geographical Information System (GIS) and Remote Sensing (RS) in Mining.

Note (1) – 1/4th of total strength of students subject to minimum of twenty students is required to offer an elective in the college in a Particular academic session .
Note (2) – Choice of elective course once made for an examination cannot be changed in future examinations.

Table -3

Open Elective –IV			
S.No.	Board of Studies	Code	Name of Subject
1	Management	300851(76)	Enterprise Resource Planning **(Except CSE & IT Branch)**
2	Information Technology	300852(33)	E-Commerce & strategic IT **(Except CSE & IT Branch)**
3	Management	300853(76)	Technology Management
4	Information Technology	300854(33)	Decision Support & Executive Information system
5	Computer Science & Engg.	300855(22)	Software Technology
6	Management	300856(76)	Knowledge Entrepreneurship
7	Management	300857(76)	Finance Management
8	Management	300858(76)	Project Planning, Management & Evaluation
9	Mechanical Engg.	300859(37)	Safety Engineering
10	Computer Science & Engg.	300801(22)	Bio Informatics
11	Mechanical Engg.	300802(37)	Energy Conservation & Management
12	Nanotechnology	300803(47)	Nanotechnology
13	Management	300804(76)	Intellectual Property Rights
14	Mechanical Engg.	300805(37)	Value Engineering
15	Civil Engg.	300806(20)	Disaster Management
16	Civil Engg.	300807(20)	Construction Management
17	Civil Engg.	300808(20)	Ecology and Sustainable Development
18	Chem. Engg.	300809(19)	Non Conventional Energy Sources
19	Electrical Engg.	300810(24)	Energy Auditing & Management **(Except Electrical Engg. Branch)**
20	Mechanical Engg.	300811(37)	Managing Innovation & Entrepreneurship
21	Information Technology	300812(33)	Biometrics
22	Information Technolgy	300813(33)	Information Theory & Coding
23	Computer Science & Engg.	300814(22)	Supply Chain Management
24	Computer Science & Engg.	300815(22)	Internet & Web Technology
25	Electrical Engg.	300816(24)	Electrical Estimation and Costing
26	Electrical& Electronics Engg.	300817(25)	Non Conventional Energy Sources
27	Computer Science & Engg.	300818(22)	Big Data and Hadoop

Note (1) 1/4th of total strength of students is required to offer an elective in thecollege in a particular academic session.
(2) -Choice of elective course once made for an examination cannot be changed

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Name of the Programme: :::: Duration of the Programme: Four Years

Branch: **Mining Engineering** Semester: **VIII**

Subject: **Pollution Control in Mining** Code: **339832(39)**

Total Theory Periods: 50 Total Tutorial Periods: **12**

No. of class Tests to be conducted: **2 (Minimum)**

No. of assignments to be submitted: **2 (Minimum)**

ESE Duration: **Three Hours** Maximum Marks in ESE: **80** Minimum Marks in ESE: **28**

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 1: ENVIRONMENTAL POLLUTION

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

UNIT 2: AIR POLLUTION

Air pollution due to various gases and suspended particulate materials, causes, consequences, Green House effect, Ozone Depletion, Acid Rain, Preventive Measures against air pollution, dust sampling equipments.

UNIT 3: WATER POLLUTION

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

UNIT 4: LAND POLLUTION

Land pollution: its causes and preventive measures, Land scape pollution and land reclamation, methods of land Reclamation, Mine closure plan.

UNIT 5: NOISE POLLUTION

Pollution due to noise and its consequences, Sources of noise, permitted level of noise, noise produced by different machinery, control and safety measures, measurement of noise level.

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

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Name of the Programme: :::: Duration of the Programme: Four Years

Branch: **Mining Engineering** Semester: **VIII**
Subject: **Mining Machinery - III** Code: **339831(39)**
Total Theory Periods: 50 Total Tutorial Periods: **12**
No. of class Tests to be conducted: **2 (Minimum)**
No. of assignments to be submitted: **2 (Minimum)**
ESE Duration: **Three Hours** Maximum Marks in ESE: **80** Minimum Marks in ESE: **28**

Course Objective

To learn applicability conditions, workings and constructional features of various mine machinery used in underground mine.
To be able to select suitable winning machine for mineral deposit of different geo mining conditions.
To be able to understand the compressor and its working.
To understand the use of electricity in mines

Course outcomes:

Apply knowledge of mine machinery for understanding, selecting and solving mine machinery problem in any underground mine.
Acquire knowledge and hands-on competence in applying the concepts in the development of suitable machinery.

UNIT 1: FACE MACHINERY

Drills for coal and stone: their constructional details, Drill jumbos: their applications, operation and maintenance, Introduction to coal cutting machine.

UNIT 2: LOADER AND TRANSPORTING MACHINE

Rocker shovel, gathering arms loaders, LHD and SDL machines: their construction, operation and maintenance, Cavo loader, shuttle car and underground trucks: their 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, different types of road headers: their construction, operation and conditions of applicability, 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, In bye compressors.

UNIT 5: USE OF ELECTRICITY IN MINES

Flame proof apparatus, intrinsically safe circuits, underground cables, drill panel, gate end box, circuit breakers, remote control (pilot circuit), underground substation, earth leakage protection, cable joining, Electrical signalling 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

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Name of the Programme: :::: Duration of the Programme: Four Years

Branch: **Mining Engineering** Semester: **VIII**

Subject: **Strata Control** Code:**339833(39)**

Total Theory Periods: 50 Total Tutorial Periods: **12**

No. of class Tests to be conducted: **2 (Minimum)**

No. of assignments to be submitted: **2 (Minimum)**

ESE Duration: **Three Hours** Maximum Marks in ESE: **80** Minimum Marks in ESE: **28**

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 undergrounds 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 1: 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 2: POWERED SUPPORTS

Powered supports: their principles of operation, Frame support, Chock support, shield support & chock shield support: Classification, designation, constructional features, merits demerits and applications, Hydraulic fluids, power pack.

UNIT 3 : STOWING

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

UNIT 4: STRATA CONTROL

Theories of ground movement, Rock pressure due to Narrow and Wide excavation, Front abutment and back abutment, Failure of roof and floor, measurement of strata movement, Causes and preventive measures against Rock burst, Bumps& Gas outbursts.

UNIT 5: SUBSIDENCE

Theories of subsidence, Types 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 protective pillars including shaft pillars. Pot holes.

References:

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

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Name of the Programme: :::: Duration of the Programme: Four Years

Branch: **Mining Engineering** Semester: **VIII**

Subject: **Report Writing & Seminar** Code: **339865(39)**

Total Theory Periods: 02 Per Week Total Tutorial Periods: **Nil**

Total marks in End Semester Exam: Nil **Teacher's Assessment: 40 marks**

Unit -I

Introduction to Technical Writing: how differs from other types of written communication Purpose of technical writing, Correspondence: prewriting, writing and rewriting Objectives of Technical Writing. Audience Recognition: High-tech audience, Low tech audience, Lay audience, Multiple Audience.

Unit - II

Correspondence: Memos, Letters, E-mails, Its differentiation, types of letters, Document Design, its importance, Electronic Communication: Internet, Intranet, extranet, Writing effective e-mail.

Unit - III

Summary: Report Strategies, Effective style of technical report writing: Structures: content, introduction, conclusions, references, etc., Presentation, Writing first draft, revising first draft, diagrams, graphs, tables,

etc. report lay-out.

Unit -IV

Report Writing: Criteria for report writing, Types of Report: Trip report, Progress report, lab report, Feasibility report, project report, incident report, etc. Case Studies.

Unit -V

Proposals & Presentation: Title page, Cover letter, Table of Content, list of illustrations, summary, discussion, conclusion, references, glossary, appendix, Case Studies. Oral Presentation/ Seminar:

Text Books:

1. Sharon J. Gerson & Steven M. Gerson "Technical Writing - Process& Product", Pearson Education.

Reference Books:

1. Sunita Mishra, "Communication Skills for Engineers" Pearson Education
2. Davies J.W. "Communication for engineering students", Longman
3. Eisenberg, "Effective Technical Communication", Mc. Graw Hill.

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Name of the Programme: :::: Duration of the Programme: Four Years

Branch: **Mining Engineering**

Semester: **VIII**

Subject: **Mining Machinery – III Lab**

Code: **339861(39)**

Total Practical Periods: 50

Total Tutorial Periods: Nil

Total Marks in End Semester Exam: 40

List of Practical to be performed:

1. Study of working and construction of Rotary Coal Drill Machine used in U/G Coal Mine.
2. Study of working and construction of Jack hammers drill used in Metal Mine.
3. Study of working and construction of Long Wall Coal Cutting Machine
4. Study of working and construction of Side dump loader.
5. Study of working and construction of a LHD
6. Study of Double ended ranging drum shearer.
7. Study of drill panel and gate end box.
8. Study of working and construction of Gathering Arm Loader.
9. Study of working and construction of Coal Plough.
10. Study of working and construction of Torque Convertor.
11. Study of working and construction of Reciprocating Compressors.

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Name of the Programme: :::: Duration of the Programme: Four Years

Branch: **Mining Engineering**

Semester: **VIII**

Subject: **Strata Control Lab**

Code: **339862(39)**

Total Practical Periods: 28

Total Tutorial Periods: Nil

Total Marks in End Semester Exam: 40

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.

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Name of the Programme: :::: Duration of the Programme: Four Years

Branch: **Mining Engineering** Semester: **VIII**

Subject: **Pollution Control Engg. Lab** Code: **339863(39)**

Total Practical Periods: 28 Total Tutorial Periods: Nil

Total Marks in End Semester Exam: 40

List of Practical to be performed:

1. Study of Konimeter

2. Study of Dust precipitator

3. Study of gas chromatograph

4. Study of noise measuring instruments

5. Measurement of noise

6. Study of noise controlling techniques

7. Study of vibration measuring instruments

8. Measurement of vibration

9. Study of land reclamation methods

10. Preparation of EIA and EMP for a mining project

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Name of the Programme: :::: Duration of the Programme: Four Years

Branch: **Mining Engineering** Semester: **VIII**

Subject: **Professional Elective-III(Surface Mining-II)** Code: **339841(39)**

Total Theory Periods: 50 Total Tutorial Periods: **12**

No. of class Tests to be conducted: **2 (Minimum)**

No. of assignments to be submitted: **2 (Minimum)**

ESE Duration: **Three Hours** Maximum Marks in ESE: **80** Minimum Marks in ESE: **28**

Course Objective

To learn various layout of opencast mine and waste dump.
To choose suitable excavators for any deposit extracted by opencast method.
To be able to design an opencast mine and mine waste dump.
To understand the pit slope stability and its impact on mining activity

Course outcomes:

Apply knowledge of surface mining for understanding, formulating and solving slope stability problem in any opencast mine.
Identify, analyze and solve opencast mining problems.
Acquire knowledge and hands-on competence in applying the concepts in the development of opencast mine planning.

Unit I: Layouts of open pit mines, Methods of sidecasting, Sidecasting by Stripping Shovel and Dragline, Range Diagram, calculation of operating radius. Explosive casting, Layouts of waste dumps. Design of Haul roads.

Unit II: Introduction to continuous surface mining equipment, Bucket wheel excavators: construction , basic operation and productivity calculation, Continuous surface miner: construction, basic operation and productivity calculation. Face Layouts.

Unit III: Ultimate pit design, Factors affecting ultimate pit limits; Significance of ultimate pit limits; Manual methods of developing ultimate pit limits. Floating cone technique, Production planning, Basics of mine life and plant size concepts, Mine and Mill plant sizing,

Unit IV: Introduction to rock slope engineering, Slopes in surface mines and their formation, Pit slopes and their influence on mine economics, Slope stability, Factors influencing slope stability, Various types of slope failure and their conditions.

Unit V: Determination of factor of safety of a slope under plane and circular failure, Planning of slope stability investigations, Stablisation and protection methods for stability of slopes.

References:

1. Surface Mining : G.B. Misra
2. Surface mining equipment : Martin
3. Surface Mining : Pfleider
4. Rock slope engg. : Hoek & Bray
5. SME handbook : Hartman
6. Surface Mine Planning & Design : Hustralid & Kuchha

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Name of the Programme: :::: Duration of the Programme: Four Years

Branch: **Mining Engineering** Semester: **VIII**

Subject: **Professional Elective-III(Application of Computer, Geographical Information System (GIS) and Remote Sensing (RS) in Mining**

Code : **339842(39)**

Total Theory Periods: 50 Total Tutorial Periods: **12**

No. of class Tests to be conducted: 2 (Minimum) No. of assignments to be submitted: 2 (Minimum)

ESE Duration: Three Hours Maximum Marks in ESE: **80** Minimum Marks in ESE: **28**

Course Objective

To learn various application of computers in the mining field.

To. be able to understand the use of Remote sensing in the surveying of pencast mine

To be able to understand the use of GIS in transportation system of opencast mine..

To understand the pit slope stability and its impact on mining activity

Course outcomes:

Apply knowledge of this subject for understanding, formulating and solving transportation problem in any opencast mine.

Identify, analyze and solve opencast mining problems.

Acquire knowledge and hands-on competence in applying the application of GIS ,Remote Sensing and application of computer in the development of opencast mine planning.

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. Hardware and Software 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, Contract Enhancement, Spatial Filtering, Band Ratioing Image Classification, Supervised And Unsupervised Classification. Remote Sensing Applications in Forestry, Geology, Hydrogeology, Land use 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 of Vector 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-Project Planning, 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