

STATE COUNCIL FOR TECHNICAL EDUCATION & VOCATIONAL TRAINING, ODISHA

TEACHING & EVALUATION SCHEME

DISCIPLINE : Mining Engineering

SEMESTER : VI

Sl. No	Subject Code	Subject	Teaching Scheme (Hours/week)			Evaluation Scheme					Total Mark
						Theory			Practical		
			L	T	P	End Exam	Teachers Assignment	Class Test	End Exam	Sessional	
1	MNT-601	Entrepreneurship & Mine Management.	4	-	-	70	10	20	-	-	100
2	MNT-602	Mine Machinery-II	4	-	-	70	10	20	-	-	100
3	MNT-603	Mining Geology	4	-	-	70	10	20	-	-	100
4	MNT-604	Mining methods (Underground Metal)	4	-	-	70	10	20	-	-	100
5	MNT-605	ELECTIVE(Any One) (i) Mineral Dressing (ii) Material Handling in Mines (iii) Advanced Mines Survey (iv) Computer Application in Mines.	4	-	-	70	10	20	-	-	100

Practical

1	MNP-601	Mining Geology-Lab	-	-	6	-	-	-	25	25	50
2	MNP-602	Application of Software in Mines	-	-	4	-	-	-	25	25	50
3	MNP-603	Mine Machinery-II Lab.	-	-	6	-	-	-	50	50	100
4	MNP-604	Project Work , Industrial Training Report & Seminar	-	-	1	-	-	-	-	50	50
5		Library Studies	-	-	2	-	-	-	-	-	-
Total			20	-	19	350	50	100	100	150	750

NOTE : (i) Evaluation for Teacher Assignment, Class Test , Sessional & Practical to be made as per guidelines of SCTE & VT., Odisha, Bhubaneswar.

(ii) The Theory & Practical classes except Industrial Training will be conducted for 11 weeks in a semester and Industrial Training will be for 4 weeks per semester.

ENTERPRENURSHIP & MINE MANAGEMENT

MNT-601

L/wk T/wk P/wk

4 0 0

Periods per week: 04

Total Marks: 100

Evaluation Scheme

Total Periods

Theory:

Lecture: 44

End Term Exam : 70

Teacher Assignment : 10

Class Test :20

Total 100 Marks

TOPIC WISE DISTRIBUTION OF PERIODS

Sl.No.	Topics	Periods:	L
1.	Entrepreneurship		04
2.	Management & Organisation		05
3.	Financial Management		03
4.	Manpower Management		03
5.	Management by Objectives		05
6.	Motivation		04
7.	Work Study		04
8.	Wages		03
9.	Incentives		02
10.	Industrial Psychology		03
11.	Trade Unions		03
12.	Industrial Dispute Act		<u>06</u>
			44

RATIONALE

A Mining Engineer should possess entrepreneurial qualities of efficient management of mining operations. Since a large number of employees are involved in mining, a mining engineer should have the knowledge of industrial psychology, trade unions and their functions, Industrial Dispute Act etc.

OBJECTIVES

On completion of the subject, students will be able to:

1. Define entrepreneurship & its characteristics.
2. State the principle and function of entrepreneurship management & Explain management techniques.
3. Explain the procedure involved in financial management.
4. State the meaning of the manpower management.
5. Explain the meaning of management by objects.
6. Explain motivational technique.
7. Explain the procedure of work-study.
8. Describe wage system and different type of wages.
9. State basic concepts of incentives.
10. State the meaning of industrial psychology working conditions & environment.
11. State & explain the functions of trade unions & their function.
12. State the Industrial dispute Act.

COURSE CONTENTS (Based on specific objectives)

1.0 Entrepreneurship

- 1.1 Define entrepreneurship.
- 1.2 Explain role of entrepreneurship in industrial development.
- 1.3 Describe entrepreneurship characteristics.
- 1.4 Describe the scope of entrepreneurship in small mines & allied industries.
- 1.5 State principle of entrepreneurship management.

2.0 Management & Organisation.

- 2.1 State function of management.
- 2.2 Explain organizational structure.
- 2.3 Basic concepts of Management
- 2.4 Briefly discuss on Planning, Organizing, Coordinating, Motivating, Directing & Controlling.
- 2.5 Describe Mine organization structures, Competent person & officials.

3.0 Financial management

- 3.1 State types of working capital.
- 3.2 Discuss principle & function of financial institution.
- 3.3 Describe the principle of mine economies & cost control avenues.

4.0 Meaning & objective of man-power management.

- 4.1 Describe human behavior & group attitude of labours in mines.

5.0 Management by Objectives.

- 5.1 Discuss the meaning of the term management by objectives, its necessity & advantages.

6.0 Motivation

- 6.1 Define & describe different kinds of motivation.
- 6.2 Explain different motivational techniques.

7.0 Work Study.

- 7.1 State basic concept, procedure and advantages of work study, time study & motion study.

8.0 Wages.

- 8.1 Define wage, nominal wage, real wage, living wage, minimum wage, fair wage & fall back wages (Definitions as per Mines Act & Rules).
- 8.2 Discuss essentials of good wages system.

9.0 Incentives.

- 9.1 State basic concept of incentives.

10.0 Industrial Psychology

- 10.1 State meaning of industrial psychology working condition & environment.

11.0 Trade Unions.

11.1 Develop concept about trade unions & their function.

12.0 Industrial Dispute Act.

12.1 State main provision of Industrial dispute Act-1956.

RECOMMENDED BOOKS

1. Entrepreneurship & Management – B.Badhei
2. Principle of Management – L.M.Prasad
3. Industrial Management & Organisation – O.P.Khana
4. Industrial Management & Organisation – Banga & Sharma

MINE MACHINERY – II

MNT-602

L/wk T/wk P/wk
4 0 0

Periods per week: 04

Total Marks: 100

Evaluation Scheme

Total Periods

Theory:

Lecture: 44

End Term Exam : 70

Teacher Assignment : 10

Class Test :20

Total 100 Marks

TOPIC WISE DISTRIBUTION OF PERIODS

Sl.No.	Topic	Periods:	L
1.	Underground face machineries		15
2.	Opencast machineries		12
3.	Mine Pumps		08
4.	Bore hole pump		05
5.	Pipes and valves		<u>04</u>
			44

RATIONALE

It is imperative that a Mining Engineer should be thoroughly conversant with various types of machine used in mining operations.

OBJECTIVES

On completion of the subject, students will be able to:

1. Describe various underground face machineries & its applicability.
2. Describe various opencast machineries & its applicability.
3. Describe various types of pump & its applicability.

COURSE CONTENTS (Based on specific objectives)

1.0 Underground face machineries.

- 1.1. Electric coal drill
 - 1.1.1 Describe constructional features, operation, principle & use of electric coal drill.
 - 1.1.2 State types of drill rods & drill bits used in electric coal drill.
- 1.2 Describe basic constructional features of gathering arm loader, scraper loader, side discharge loader & load & haul loader.
- 1.3 Describe basic constructional features & operation principle of jack hammer drill & air leg rock drill.
- 1.4 Describe basic constructional features & operation principle of road header & Shearer loader.

2.0 Opencast machineries

- 2.1 Describe basic constructional features of surface miner, dragline, shovel & backhoe, bucket wheel excavator.
- 2.2 Describe basic constructional features of dumper, dozer, scraper & road grader.

3.0 Mine Pumps.

- 3.1 Classify mine pumps.
- 3.2 Describe constructional features, working & use of ram pumps.
- 3.3 Centrifugal & turbine pumps.
- 3.4 Describe constructional features of centrifugal & turbine pumps.
- 3.5 State principle of centrifugal & turbine pumps & its applicability.
- 3.6 Explain balancing the axial thrust of turbine pumps.
- 3.7 Draw characteristic curves for turbine pumps.
- 3.8 Solve numerical problems on centrifugal & turbine pumps.
- 3.9 Describe constructional features and working principle & use of roto pump (screw pump)
- 3.10 Describe constructional features & working principle of sinking pump.
- 3.11 State procedure of suspension in shaft.

4.0 Bore hole pump

- 4.1 Describe constructional features & working of bore hole pump.
- 4.2 State installation of bore hole pump.

5.0 Pipes and valves

- 5.1 State types of pipe & valves used in Mines.
- 5.2 Describe constructional features of various type of valves.
- 5.3 State & describe different types of pipe joints.
- 5.4 Describe support of laying main pipe in shaft.
- 5.5 Discuss the Pipe line layout.

RECOMMENDED BOOKS

1. Electrical equipment in Mine – H. Cotton
2. Winning and Working of Iron Ore – Desmukh & Desmukh
3. E.M.T. Vol.-III – D.J.Desmukh

MINING GEOLOGY

MNT-603

L/wk T/wk P/wk

4 0 0

Periods per week: 04

Total Marks: 100

Evaluation Scheme

Total Periods

Theory:

Lecture: 44

End Term Exam : 70

Teacher Assignment : 10

Class Test :20

Total 100 Marks

TOPIC WISE DISTRIBUTION OF PERIODS

Sl.No.	Topic	Periods:	L
1.	Stratigraphy		09
2.	Fossil Fuels		09
3.	Prospecting & Exploration		09
4.	Economic Geology		09
5.	Sampling		<u>08</u>
			44

RATIONALE

In majority of the cases, materials that need to be explored comprise rocks & minerals. It is therefore, essential for an engineer to have basic knowledge of mining geology.

OBJECTIVES

On completion of the paper, students will be able to:

1. Outline the importance of Stratigraphy & Geological time Scale in the study of geology.
2. The major Groups & economic minerals associated with them that form the basis for the study of stratigraphy.
3. Describe the use, origin mode of occurrence & distribution of fossil fuels & where top look for them.
4. Explain the fundamental principles that underline the search for economic minerals. He will achieve a certain amount of clarity in using geological, geophysical & geochemical methods for looking for important mineral deposits.
5. Develop a comprehensive idea regarding mineralogy mode of occurrence, uses & distribution of ores.
6. Undertake sampling work according to BIS specification.

COURSE CONTENTS (Based on specific objectives)

1.0 Stratigraphy

- 1.1 Describe the principles of stratigraphy.
- 1.2 Describe the geological time Scale.
- 1.3 Describe the stratigraphic sequence, lithology, distribution & economic mineral deposits of Iron Ore series, Cuddpah Supergroup, Vindhyan super group & gondwana super group.

2.0 Fossil fuels

- 2.1 Coal
 - 2.1.1 Describe the different ranks of coal.

- 2.1.2 Describe different grades of coal like A,B,C,D.
- 2.1.3 Describe the various theories accounting for the origin of coal.
- 2.1.4 Describe various important lower gondwana Coalfields of India.
- 2.2 Petroleum
 - 2.1.1 Describe the organic & inorganic theories accounting for the origin of petroleum.
 - 2.1.2 Define oil pool & oil trap.
 - 2.1.3 Describe process of accumulation of oil.
 - 2.1.4 Describe different important oil fields in India.
- 3.0 Prospecting & exploration.**
 - 3.1 Define prospecting.
 - 3.2 Differentiate between prospecting & exploration.
 - 3.3 Enumerate & describe various criteria for geological exploration.
 - 3.4 Describe various methods of Geophysical prospecting.
 - 3.5 Explain Geochemical prospecting.
 - 3.6 Differentiate between biogeochemical & geobotanical prospecting.
- 4.0 Economic Geology**
 - 4.1 Define ore & gangue.
 - 4.2 Define tenor & grade.
 - 4.3 Describe the mineralogy, mode of occurrence, distribution & use of iron ore deposits in India.
 - 4.4 Describe the mineralogy, mode of occurrence, & description of Chromites deposits in India & its uses.
 - 4.5 Describe the mineralogy, mode of occurrence & distribution of copper deposits in India & uses of this metal.
 - 4.6 Describe the mineralogy, mode of occurrence, distribution of lead & zinc deposits in India & the uses of these metals.
 - 4.7 UNFC (United Nation Framework of Classification) code of classification of reserves.
- 5.0 Sampling**
 - 5.1 Define sampling, outline the method of preparation of samples for assay.
 - 5.2 Explain sampling
 - 5.3 Describe the different methods of sampling as outlined by Bureau of Indian Standards. (BIS)

RECOMMENDED BOOKS

1. Geology of India & Burma – M.S. Krishnan
2. An Introduction to geology of Coal & coalfields of India – N.L.Sharma, K.S.V.Ram
3. Geology of petroleum – A.I.Levorsen
4. Geological prospecting & Exploration – V.K.Kreiter
5. A Hand Book of economic geology – A.K.Sen, P.K.Guha
6. Mineral Economics – R.K. Sinha, N.L.Sharma

MINING METHODS (UNDERGROUND METAL)

MNT-604

L/wk T/wk P/wk

4 0 0

Periods per week: 04

Total Marks: 100

Evaluation Scheme

Total Periods

Theory:

Lecture: 44

End Term Exam : 70

Teacher Assignment : 10

Class Test :20

Total 100 Marks

TOPIC WISE DISTRIBUTION OF PERIODS (Theory)

Sl.No.	Topic	Periods:	L
1.	Development in underground metal mines		10
2.	Comparative study between Coal & Metal Mining		03
3.	Stoping Method		15
4.	Stone Drifting.		05
5.	Rock burst.		03
6.	Face mechanization		08
			44

RATIONALE

As Mining Engineer, one should have the knowledge in fundamental principles of generation in underground metal mines.

OBJECTIVES

On completion of the subject, students will be able to :

1. Explain various methods of development used in underground metal mines.
2. Compare between coal & metal mining.
3. Explain various stopping methods used in u/g metal mines.
4. Stone Drifting.
5. Explain causes & prevention of rock burst.
6. Describe about face mechanization.

COURSE CONTENTS (Based on specific objectives)

1.0 Development in underground Metal Mine.

- 1.1 Explain formation of blocks of mineral deposit.
- 1.2 Explain level interval
- 1.3 Describe
 - i) Open raising method
 - ii) Two compartment method
 - iii) Jora raise lift
 - iv) Long hole drilling method./Vertical Crater retreat (VCR) method.
 - v) Alimak raise climber
 - vi) Raise borer.

2.0 Give a comparative study between coal and metal Mining.

3.0 Stopping methods.

- 3.1 Classify stopping methods with application and factors affecting methods of stopping.
- 3.2 Preparatory arrangement for stoping.
- 3.3 Describe the following methods with layout including drilling, blasting, transportation and supports.
 - a) Open stoping.
 - b) Open stoping with pillar support.
 - c) Shrinkage stoping.
 - d) Cut & fill stoping.
 - e) Square set stoping.
 - f) Block caving.
 - g) Sub-level caving.
 - h) Top slicing.

4.0 Stone Drifting

- 4.1 Describe conventional methods of drifting. Find out direction gradient of drift. Describe drilling and blasting, support, transportation, drainage, ventilation and lighting arrangements, organisation and supervision in mechanised method of drifting.

5.0 Rock Burst

- 5.1 Explain causes and prevention of rock burst.

6.0 Face mechanization

- 6.1 Describe use of jumbo drill with air leg.
- 6.2 Describe various Loading & Transportation System like L.H.D., L.P.D.T.(Low Profile Dump Truck), rocker shovel, spiral chutes and draw points, Scraper etc.

RECOMMENDED BOOKS

1. SME Mining Engineering Hand Book Vol.I & II-1993 edition.
2. Metal Mining – Chacharker
3. Mining Engineering Hand Book – Peele
4. EMT Vol.II – D.J.Desmukh
5. Mining Ground control – Prof. B.S. Verma
6. Rock Mechanics – Jermic
7. Rock Mechanics – Jugger & Cook
8. Metalliferous Mining – Higam
9. Underground Mining Method-Bullock.

MINERAL DRESSING

MNT-605

L/wk T/wk P/wk

4 0 0

Periods per week: 04

Total Marks: 100

Total Periods

Lecture: 44

Evaluation Scheme

Theory:

End Term Exam : 70

Teacher Assignment : 10

Class Test :20

Total 100 Marks

TOPIC WISE DISTRIBUTION OF PERIODS

Sl.No.	Topic	Periods:	L
1.	Introduction		02
2.	Unit Operations		05
3.	Grinding		06
4.	Lab. Sizing		05
5.	Industrial Screening		05
6.	Gravity Concentration		06
7.	Heavy Media Separation		05
8.	Floatation		05
9.	Magnetic & Electrostatic Separators		<u>05</u>
			44

RATIONALE

In case of metalliferous mines, the ultimate goal is the extraction of metals. Prior to sending ores into the process of extraction, it requires dressing for removal of desirable gangue minerals as far as possible. So a Mining Engineer, specially attached to metalliferous mines should have some basic concepts about mineral dressing.

OBJECTIVES

On completion of the subject, students will be able to:

1. Comprehend physical & chemical properties of ores, know the application in mineral dressing.
2. Explain the principle of operation of Blake & Dodge jaw crushers, Gyratory Cone crushers, roll crushers.
3. Explain the principle of ball mill, open circuit & close circuit Grinding.
4. Explain the principle of lab.sizing.
5. Explain the principle of operation of industrial screening. Comprehend the principle of operation of classifiers & their application in the field.
6. Comprehend elementary idea about gravity concentration.
7. Explain the principle of operation of heavy media separation.
8. Comprehend elementary principle of floatation process.
9. Explain the principle & application of magnetic separators.

COURSE CONTENTS (Based on specific objectives)

1.0 Introduction

1.1 Describe the objective & scope of application of mineral dressing in surface & u/g mines.

2.0 Unit operations

2.1 Explain the principle of Blake & dodge jaw crushers, gyratory & cone crushers, roll crusher.

3.0 Grinding

3.1 Explain the principle of ball mill operation, open circuit grinding, close circuit grinding, dry & wet grinding.

4.0 Explain the procedure for size analysis & use of standard screen as also screening techniques employed.

5.0 Industrial screening

5.1 Explain the principle of industrial screening, type of screening (without calculation)

5.2 Explain the operation of classifier & their application.

6.0 Gravity concentration

6.1 Explain the general principles of wilfly table & its operation.

6.2 Develop elementary idea regarding the operation jigs.

7.0 Heavy media separation

7.1 Explain the fundamental principle of heavy media separation – Chance process.

6.0 Flotation

8.1 Comprehend elementary principle of froth floatation, practical utility of frother, collection, modifiers & depressants.

8.2 Describe & illustrate floatation cell.

9.0 Magnetic & Electrostatic Separators

9.1 Explain the principle of operation of magnetic & electrostatic separators.

9.2 Describe the application of separators in mineral dressing.

RECOMMENDED BOOKS

1. Principles of Mineral Dressing- Gaudin A.M.
2. Hand Book of Mineral Dressing Ores & Minerals – A.E.Taggart
3. Mineral Processing Technology – B.A.Wills

MATERIAL HANDLING IN MINES

MNT-605

L/wk T/wk P/wk

4 0 0

Periods per week: 04

Total Marks: 100

Evaluation Scheme

Total Periods

Theory:

Lecture: 44

End Term Exam : 70

Teacher Assignment : 10

Class Test :20

Total 100 Marks

TOPIC WISE DISTRIBUTION OF PERIODS

Sl.No.	Topic	Periods:	L
1.	Introduction to surface & Underground haulage system		05
2.	Conveyors		08
4.	Locomotive haulage		07
5.	Aerial ropeways		06
6.	Introduction of hydraulic transportation		05
7.	Man riding haulage		05
8.	Spiral chutes		03
9.	Flow of materials in bins, bunkers		<u>05</u>
			44

RATIONALE

A Mining Engineer entrusted with the responsibility of supervising material handling in a mine should have specialized knowledge in this area including transportation in mines.

OBJECTIVES

On completion of the subject, students will be able to:

1. Classify underground & surface transportation system in mines.
2. Describe various types of conveyor & its design.
3. Explain various types of locomotive haulage used in underground mines.
4. Describe aerial ropeway & its applicability.
5. Describe hydraulic transportation in mines.
6. Explain man riding haulage system.
7. Explain spiral chute.
8. Describe flow of materials in bins & bunkers.

COURSE CONTENTS (Based on specific objectives)

1.0 Introduction to surface & underground haulage system

- 1.1 Classify underground & surface haulage system.
- 1.2 State factors affecting design of a haulage system.
- 1.3 Find out the capacity of a haulage system in a given production.

2.0 Conveyors

- 2.1 Classification of Conveyors.

- 2.2 State factors affecting design of belt conveyor, cable belt conveyor and steel cord conveyors.
- 2.3 Find out carrying capacity of belt conveyor, cable belt conveyor & steel cord conveyor.
- 2.4 Describe constructional features of belt conveyor & cable belt conveyor.
- 2.5 Describe formula to calculate drive capacity of belt conveyor & cable belt conveyor.
- 3.0 Locomotive haulage**
 - 3.1 State different types of locomotive haulage.
 - 3.2 Describe basic constructional features of trolley wire, compressed air , diesel & battery locomotives.
 - 3.3. State applicability, merits & demerits of locomotives.
 - 3.4 Describe safety devices of diesel locomotive including flame trap around exhaust conditioner box.
 - 3.5 Solve numerical problems.
- 4.0 Aerial ropeways**
 - 4.1 Classify aerial ropeways.
 - 4.2 State applicability of aerial ropeways.
 - 4.3 Describe constructional features of bicable and twin cable ropeways.
 - 4.4 Describe loading, unloading & angle stations bicable & thin cable ropeways.
- 5.0 Hydraulic transportation of solids**
 - 5.1 Define hydraulic transportation.
 - 5.2 Discuss theory of hydraulic transportation of solids in mines (without derivation)
 - 1.1 Design the hydraulic transportation system.
 - 1.2 State applicability, advantages & disadvantages of hydraulic transportation in Mines.
- 6.0 Man riding haulage**
 - 6.1 State different types of man riding system.
 - 6.2 Describe constructional features of monorail, deorail & flight chairs & conveyor system.
- 7.0 Spiral Chutes**
 - 7.1 State capability of spiral chutes.
 - 7.2 Explain working principle of spiral chutes.
 - 7.3 Describe constructional features of spiral chutes.
- 8.0 Flow of materials in bins, bunkers**
 - 8.1 Describe bins & bunkers.
 - 8.2 Explain flow of materials in bins & bunkers.
 - 8.3 Design bunkers & bins for a given production.

RECOMMENDED BOOKS

- 1. Mining Machinery – T. Bryson
- 2. Material Handling in Mines IIT Kharagpur journal
- 3. Mine Transport – N.T.Kerlin
- 4. EMT Vol.-III – D.J.Desmukh
- 5. S.M.E. Mining Engineering Hand Book

ADVANCED MINES SURVEY

MNT-605

L/wk T/wk P/wk

4 0 0

Periods per week: 04

Total Marks: 100

Total Periods

Lecture: 44

Evaluation Scheme

Theory:

End Term Exam : 70

Teacher Assignment : 10

Class Test :20

Total 100 Marks

TOPIC WISE DISTRIBUTION OF PERIODS

Sl.No.	Topic	Periods:	L
1.	Spherical Trigonometry		09
2.	Field Astronomy		09
3.	Elements of Photogrametry		12
4.	Global Positioning System		08
5.	Total Station		06
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			44

RATIONALE

A Mining engineer entrusted with the responsibility of supervising mine survey works should be through conversant with the latest developments techniques employed in mine surveying.

OBJECTIVES

After the completion of the subject, students will develop the fundamental concepts of :

1. Spherical Trigonometry.
2. Field Astronomy.
3. Elements of Photogrametry.
4. Global Positioning System.
5. Total Station.

COURSE CONTENTS (Based on specific objectives)

1.0 Spherical Trigonometry.

- 1.1 Define some common terms used in Spherical Trigonometry like Sphere. Great circle , Small circle, Side of a triangle , Angle of a Triangle, Spherical axes, Spherical Triangle, Right Angled Triangle.
- 1.2 Convert rectangular to Spherical coordinates.
- 1.3 Define convergence of meridian and parallel of latitude.

2.0 Field Astronomy.

- 2.1 Define some terms used in field astronomy like, Celestial Sphere, Celestial Latitude, Celestial Longitude, Azimuth, Hour angle, Declination , Altitude, Zenith, Nadir, Right Ascension, Celestial Meridian, Celestial Equator, Zenith Distance, Vertical Circle, Celestial Horizon. Astronomical Triangle etc. Discuss different astronomical coordinates for heavenly bodies.

- 2.2 Determine apparent time , Meantime, Sidereal time, Standard Time, Relation between different types of time.
- 2.3 Determine latitude , Longitude, Time and azimuth of a place .
- 3.0 Element of Photogrammetry.**
 - 3.1 Know the Photo theodolite.
 - 3.1.1 Define camera axis, Picture Plane, Principal points, Focal Length, Nodal Point, Prospective centre, Principal Distance, Principal Plane, Print, Isocentre in terrestrial Photogrammetry.
 - 3.1.2 Explain fundamental principles behind stereo phtogrammetry.
 - 3.1.3 Define vertical photograph , Tilted Photograph, Oblique photograph, Prospective projection, Explosure station, Flying height focal length, Principal Point, Nadir Point, Ground Nadir Point, Till, Principle plane, Principle Line, Isocentre, Azimuth of Principle Plane, Horizontal Point .Find out the scale of Photography.
- 4.0 Global Positioning System.**
 - 4.1 Define Global Positioning System. Explain the Principle of working of the system in brief.
 - 4.1.2 Outline the application of GPS in Mining Engineering.
- 5.0 Total Station.**
 - 5.1 Identify different components of Total Station.
 - 5.1.1 Describe the applications of Total Station in Mines.

RECOMMENDED BOOKS

1. Surveying VOL.-III by Dr. B. C. Punmia
2. Modern concept of Mine Surveying by Prof. Alam Chand.

COMPUTER APPLICATION IN MINES

MNT-605

L/wk T/wk P/wk

4 0 0

Periods per week: 04

Total Marks: 100

Evaluation Scheme

Total Periods

Theory:

Lecture: 44

End Term Exam : 70

Teacher Assignment : 10

Class Test :20

Total 100 Marks

TOPIC WISE DISTRIBUTION OF PERIODS (THEORY)

Sl. No.	Topics	Periods	
		L	T
01.	Module I	14	-
02.	Module II	15	-
03.	Module III	15	-
		<hr/>	<hr/>
		44	-

Objective:

For undergraduate students who are familiar with the basics of mining engineering as well as the fundamentals of computer programming, this course aims at giving them an over view of how the software used in mining engineering works.

COURSE CONTENT

1.0 Module I

Overview of computer programming with reference to pseudo codes, C and C++ languages. Principles of plotting pixels and a brief introduction to lines and curves as orderly combinations of pixels. Coordinate system of plotting Mine Survey data and the use of computer graphics for such plotting. Overview of the common well known software packages like Surpac, Intellimine, Crystal etc.

2.0 Module II

Introduction to computer applications in rock mechanics and support design, blast design, prediction and assessment of blasting results, mine ventilation calculations, dispatch scheduling and other mining applications. Scope and limitations of networking mine offices, stores, workshops etc. to enhance productivity and cost control.

3.0 Module III

Application of System Simulation to study and solve mining problems. Modeling and simulation of mineral handling and mineral beneficiation systems. Overview of a few well known simulation packages to Mineral processing like JKSIMET, MODSIM etc.

Text Books:

1. Fundamentals of Database Systems, Elmarsi and Navathe, 3rd edition, Wesley 2000.
2. CAD/CAM : Computer Aided Design and Manufacturing, Mikell P. Groover, Emory W. Zimmers, Jr. PHI Inida, 1989.

References:

1. Fishman, G. S. (1995). Monte Carlo: Concepts, Algorithms, and Applications. New York: Springer
2. Ripley, B. D. (1987). Stochastic Simulation. Wiley & Sons.
3. Computer Simulations in Science and Technology Studies by Ahrweiler, Petra, Gilbert Nigel, and F. Ahrweilereditors., Springer Verlag, 1998. ISBN# 3540648712
4. Advances in Stochastic Simulation Methods by Balakrishnan, N. *et.al.*editors.,Birkhauser, 2000. ISBN# 0817641076
5. Simulation Fundamentals Bennett, Brian., Prentice Hall, 1995. ISBN#0138132623 [general]
6. Mineral Crushing and Grinding circuits, Simulation. by A.J.Lynch – Elsevier 2006
7. Modeling and Simulation of Mineral Processing Systems by Peter R. King – Amazon 2001
8. Mine Ventilation and Air Conditioning by Hartman – Wiley International 1961
9. Mine Environmental Engineering by V.S.Vutukuri& Lama – Cambridge University Press 1986

MINING GEOLOGY- LAB

MNP-601

L/wk T/wk P/wk

0 0 06

Period per week: 06

Total Periods: 66

Evaluation Scheme

Practical:

End Term Exam: 25 Marks

Sess.: 25Marks

Total Marks : 50 Marks

1. Megascopic identification of Igneous rocks in hand specimens.
2. Megascopic identification of Sedimentary rocks in hand specimens.
3. Megascopic identification of Metamorphic rocks in hand specimens.
4. Interpretation of contour maps and preparation of the profile section for it.
5. Interpretation of geological maps and preparation of the profile section for it.
6. Describe the specific gravity of small specimen by Joley's spring balance.

APPLICATION OF SOFTWARE IN MINES

MNP-602

L/wk T/wk P/wk

0 0 04

Period per Week: 4 Total Marks: 50

Total Periods

Practical:44

Evaluation Scheme

Theory:

Practical

End Term Exam: 25 Marks

Sess.: 25 Marks

Total Marks : 50 Marks

Draw the flowchart (DFC), write & run the programme on the problems relate to

1. Ventilation networking.
2. Transport linkage.
3. Winding system design & capacity assessment (torque, power, speed etc.)
4. Mine production & productivity calculation.
5. Mine Planning & design.
6. Study of Mining Software
 - 6.1 SURPAC Version 6.1.4 etc
 - 6.2 Study of Slope Stability
 - 6.3 Rock Analysis
 - 6.4 Rock Fall Analysis.

MINE MACHINERY – II LAB

L/wk T/wk P/wk

0 0 06

Period per week: 06

Total Periods: 66

Evaluation Scheme

Practical:

End Term Exam: 50 Marks

Sess.: 50 Marks

Total Marks : 100 Marks

1. Study of Centrifugal Pumps.
2. Study of Turbine Pumps.
3. Study of Roto Pump.
4. Study of Sinking Pump.
5. Study of electric coal drills & its accessories.
6. Study of Jack Hammer Drill with air leg.
7. Study of scrapper & shaker conveyor.
8. Study of scrapper loader.
9. Model Development of Gathering arm loader.
10. Study of Electric Coal Drill.

PROJECT WORK , INDUSTRIAL TRAINING **REPORT & SEMINAR**

MNP-604

L/wk T/wk P/wk

0 0 1

Periods per week: 1

Total Periods

Practical: 11

Total Marks:50

Evaluation Scheme

Practical.

Sessional: 50 Marks

Total Marks : 50 Marks

Students will go to different mines on practical training at the end of 2nd, 3rd, 4th & 5th Semesters for a period of 4 weeks/30 days. In the 6th Semester they will be assigned a project related to field. They will submit the project report after returning from training. On returning from mines a presentation is to be given by the students which will be evaluated followed by viva-voce examination.

They are also required to submit training reports touching all the aspects of the Mining & related operation i.e. geology, survey, drilling, blasting, method of work, ventilation, support, transportation & any problem in Mines detected by them. This will be followed as per the curriculum. Training report will not be accepted without training certificate from the Mine Manager concerned. In addition, students have to submit reports on study Tour on different Mines visited by them. During Seminar as per convenience Technical persons will be called from respective fields.