

# CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

## DIPLOMA PROGRAMME IN MNING / MINING AND MINE SURVEYING COURSE OF STUDY AND SCHEME OF EXAMINATION

### SEMESTER - VI

Sn.	Board of Study	Subject Code	Subject	Periods/ week in hours			Scheme of Examination					Total Marks	Credit L+[T+P]/2
				L	T	P	Theory			Practical			
							ESE	CT	TA	ESE	TA		
1	Mining and Mine Surveying	239611 (39)	Mine Economics and Beneficiation	4	1	-	100	20	20	-	-	140	5
2	Mining and Mine Surveying	293612 (93)	Surface Mining	4	2	-	100	20	20	-	-	140	5
3	Mining and Mine Surveying	293613 (93)	Mine Management and Safety Aspects	4	2	-	100	20	20	-	-	140	5
4	Mining and Mine Surveying	293614 (93)	Advance Mine Surveying	5	2	-	100	20	20	-	-	140	6
5	Mining Engineering	293615 (93)	Mine Machinery-II	4	1	-	100	20	10	-	-	130	5
6	Mining and Mine Surveying	293621 (93)	Surface Mining (Lab)	-	-	2	-	-	-	50	20	70	1
7	Mining and Mine Surveying	293622 (93)	Advance Mine Surveying (Lab)	-	-	3	-	-	-	100	50	150	2
8	Mining and Mine Surveying	293623 (93)	Mine Machinery-II (Lab)			2				50	40	90	1
<b>Total</b>				<b>21</b>	<b>08</b>	<b>07</b>	<b>500</b>	<b>100</b>	<b>90</b>	<b>200</b>	<b>110</b>	<b>1000</b>	<b>30</b>

L: Lecture, T: Tutorial, P: Practical.

ESE: End Semester Examination, CT: Class Test, TA: Teacher's Assessment

## CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

- A) SEMESTER : VI  
 B) SUBJECT TITLE : MINE ECONOMICS AND BENEFICIATION  
 C) CODE : 239611(39)  
 D) BRANCH/DISCIPLINE : MINING AND MINE SURVEYING  
 E) RATIONAL :

A good engineer should be a good economist also. The back bone of any industry is economics and such industrial economics is included as a subject in many branches of engineering.

In mining industry economics is not applied only to higher level ie. planning level but also at the lowest level ie. planning of faces in the district for production. It is necessary for a diploma pass out in mining to have the elementary knowledge of economics, its general terminology and definitions and their applications to mining operations.

In this paper basic topics of economics are included with mine economics and beneficiation, to make a diploma holder perfect on the supervisory cadre.

### F) TEACHING AND EXAMINATION SCHEME:

Sn.	Subject Code	Periods/ week (in Hours)			Scheme of Examination					Total Marks	Credit L+[T+P]/2
					Theory			Practical			
		L	T	P	ESE	CT	TA	ESE	TA		
1	239611 (39)	4	1	-	100	20	20	-	-	140	5

L: Lecture hours, T: Tutorial hours, P: Practical hours

ESE: End of Semester Examination, CT: Class Test, TA: Teacher's Assessment

### G) DISTRIBUTION OF MARKS AND HOURS:

S. No.	Chapter No.	Chapter Name	Hours	Marks
1.	1	General Economics	16	20
2.	2	Mine Economics	16	20
3.	3	Sampling	16	20
4.	4	Valuation	16	20
5.	5	Tender documents and their application	16	20
<b>Total</b>			<b>80</b>	<b>100</b>

## CHAPTER - 1 GENERAL ECONOMICS

- 1.1 Economics terms
  - a) Wealth
  - b) Value:
    - (i) value in use and.
    - (ii) value in exchange.
  - c) Goods.
  - d) Price.
  - e) Income.
  - f) Investment.
  - g) Saving.
- 1.2 Consumption and its importance
  - a) consumption- satisfaction-needs.
  - b) Types of consumption.
  - c) importance of Consumption
- 1.3 Wants-wants and economics activities, classification, of wants-
  - a) Law of diminishing utility
  - b) Law of equi-marginal utility.
- 1.4 Utility- Meaning measurement, marginal and total utility.
- 1.5 Demand- definition, demand schedule and demand curve.
  - a) Law of Demand.
  - b) Extension and contraction in demand.
  - c) Increase and decrease in demand.
  - d) Elasticity of demand.
- 1.6 Supply
  - a) Supply of price.
  - b) Supply schedule.
  - c) Supply curve
  - d) Supply function.
  - e) Law of supply.
  - f) Elasticity of supply.
- 1.7 Capital- Meaning, definition-
  - a) Characteristics of capital.
  - b) Wealth and Capital.
  - c) Capital and labour.
  - d) Capital and lands.
  - e) Importance and function of Capital.
- 1.8 Money:
  - a) Definition of money.
  - b) Function of money.
  - c) Classification of money.

## **CHAPTER - 2 MINE ECONOMICS**

### 2.1 Mineral industry – its role in national economy

- a) Indian mineral resources and their statistics.
- b) Mineral policies.
- c) Conservation of minerals including coal company.

### 2.2 Constitution of companies under companies act.

- a) Types of companies.
- b) Private and public sector, merits and demerits.
  - i) Govt. undertakings.
- c) Nationalisation of coal industry formation of CIL and its subsidiaries.
- d) Elementary introduction of the following companies.
  - i) HCL
  - ii) BGML
  - iii) BALCO
  - iv) MOIL
- e) Labour
  - i) Efficiency of labour.
  - ii) Labour welfare.
  - iii) Social securities.
  - iv) Trade unions.

## **CHAPTER -3 SAMPLING-**

- ### 3.1
- a. Methods and importance of sampling.
  - b. Size of samples.
  - c. Class of samples.
  - d. Different methods of sampling.
  - e. Surface sampling.
  - f. Underground sampling.
  - g. Sampling of alluvial deposits.
  - h. Errors in Sampling.

### 3.2 Salting

- a. Method of salting
- b. Safe guards against salting.
- c. Sampling records.
- d. Computation for tonnage –
  - Average assay value
  - Average sloping width
  - Clear width
  - Willing width
  - Length average
  - Average of block and total average
  - Prismoidal averaging

## **CHAPTER – 4 VALUATION**

- 4.1
  - a) Methods of valuation
  - b) Cases requiring valuation risk in calculation of mines
  - c) Calculation of life of a mine
  - d) Valuation reports
  - e) Mine as a wasting assets
  - f) Redemption of capital depreciation
- 4.2 Valuation of mineral property and preparation of report

### **Reference Book:**

<b>Sl.No.</b>	<b>Title</b>	<b>Author, Publisher, Edition and Year</b>
1.	Industrial economics	V.C.Sinha and Pushpa Sinha
2.	Mineral economics	R.K.Sinha and N.L.Sharma
3.	Mineral and mine economics	R.T.Deshmukh

## CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

- A) SEMESTER : VI  
B) SUBJECT TITLE : SURFACE MINING  
C) CODE : 293612(93)  
D) BRANCH /DISCIPLINE : MINING AND MINE SURVEYING  
E) RATIONAL :

The techniques of extracting minerals from the earth are changing rapidly with recent developments in mining industry. Stress is being given for winning of deposits by removing overlying strata as compared to underground mining. as employment of heavy machineries. It is essential to study the technology applied in mining field for extraction of mineral completely by introducing heavy machines & comfortable natural conditions;

Open cast mining and problems of mined out area is one of the important field of mining/Industry. To enable the knowledge of student in this regard, an attentive attention is attracted through the various topics covered in this Subject, like:-

1. Open cast mining
2. Removal of strata.
3. Transportation of mineral.
4. Loading machines.
5. Land Reclamation.

A comprehensive knowledge on the aforesaid topics with certain case study of some important Indian open cast mines will enable a student to become a good mining engineer.

### F) TEACHING AND EXAMINATION SCHEME:

Sn.	Subject Code	Periods/ week (in Hours)			Scheme of Examination					Total Marks	Credit $L+[T+P]/2$
					Theory			Practical			
		L	T	P	ESE	CT	TA	ESE	TA		
1	293612 (93)	4	2	-	100	20	20	-	-	140	5
2	293621 (93)	-	-	2	-	-	-	50	20	70	1

L: Lecture hours, T: Tutorial hours, P: Practical hours

ESE: End of Semester Examination, CT: Class Test, TA: Teacher's Assessment

## G) DISTRIBUTION OF MARKS AND HOURS:

S. No.	Chapter No.	Chapter Name	Hours	Marks
1.	1	Open cast mining	14	15
2.	2	Opening of opencast mine	14	15
3.	3	Removal of strata	36	40
4.	4.	Loading Machines	10	10
5.	5.	Transportation	10	10
6.	6.	Land Reclamation	12	10
<b>Total</b>			<b>96</b>	<b>100</b>

### CHAPTER 1- OPEN CAST MINING

- 1.1 Classification of O.C. mine, manual, semi mechanized & mechanized.
- 1.2 Scope and limitation of O/C mines, Advantages and disadvantage of O/C mining.
- 1.3 Factors deciding the O/C mining.
- 1.4 Machineries used in O/C mines.

### CHAPTER 2- OPENING OF O/C MINE

- 2.1 box cut and access trenches.
- 2.2 lay out and design – bench, dimensions, height and width, overall pit slope; stability, general layout of O/C mine.
- 2.3 Drainage in pit and slope.
- 2.4 Suitability & limitations of O/C Machineries.

### CHAPTER 3- REMOVAL OF STRATA

- 3.1 By scrapers, Dozers, Graders, Draglines for soft strata, shovels and haul packs surface miners and bucket wheel excavators.
- 3.2 By drilling and blasting for hard strata; primary & secondary blasting.
- 3.3 Blast hole pattern; burden, spacing, diameter and depth of blast holes.
- 3.4 Drilling blast holes and drill machines.
- 3.5 Blast hole geometry, toe formation, sub grade drilling , creator theory.
- 3.6 Different types of explosive used in O/C mines liquid oxygen, ANFO, OCG, slurries, side mixed slurry (SMS), Emulsion explosive
- 3.7 Deck charging, & column loading; calculation of powder factor/ charge factor, calculation of charge /hole, control blasting technique- Special blasting technique.
- 3.8 detonators- blasting fuses, detonating fuses, Electric detonators, Nonel & Raydets detonators.
- 3.9 Secondary blasting – pop shooting and plaster shooting, snake holing,
- 3.10 Ground vibration measurement- its limitations.

#### **CHAPTER 4- LOADING MACHINARIES**

- 4.1 Different machines used for loading – shovels, dragline, Multi bucket excavators, front end loader, pay loader and cranes-their application, scope & capacity.
- 4.2 Time study and calculation of out-put with shovel, dumper & dragline.

#### **CHAPTER 5- TRANSPORTATION**

- 5.1 Rail transport; trackless transport, Dumpers, conveyors; spreaders, transport haul road gradient width and slope.
- 5.2 Dumps-site, slope and prevention of double handling.

#### **CHAPTERS 6- LAND RECLAMATION**

- 6.1 Physical restoration of mined out areas.
- 6.2 Slope stabilization.
- 6.3 Various methods for land reclamation; afforestation crop cultivation etc.

#### **Reference Book**

<b>Sl.No.</b>	<b>Title</b>	<b>Author, Publisher, Edition and Year</b>
1.	Elements of mining technology Vol -I	D.J. Deshmukh
2.	Surface mining technology	Sameer Das
3.	Explosive & Blasting practice in mines	Sameer Das

#### **SUBJECT: SURFACE MINING LAB**

**PRACTICAL CODE: 293621(93)**

**HOURS: 32**

#### **LIST OF PRACTICALS:**

1. To study and discuss the advantages and disadvantages of open cast mining.
2. To study and describe the factors deciding the open cast mining.
3. To list the machineries used in open cast mining.
4. To study and design different types of mine entries in open cast mines.
5. To study and design layout of open cast mines for
  - i. manual mines
  - ii. mechanized Mines for the given production.
6. To study and describe different combinations of loading and transpiration machines
7. To study and calculate the output with given numbers of shovel, dumpers and draglines.
8. To study and describe methods of land reclamation.



## CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

- A) SEMESTER : VI  
B) SUBJECT TITLE : MINE MANAGEMENT AND SAFETY ASPECTS  
C) CODE : 293613(93)  
D) BRANCH /DISCIPLINE : MINING AND MINE SURVEYING  
E) RATIONAL :

Mining is an operation in which the natural stability of the ground is disturbed. as such the strata becomes unstable which may cause serious accidents causing losses of life and property. Similarly the machines used on the surface and underground should be safe enough because mining is a work against nature. It is very essential that mining operation should be quite safe.

Under the provisions of mines act,1952 various rules and regulations are made for safe working. The diploma pass out in mining should be well aquented with the rules and regulations enforced, the violations of regulation and rules may cause criminal action against the authorities and closer of mines. Similarly provision of various act on prevention and control of pollution, environment protection act, Indian forest act etc, are also applicable to mining. The mines authorities are to file returns to the pollution control board. The student should also know these obligations as such these topics are also included in this subject, which are not there previously. Regulation of land for mining is a very complicated procedure as such a diploma holder should be aquented the provisions of land requisition, this is also introduced.

The diploma pass outs are to appear in the legislation paper for second class mine managers certificates of competency as such the topic of the syllabus of second class exam are also covered in this subject.

### F) TEACHING AND EXAMINATION SCHEME:

Sn.	Subject Code	Periods/ week (in Hours)			Scheme of Examination					Total Marks	Credit L+[T+P]/2
					Theory			Practical			
		L	T	P	ESE	CT	TA	ESE	TA		
1	293613 (93)	4	2	-	100	20	20	-	-	140	5

L: Lecture hours, T: Tutorial hours, P: Practical hours

ESE: End of Semester Examination, CT: Class Test, TA: Teacher's Assessment

**G) DISTRIBUTION OF MARKS AND HOURS :**

S. No.	Chapter No.	Chapter Name	Hours	Marks
1.	1	Management	32	40
2.	2	Safety	32	20
3.	3	Legislation	32	40
Total			96	100

**CHAPTER- 1 MANAGEMENT**

- 1.1 General principles of scientific management.
- 1.2 Managerial function of the following in brief-
  - a) Planning.
  - b) Organising
  - c) Staffing
  - d) Direction and control.
  - e) Motivation
- 1.3 Work study in brief-
  - a) Motion study
  - b) Time study

**CHAPTER- 2 SAFETY**

- 2.1 Accidents.
  - a) Classification and analysis
  - b) causes
  - c) Remedial measures and Provisions in regulation.
  - d) Cost of accident
  - e) Report writing.
  - f) Pit safety committee- safety organization and safety policy

**CHAPTER- 3 LEGISLATION**

- 3.1 Prevention and control of pollution Acts and rules (Air and water) Environment (Protection Act 1986 Provisions applicable to mining operation only.
- 3.2 Provisions of reclamation mined out land and afforestation as per forest conservation Act 1980.
- 3.3 Industrial Dispute Act.
- 3.4 Companies act-2013.

## **MINE MANAGEMENT AND SAFETY ASPECTS**

### **BOOK RECOMMENDED –**

1. Mines Act..
2. Coal mines Regulations.
3. Metalliferous Mine Regulations
4. Mine rules.
5. Industrial dispute Act 1947.
6. Companies act-2013.
7. Environment ( Protection) Rules 1986.
8. Forest conservation Act 1980.
9. Rescue rules.
10. V.T. Rules.
11. Trade Union Act.

## CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

<b>A) SEMESTER</b>	<b>:</b>	<b>VI</b>
<b>B) SUBJECT TITLE</b>	<b>:</b>	<b>ADVANCE MINE SURVEYING</b>
<b>C) CODE</b>	<b>:</b>	<b>293614(93)</b>
<b>D) BRANCH /DISCIPLINE</b>	<b>:</b>	<b>MINING AND MINE SURVEYING</b>
<b>E) RATIONAL</b>	<b>:</b>	

Statutory provisions of coal mines regulation 1957, and metalliferous mine regulation 1961, require employment of a mine surveyor, having certificate of competency to work in mines, as a surveyor, granted by board of mining examination under the chairmanship of “Director General of Mines Safety” of Govt. of India.

BME has granted an exemption to pass outs of three years Diploma in mining and mine surveying from appearing in the examination for certificate of competency this exemption is the special achievement and credit to this diploma, in the country ; and this honor and status is awarded only on the ground of adequate theoretical & Practical teaching of the following subjects in the final year :-

1. Rectangular coordinate system.
2. Tachometry
3. Curves
4. Triangulation survey.
5. Correlation survey
6. Stope surveying
7. Open cast mine surveying.
8. Drifts, Dip, Strike borehole problems
9. Faults problems.
10. Modern survey technique
11. Introduction to Arial photography

with the acquired skill of maintaining the standard of accuracy a student will become qualified mine surveyor as target to achieve designed by this course.

### F) TEACHING AND EXAMINATION SCHEME:

Sn.	Subject Code	Periods/ week (in Hours)			Scheme of Examination					Total Marks	Credit L+[T+P]/2
					Theory			Practical			
		L	T	P	ESE	CT	TA	ESE	TA		
1	293614 (93)	5	2	-	100	20	20	-	-	140	6
2	293622 (93)	-	-	3	-	-	-	100	50	150	2

L: Lecture hours, T: Tutorial hours, P: Practical hours

ESE: End of Semester Examination, CT: Class Test, TA: Teacher’s Assessment

**G) DISTRIBUTION OF MARKS AND HOURS :**

<b>S. No.</b>	<b>Chapter Name</b>	<b>Chapter Name</b>	<b>Hours</b>	<b>Marks</b>
1.	1	Rectangular coordinate system	8	10
2.	2	Tacheometry	10	10
3.	3	Curves	13	10
4.	4	Triangulation survey .	12	10
5.	5	Correlation survey	15	10
6.	6	Stope surveying	10	10
7.	7	Open cast mine surveying.	5	5
8.	8	Drifts, Dip, Strike borehole problems	10	10
9.	9	Faults problems..	10	10
10.	10	Modern survey technique	12	10
11.	11	Introduction to Arial photography	7	5
Total			112	100

**CHAPTER- 1 RECTANGULAR COORDINATE SYSTEM**

- 1.1 Definitions; latitudes & departures.
- 1.2 Partial latitude and partial departures.
- 1.3 Calculation of Partial latitude and partial departures
- 1.4 Total latitude and total departures
- 1.5 Calculation of Total latitude and total departures
- 1.6 Calculation of length & bearing from total coordinates.
- 1.7 Calculation of Area by Partial coordinate
- 1.8 Calculation of Area by total coordinates Methods
- 1.9 National grid system.
- 1.10 To join colliery survey with N.G.

**CHAPTER- 2 TACHEOMETRY**

- 2.1 General
- 2.2 Stadia Diaphragm and its principle.
- 2.3 Theory of anallatic lens.
- 2.4 Determination of Multiply and additive constant.
- 2.5 Tacheometric survey.

**CHAPTER- 3 CURVE**

- 3.1 Definition & properties of circle.
- 3.2 Types of Curves.
- 3.3 Nomenclature of a simple circular curve.

- 3.4 Elements of simple curve (Circular)
- 3.5 Peg Interval, Degree of curve.
- 3.6 Classification of curve ranging method.
- 3.7 Methods of simple circular curve ranging.
  - a. Chain and tape
    - i. By successive bisection of arc.
    - ii. by taking perpendicular off sets from tangents.
    - iii. by taking perpendicular off sets from long chord
    - iv. Chord and off set method.
  - b. Instrumental methods.
    - i. Chord and angle method (tangential angle method)
    - ii. by taking angles from single station (ranking method)
    - iii. by taking angles from two stations.
  - c. U/G curve ranging methods.
    - i. Chord and off set methods
    - ii. Chord and angle methods
- 3.8 Super Elevation.
- 3.9 Numerical Problems on simple circular curve.

## **CHAPTER- 4 TRIANGULATION SURVEY**

- 4.1 Definition & principle of Triangulation survey.
- 4.2 Classification of Triangulation survey
- 4.3 Fixing of Stations.
- 4.4 Selection of site for Base line.
- 4.5 Sequence of operation before base line measurement.
- 4.6 Equipments required for base line measurement.
- 4.7 measurement of base line
- 4.8 Correction required in base line measurement.
- 4.9 Prolongation of a base line.
- 4.10 Adjustment of horizontal angles.
- 4.11 Colliery Triangulation.
- 4.12 Precautions and Measuring angles and base line.
- 4.13 Triangulation and Precise traversing.
- 4.14 True north determination (App. Method).
- 4.15 Methods of determining true north astronomical.
- 4.16 Method of determination of true north in day time by observing sun.
- 4.17 Method of determining latitude and longitude of a survey station.
- 4.18 Definition of astronomical survey and important terms, determination of azimuth by astronomical observation.

## **CHAPTER- 5 STOPE SURVEYING**

- 5.1 Definition and Introduction, purpose of stope survey.
- 5.2 Methods of stope surveying for flat, moderate indianed of steeply indined ore deposits.

## **CHAPTER- 6 OPEN CAST MINE SURVEYING**

- 6.1 fixing of stations around boundary.
- 6.2 fixing of stations on benches.
- 6.3 taking techeometric observation to check the position of stations.
- 6.4 Levelling operation to determine the R.L. of Station points.
- 6.5 to conduct traverse survey to determine the exact position of stations.
- 6.6 To conduct off set survey to determine the position of bench.

## **CHAPTER- 7 CORRELATION SURVEY**

- 7.1 Purpose of correlation survey.
- 7.2 classification of methods of orientation.
- 7.3 Direct methods of traversing .
- 7.4 Assumed bearing method ( Two shaft method).
- 7.5 Exact alignment method.
- 7.6 Approximate alignment method.
- 7.7 Wiess-quadrilateral method.
- 7.8 Special chain of tape method.
- 7.9 Precise magnetic method.
- 7.10 Gyrotheodolite method.
- 7.11 Correlation with national grid and local scale factor.

## **CHAPTER- 8 DRIFT AND FAULT PROBLEM**

- 8.1 Definition , fault, normal, reverse and trans current fault, fault plane hade of fault , throw, want heave, excess.
- 8.2 Numerical problems on drift and fault.

## **CHAPTER- 9 INTRODUCTION TO MODERN SURVEY TECHNIQUES**

- 9.1 Digital theodolite , electronic distance measuring equipment, Total station- name of parts, constructional details, operational details, setting up of total station, measuring and setting back sight and fore sight station, measuring angle, R.L and distances of given points using total station.
- 9.2 Softwares related to mine surveying.

## **CHAPTER- 10 INTRODUCTION TO AERIAL PHOTOGRAPHY**

- 10.1 General Principle; Phototheodolite; Stero photographic surveying; aerial
- 10.2 Surveying- field of application ; Vertical and oblique photographs; aerial photography; preparation of photographical maps by simple methods;

## Reference Book

Sl.No.	Title	Author, Publisher, Edition and Year
1.	Mining Suveying Vol-I& II	S.Ghatak
2.	Surveying and leveling Vol-II	Kanetkar and Kulkarni
3.	Surveying Vol-II	B.C. Punamia
4.	Advance Surveying	Alam chand
5.	Advance mine Surveying	D.C. Clark
6.	Surveying Vol-I& II & III	Arora

## SUBJECT: ADVANCE MINE SURVEYING LAB

**PRACTICAL CODE: 293622(93)**

**HOURS: 48**

### LIST OF PRACTICAL:

1. To traverse an area by included angle method.
2. To traverse an area by deflection angle method.
3. To traverse an area by continuous azimuth method.
4. To determine the height of an electric pole/building tower by measuring vertical angle from a single station.
5. To determine the height of an electric pole/building tower by measuring vertical angle from a two station.
6. To determine the constant of given a teacheometer.
7. To determine the distances from the Instrument stations to the given stations.
8. To traverse an area by measuring horizontal angles and staff intercept.
9. To range a curve by successive bisection of arc.
10. To range a curve by taking perpendicular off sets from tangents.
11. To range a curve by taking perpendicular off sets from long chord.
12. To range a curve by chord of off sets method.
13. To range a curve by chord and angle method.
14. To range a curve by measuring from single station.
15. To range a curve by measuring angles from two stratification.
16. To prolong a given base line up to a given length.
17. To measure a given base line and apply necessary correction on it.
18. To conduct a triangulation survey in an given area.



19. To conduct correlation survey by exact alignment method.
20. To conduct correlation survey by direct method of traversing.
21. To conduct correlation survey by approximate alignment method.
22. To calculate the coordinate of given station points by taking necessary observation and plot the same by rectangular coordinate system.
24. To calculate the length and bearing of closing line of given traverse by taking necessary observations.
25. To calculate the area of a given closed traverse by total coordinate method by taking necessary observations.
26. Demonstration of modern survey equipments, EDM, Tacheomate, total station etc.

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI**

- A) **SEMESTER** : VI  
 B) **SUBJECT TITLE** : MINE MACHINERY-II  
 C) **CODE** : 293615(93)  
 D) **BRANCH/DISCIPLINE** : MINING AND MINE SURVEYING  
 E) **RATIONAL**

Modern trend towards mining industry is to achieve higher productivity with employment of winning machineries in mines, with this regard various mining machines for drilling, Extraction, Loading, Transport and other mining operation are being used in mines; thus the knowledge of operation, maintenance and main features of the machines is very essential for a mining student for proper management. The subject covers all basic aspects of different machineries and their accessories; and deals with coal face mechanization, gate-end box, compressed air machines and mine pumps.

**F) TEACHING AND EXMINATION SCHEME:**

Sn.	Subject Code	Periods/ week (in Hours)			Scheme of Examination					Total Marks	Credit L+[T+P]/2
					Theory			Practical			
		L	T	P	ESE	CT	TA	ESE	TA		
1	293615 (93)	4	1	-	100	20	10	-	-	130	5

L: Lecture hours, T: Tutorial hours, P: Practical hours

ESE: End of Semester Examination, CT: Class Test, TA: Teacher's Assessment

**G) DISTRIBUTION OF MARKS AND HOURS:**

Sl. No.	Chapter No.	Chapter Name	Hours	Marks
1.	1.	Coal face mechanisation	40	50
2.	2.	Gate End Box	08	10
3.	3.	Compressed air machines	12	15
4.	4.	Concepts of preventive maintenance	08	10
5.	5.	Mine Pumps	12	15
		<b>Total</b>	<b>80</b>	<b>100</b>

## **H) DETAILED COURSE CONTENTS:**

### **CHAPTER-1 Coal Face Mechanisation**

- 1.1 Face mechnaisation
- 1.2 Electric coal drill
- 1.3 Loaders-Power Loaders, Operation and use.
- 1.4 L.H.D and S.D.L Operation and use
- 1.5 Longwall Fcae mechanization, Stag Loaders, AFC, Crushers.

### **CHAPTER – 2 Gate End Box**

- 2.1 Purpose of remote Control.
- 2.2 General principle of working of Gate End Box.
- 2.3 Protection of Machineries Through remote control.
- 2.4 Flame Proof and Intrinsic Safety.

### **CHAPTER – 3 Compressed Air Machines.**

- 3.1 Compressed air power.
- 3.2 Different kinds of Compression and compressors.
- 3.3 Calculation of work done and H.P for given pressure and quantity of free air.
- 3.4 Efficiency of Compressors.
- 3.5 Advantages and limitations of compressed air power over electric power.
- 3.6 Compressed air machines used in mines- Drills, Air leg, pneumatic picks

### **CHAPTER – 4 Concept of preventive maintenance.**

- 4.1 Concept of preventive maintenance and it's importance.

### **CHAPTER-5 Mine Pumps.**

- 5.1 Sources of mine water.
- 5.2 Types of pumps, Roto Pumps, Centrifugal pumps, Turbine Pumps
- 5.3 Pump Fittings- Characteristics, Operation , Selection & maintenance of pumps
- 5.4 Pump Calculations.

**SUBJECT: MINE MACHINERY–II (LAB) PRACTICAL**

**CODE: 293623 (93)**

**HOURS: 32**

**LIST OF PRACTICALS:**

1. To Study, Sketch and describe electric Coal drill.
2. To Study, Sketch and describe power loaders.
3. To Study, Sketch and describe different longwall face machineries.
4. To describe the layout, plan of operation and safety measures of mechanization observed during training in mines.
5. To Study, Sketch and describe Roto pump.