

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Diploma Programme in Mining and Mine Surveying

Semester - III

S. No	Board of Study	Subject Code	Subject	Period/week in Hours			Scheme of Examination					Credit L+(T+P)/2	
				L	T	P	Theory			Practical			Total Marks
							ESE	CT	TA	ESE	TA		
1.	Mech.	239311 (37)	Applied Mechanics	4	2	-	100	20	20	-	-	140	5
2.	Civil	239312 (20)	Basic Civil Engineering	4	2	-	100	20	20	-	-	140	5
3.	Mech.	239313 (37)	Basic Mechanical Engineering	4	2	-	100	20	20	-	-	140	5
4.	Mining	239314 (39)	Mine Environmental Engineering	4	1	-	100	20	20	-	-	140	5
5.	Mining	239315 (39)	Strata Control and Roof Support	4	1	-	100	20	20	-	-	140	5
6.	Mechanical	239321 (37)	Applied Mechanics (Lab)			3	-	-	-	50	20	70	2
7.	Civil	239322 (20)	Basic Civil Engineering (Lab)	-	-	2	-	-	-	50	20	70	1
8.	Mech.	239323 (37)	Basic Mechanical Engineering (Lab)	-	-	2				50	20	70	1
9.	Mining	239324 (39)	Industrial Training*	-	-	1	-	-	-	50	40	90	1
Total				20	8	8	500	100	100	200	100	1000	30

L: Lecture Hours, T: Tutorial Hours, P: Practical Hours,
ESE: End Sem Exam, CT: Class Test, TA: Teacher's Assessment

* Industrial Training: Students will undergo on industrial practical training for 2 & 1/2 months during 3rd semester.

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY,
BHILAI**

- A) SEMESTER : III
 B) COURSE TITLE : APPLIED MECHANICS
 C) CODE : 239311 (37)
 D) BRANCH/DISCIPLINE : Mining & Mine Surveying
 E) RATIONALE :

It is a hard-core course of diploma programme and is intended to expose the students, core concepts, principles and procedure of Engineering Mechanics so that they are able to analyse the problems encountered in core technology courses. The selected topics aimed to develop the ability to analyse system of forces and motion met within the field of engineering.

F) TEACHING AND EXMINATION SCHEME:

Course Code	Periods/Week (In Hours)			Scheme of Examination						Credit [L+(T+P)/2]
	L	T	P	Theory			Practical		Total Marks	
				ESE	CT	TA	ESE	TA		
239311 (37)	4	2	-	100	20	20	-	-	140	5
239321 (37)	-	-	3	-	-	-	50	20	70	2

G) DISTRIBUTION OF MARKS AND HOURS:

Chapter No.	Chapter Name	Hours	Marks
1	Fundamental concepts	3	6
2	Composition & Resolution of forces	8	14
3	Centroid & Moment of Inertia	7	10
4	Friction	6	10
5	Work, Power & Energy	7	10
6	Kinematics	7	12
7	Kinetics	7	10
8	Simple lifting machines	10	14
9	Transmission of power	9	14
Total		64	100

H) DETAILED CONTENTS:

Chapter – 1 : Fundamental Concepts

- ~~☞~~ Definition of Mechanics, Statics, Dynamics, Kinetics, Kinematics.
- ~~☞~~ Concept of space, mass, particle, body, rigid body.
- ~~☞~~ Scalar, vector, fundamental units, derived units.

Chapter – 2 : Composition & Resolution of Forces

- ~~/~~ Force- concept, definition, unit, graphical representation.
- ~~/~~ Concept of system of forces- non-coplanar, coplanar, concurrent, non-concurrent & parallel forces.
- ~~/~~ Composition & Resolution of forces.
- ~~/~~ Free body diagrams, law of parallelogram, Varignon's theorems.
- ~~/~~ Equilibrium of Coplanar concurrent forces, parallel forces & non-concurrent forces, Lami's Theorem.
- ~~/~~ Moment of a force and Couple.

Chapter – 3 : Centroid & Moment of Inertia

- ~~/~~ Location of centroid and center of gravity.
- ~~/~~ Centroid of regular plane and compound areas.
- ~~/~~ Center of gravity of simple solids.
- ~~/~~ Moment of Inertia of plane areas.
- ~~/~~ Perpendicular & Parallel. Axes theorems.

Chapter – 4 : Friction

- ~~/~~ Rough & Smooth surfaces, concept of friction.
- ~~/~~ Types of friction, Coloumb's law of friction, Co-efficient of friction, angle of friction, angle of repose.
- ~~/~~ Friction on inclined plane, Screw and Nut friction.
- ~~/~~ Ladder and wedge friction.
- ~~/~~ Friction in Journal bearings
- ~~/~~ Method of reducing friction.

Chapter – 5 : Work, Power & Energy

- ~~/~~ Definition and unit of Work done, Power and Energy.
- ~~/~~ Forms of Energy- Kinetic and Potential Energy.
- ~~/~~ Principle of Conservation of power and energy.
- ~~/~~ Power of engine and pumps, mean effective pressure, power measurement.
- ~~/~~ Relation between Heat & Mechanical work, relation between Electrical & Mechanical energy.

Chapter – 6 : Kinematics

- ~~/~~ Kinematics in Cartesian and polar coordinates.
- ~~/~~ Concept of speed, velocity, acceleration, radial and transverse velocity, particle under uniform and non-uniform acceleration, tangential and normal acceleration.
- ~~/~~ Angular displacement, Angular Velocity, Angular Acceleration.
- ~~/~~ Motion under gravity.

Chapter – 7 : Kinetics

- ~~/~~ Kinetics of particle, motion under constant force, Newton's Laws of Motion.
- ~~/~~ Momentum and energy principles, Impulses and angular momentum.
- ~~/~~ D' Alemberts principle.
- ~~/~~ Motion under constant torque, Flywheel.

Chapter – 8 : Simple lifting machines

- ~~/~~ Load, Effort, Mechanical advantage, Velocity ratio, Efficiency and relation between them.
- ~~/~~ Law of Machine, Reversibility of Lifting machine.
- ~~/~~ Study of Machines- Differential wheel & axel, Weston differential pulley block, Simple Screw Jack, Worm & Wheel, Single and Double purchase Winch, System of pulleys.

Chapter – 9 : Transmission of power:

- ✍ Transmission of power through Belt, Rope and Gears,
- ✍ Ratio of tension on tight and slack sides.
- ✍ Spur, Helical & Bevel gear, Rack and Pinion gear.
- ✍ Gear Trains- Simple, Compound, Reverted.

I) SUGGESTED INSTRUCTIONAL STRATEGIES:

- ✍ **Lecture Method.**
- ✍ **Industrial visits.**
- ✍ **Expert Lecture.**
- ✍ **Demonstration.** The course shall be taught using the laboratory side by side. Underpinning laws and Principles should be explained using desktop models. Special emphasis should be given on Laboratory experiments.

J) SUGGESTED LEARNING RESOURCES.

(a) Reference Books :

COURSE TITLE:	Sl. No.	Title	Author and Publisher
A PPLIED MECHA NICS LAB PRACTIC	1	A Text Book of Applied Mechanics	R.S. Khurmi, S. Chand & Company Ltd., New Delhi
	2	Applied Mechanics	I. B. Prasad, Khanna Publisher, New Delhi
	3	Applied Mechanics	Ramanathsn, Dhanpat Rai and Sons, New Delhi
	4	Engineering Mechanics	Timoshenko & Young, Mc Garawhills Publication
	5.	Engineering Mechanics	S. Rajshekar & G. Sankarsubramaniam, Vikas Publishing House Pvt. Ltd. New Delhi
	5	Strength of Material and Mechanics of Structure	Punamia, Standard Publisher Distributor New Delhi

ODE: 239321 (37)

Tota; HOURS : 32

LIST OF PRACTICALS / TUTORIALS:

- ✍ Verification of law of triangle of forces.
- ✍ Verification of law of Parallelogram of forces.
- ✍ Verification of law of Polygon of forces.
- ✍ Verification of Lami's Theorem by Jib crane method.
- ✍ Demonstration of Non-concurrent, Non-Parallel forces (Funicular diagram)
- ✍ Verification of Law of Moments.
- ✍ Determination of C.G. of a given lamina.
- ✍ Determination of coefficient of friction for surfaces of different materials on-
 - a) Horizontal Plane
 - b) Inclined Plane
- ✍ Draw – V-T diagram's for different combinations of-
 - a) Velocities
 - b) Uniform accelerations

~~///~~ Find-out Mechanical advantage, Velocity Ratio and Efficiency for following machines-

- a) Simple Screw
- b) Differential Wheel & Axle
- c) Simple Purchase Crab
- d) Differential Pulley Block

~~///~~ Demonstration of use of inclined plane as a lifting machine.

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

- A) SEMESTER : III
 B) SUBJECT TITLE : BASIC CIVIL ENGINEERING
 C) CODE : 239312 (20)
 D) BRANCH/DISCIPLINE : MINING & MINE SURVEYING
 E) RATIONAL :

The Civil works is most common to each and every field of engineering. Civil is a basic engineering subject and is a prerequisite to any other project. Before starting any project of engineering such as electrical, mechanical, mining or metallurgy, civil works are required like planning township, plant construction, water supply and other similar works.

In Mining Engineering, knowledge of civil engineering is required in surface planning, roads, building, under ground construction of stopping, Dams, etc. In open cast mining, soil erosion and slope stability create problems, which are solved by the knowledge o soil mechanics. Similarly, water is also a problem in both under ground and open cast mines, which requires the knowledge of hydraulics. In designing this course, the requirement of mining engineers are considered and only those topics are which form the basis of the knowledge of civil engineering to mining engineers.

F) TEACHING AND EXAMINATION SCHEME:

Course code	Periods/ week (In Hrs.)			Scheme of examination						Credit [L+(T+P)] 2
	L	T	P	Theory			Practical		Total Marks	
				ESE	CT	TA	ESE	TA		
239312 (20)	4	2	-	100	20	20	-	-	140	5
239322 (20)	-	-	2	-	-	-	50	20	70	1

G) DISTRIBUTION OF MARKS AND HOURS :

S. No	Topics	Hours	Marks
1.	Fluid Properties	09	05
2.	Hydrostatics	08	05
3.	Kinematics of flow	11	10
4.	Dynamics of flow	11	10
5.	Bricks	07	10
6.	Stones and aggregates	07	10
7.	Cement	08	10
8.	Steel	09	10
9.	Timber	07	10
10.	Foundation	11	10
11.	Masonry	08	10
	Total	96	100

H)

DETAILED COURSE CONTENTS:

S. No.	Topics	Content
1	FLUID PROPERTIES	Properties of liquid, definition of liquid, action of shear forces on solids and liquid, type of fluids, ideal fluid, real fluid, definition of hydrostatics, hydro kinematics and hydro dynamics.
2	HYDROSTATIC:	Pressure intensity, PASCAL's law, variation of hydraulics, absolute pressure and gauge pressure, pressure gauges, types of pressure measuring devices.
3	HYDRO KINEMATICS	Principle of conservation of mass and its application, continuity equation, types of flows. Steady unsteady, laminar, and turbulent, uniform and non-uniform flow. Streamlines and their characteristics. Reynold's number.
4	HYDRODYNAMICS	Bernoulli's theorem, energy's possessed by flowing liquid, potential energy, kinetic energy, pressure energy, datum head velocity head and pressure head Bernoulli's equation, venturimeter, orifice meter and pitot tube.
5	BRICKS	Requirement of good bricks, types of bricks, laboratory tests for bricks, field-tests for bricks manufacturing process of bricks.
6	STONES AGGREGATES	Requirement of a good building stone, tests for stones, selection of stones for different civil works, coarse and fine aggregates, natural and artificial aggregates. Grading of aggregates, fineness modules.
7	CEMENT	Composition of cement, types of cement, laboratory test and field test on cement.
8	STEEL AND STEEL PRODUCTS	Composition of steel, change in properties due to alloying, impurities in steel. Steel alloys, defects in steel, steel sections, testing of M.S., Bar.
9	TIMBER AND TIMBER PRODUCT	Hard wood and soft wood, characteristic of good timber, defects in timber, preservatives, seasoning of timber.
10	FOUNDATIONS	Necessity of foundations, bearing capacity and safe bearing capacity, types of foundation, shallow foundation and deep foundation, selection of type of foundation, procedure to give layout, different terms. Centre line plan, foundation plan checking accuracy of layout, utility of control point.
11	MASONRY	Brick Masonry, Necessity of bonds in brick masonry, and their type, mortars used in brick masonry, stone masonry, types of stone masonry, dry stone masonry, revetment.

SUBJECT TITLE : BASIC CIVIL ENGINEERING

Practical Code: 239322 (20)
Total Hours: 32

LIST OF EXPERIMENTS

1. Verification of Bernoulli's Theorem
2. Calibration of given venturimeter
3. Calibration of given Orifice meter
4. Grading of coarse aggregates and fine Aggregates
5. Compressive strength of Bricks
6. Determination of Water Absorption of Bricks
7. Fineness test on cement
8. Determination of initial setting and final setting time of cement
9. Determination of Normal Consistency of cement

I) SUGGESTED INSTRUCTIONAL STRATEGIES:

Lecture method
Demonstration
Experimentations
Field Practice

J) SUGGESTED LEARNING RESOURCES :

(A) Reference Books:

- | | | | |
|----|------------------------|---|--------------------|
| 1. | Building construction | - | By Sushil Kumar |
| 2. | Building Material | - | By S.C.Rangwala |
| 3. | Soil Mechanics | - | By S.N.Awasthy |
| 4. | Soil Mechanics | - | By Dr. B.C.Punamia |
| 5. | Fluir Mechanics | - | By R.S.Khurmi |
| 6. | Estimating and costing | - | By B.N.Dutta |

(B) Others -

VCDs
Video cassettes
Learning packages

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY,
BHILAI**

- A) SEMESTER : III
 B) SUBJECT TITLE : BASIC MECHANICAL ENGINEERING
 C) CODE : 239313 (37)
 D) BRANCH/DISCIPLINE : Mine and Mine Surveying
 E) RATIONALE :

The purpose of this subject is to introduce concepts of general Mechanical Engineering to the students of mining engineering to make them aware of the fundamental principles, concepts involve in shaping, designing, transmission and deformation processes. The subject covers the theories and practices of mechanical working of metals and industrial application of the processes like I.C. engines, Mechanical drives, Material handling equipment, Steam & gas power plants. The scope of the subject is very wide and as such some process such as design of simple component, hydrodynamic and hydrostatics have been included to some extend to make the student understand the fundamental principle, concept involves in process.

F) TEACHING AND EXAMINATION SCHEME:

Course Code	Teaching Scheme (Hrs./week)				Scheme of Examination						Credit [L+(T+P)] 2
	L	T	P	Total Hours	Theory			Practical		Total Marks	
					ESE	CT	TTA	ESE	PTA		
239313 (37)	4	2	-	6	100	20	20	-	-	140	5
239323 (37)	-	-	2	2	-	-	-	50	20	70	1

G) DISTRIBUTION OF MARKS AND HOURS:

Sl. No.	Chapter No.	Chapter Name	Hours	Marks
1	1	MECHANICAL PROPERTIES & SIMPLE STRESS & STRAIN	10	10
2	2	DESIGN OF SIMPLE COMPONENT	10	10
3	3	HYDROSTATIC	09	10
4	4	HYDRODYNAMICS	09	10
5	5	BASICS OF THERMODYNAMICS	10	10
6	6	STEAM & GAS POWER PLANTS	10	10
7	7	I.C. ENGINES	10	10
8	8	MECHANICAL DRIVES	10	10
9	9	MATERIAL HANDLING	09	10
10	10	MAINTENANCE	09	10
		TOTAL	96	100

H) DETAILED COURSE CONTENTS:

Chapter – 1 MECHANICAL PROPERTIES & SIMPLE STRESS & STRAIN:

- ✍ Definition of different mechanical properties – elasticity, plasticity, ductility, toughness, brittleness, hardness, malleability.
- ✍ Tensile, Compressive & Shear Stress & Strain.
- ✍ Different Elastic Moduli.

Chapter – 2 DESIGN OF SIMPLE COMPONENT:

- ✍ Cotter joint, knuckle joint, Flange Coupling &
- ✍ Single row riveted joint.

Chapter – 3 HYDROSTATICS:

- ✍ Physical properties of a fluid, Pascal's law.
- ✍ Calculation of total force & center of Pressure for a rectangular plate.

Chapter – 4 HYDRODYNAMICS :

- ✍ Continuity equation of flow.
- ✍ Bernoulli's equation.
- ✍ Venturimeters & its uses
- ✍ Flow through pipes.

Chapter – 5 BASICS OF THERMODYNAMICS:

- ✍ Properties, Processes, Basic laws of thermodynamics,
- ✍ Thermodynamic cycles.
- ✍ I.H.P., B.H.P., M.M.P., F. H.P. Simple calculations.

Chapter – 6 STEAM & GAS POWER PLANTS: -

- ✍ Boilers: Basics, Classification and Construction.
- ✍ Boiler Mounting & Accessories.
- ✍ Rankine cycle.
- ✍ Working principles of Turbine, Compressor, Condenser & Pumps.

Chapter – 7 I.C. ENGINES :

- ✍ Auto, Diesel and Dual cycles.
- ✍ Working principles of two stroke & four stroke petrol engine.
- ✍ Working principles of two stroke & four stroke diesel engines.

Chapter – 8 MECHANICAL DRIVES :

- ✍ Fundamentals of Rope, Chain & Belt.
- ✍ Clutch, gearbox, working principle & related simple problems.

Chapter - 9 MATERIAL HANDLING:

- ✍ Types of handling equipment.
- ✍ Determination of handling equipment requirement
- ✍ Factor affecting the choice of handling equipment.

Chapter –10 MAINTENANCE:

- ✍ Maintenance method.
- ✍ Types of maintenance, their importance and field of applications.

I) SUGGESTED INSTRUCTIONAL STRATEGIES:

~~///~~ **Lecture Method:**

- Teaching through chalk board
- O.H.P, LCD Projector.
- Interaction with students through seminar.
- As far as possible concepts are to visualized by extensive use of Charts models

~~///~~ **Demonstration:**

- Demonstration of mechanical devices and machine components using small desktop models.

J) SUGGESTED LEARNING RESOURCES.

(a) **Reference Books**

Sl. No.	Title	Author, Publisher, Edition & Year
1	Text book of hydraulics	R.S. Khurmi
2	Text book of thermodynamics	R.S. Khurmi
3	Text book of design & mechanics of machine	R.S. Khurmi
4.	Text book of Basic Mechanical Engineering	R.K. Rajput

(b) **Others:**

- ~~///~~ Models, charts, Transparencies, Video films etc..
- ~~///~~ Desktop models of boilers, engine, mechanical devices and simple machine components.
- ~~///~~ Charts showing details of different mechanical components.
- ~~///~~ Design data book.
- ~~///~~ Lab manual
- ~~///~~ CD's.
- ~~///~~ ISI-Codes.

SUBJECT TITLE: BASIC MECHANICAL ENGINEERING LAB

PRACTICAL CODE: 239323 (37)

HOURS: 32

LIST OF PRACTICALS / TUTORIALS:

- ~~///~~ Study of boiler mountings and accessories.
- ~~///~~ Study of Simple & Compound gear trains and calculation of speed ratio.
- ~~///~~ Study of Flat and V belts.
- ~~///~~ Study of different type of industrial chains and ropes.
- ~~///~~ Study of Cutter joint, knuckle joint and different types of Couplings.
- ~~///~~ Study of different types of Bolted & Riveted joints.

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY,
BHILAI**

- A) SEMESTER : III
 B) SUBJECT TITLE : MINE ENVIRONMENTAL ENGG.
 C) CODE : 239314 (39)
 D) BRANCH/DISCIPLINE : MINING & MINE SURVEYING
 E) RATIONAL :

It is essential to study the technology applied in mining field. Under ground coal mining practice involves careful planning with due regards to safety of men, material and mine, optimum production with consideration to conservation of mineral.

Underground mining methods are considered more hazardous due to its procedure of winning under extremely difficult conditions inviting chances of infringement of safety.

An attentive attention of mining engineer is attracted through the coal mining regulations to consider the following fields of technology –

2. System of ventilation.
3. Mine drainage systems.
4. Mine lighting.
5. Special sinking method.
6. Mine subsidence and supports.
7. Underground methods of working coal.
8. System of transportation in mines.
9. Noise and dust pollution.

A comprehensive knowledge on the topic mentioned above along with a practical experience of working in mines will enable a student to become a efficient mining engineer.

F) **TEACHING AND EXAMINATION SCHEME :**

Course code	Periods/ week (In Hrs.)			Scheme of examination						Credit [L+(T+P)] 2
	L	T	P	Theory			Practical		Total Marks	
				ESE	CT	TA	ESE	TA		
239314 (39)	4	1	-	100	20	20	-	-	140	5

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

S. No.	Chapter No.	Chapter Name	Hours	Marks
1.	1	Mine Atmosphere	15	25
2.	2	Heat and humidity	15	15
3.	3	Mine Ventilation System	20	30
4.	4	Natural ventilation	15	15
5.	5	Mine Lighting	15	15
Total			80	100

H) DETAILED COURSE CONTENTS:

CHAPTER- 1 MINE ATMOSPHERE

- 1.1 Pollution of mine atmosphere
- 1.2 Mine gases.
- 1.3 Origin and occurrence of mine gases.
- 1.4 Effects and detection of mine gases.
- 1.5 Methane drainage
- 1.6 Monitoring system of mine environment
- 1.7 Analysis of mine air

CHAPTER – 2 HEAT AND HUMIDITY

- 2.1 Heat and humidity in mine atmosphere and their effects
- 2.2 Cooling power of mine air
- 2.3 Assessment of comfort conditions
- 2.4 Air conditioning of mines, surface, underground and divided installations
- 2.5 Spot coolers

CHAPTER – 3 MINE VENTILATION SYSTEM

- 3.1 Object and standard of ventilation
- 3.2 Degree of gassiness of mines, composition of mine air
- 3.3 Measurement of air quantity, pressure and velocity
- 3.4 Law of air flow in mines, flow of air in ducts and mine roadways, resistance of air ways, Chezy's and Atkinson's equations
- 3.5 Equivalent resistance and equivalent orifice of mine
- 3.6 Regulations related with above topics, ecological and environmental laws related to mines
- 3.7 Dust monitoring
- 3.8 Mechanical ventilation, different types of fans used in mines, theoretical characteristics of centrifugal and axial flow fans, forcing and exhaust fans, relations between pressure quantity and power of fan, numerical calculation, fan drift, their constructional feature, auxiliary and booster fans, constructional feature, splitting of air current, advantage of splitting, reversal of air current

CHAPTER – 4 NATURAL VENTILATION

- 4.1 Natural ventilation and its measurements
- 4.2 Thermodynamics of natural ventilation
- 4.3 Distribution and control of air current
- 4.4 Accessories of ventilation used in mines – Door, regulator, stoppings, air lock, air crossing, brattice

CHAPTER – 5 MINE LIGHTING

- 5.1 Lighting sources in mines, cap lamps, constructional feature of lamps
- 5.2 Underground lighting
- 5.3 Flameproof and intrinsically safe lighting
- 5.4 Lamp room layout, lamp room organization, care and maintenance of cap lamps

- I) SUGGESTED INSTRUCTIONAL STRATEGIES :
- Lecture method
 - Demonstration
 - Field Practice

- J) SUGGESTED LEARNING RESOURCES :

(A) **Reference Books:**

Sl.No.	Title	Author, Publication, Edition & Year
1.	Elements of Mining Technology Vol.2	D.J.Deshmukh
2.	Mine ventilation	G.B.Mishra

- (B) **Others -**
- VCDs
 - Video cassettes
 - Learning packages

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY,
BHILAI**

A)	SEMESTER	:	III
B)	SUBJECT TITLE	:	STRATA CONTROL AND ROOF SUPPORT
C)	CODE	:	239315 (39)
D)	BRANCH/DISCIPLINE	:	MINING AND MINE SURVEYING
E)	RATIONAL	:	

Strata control is one of the most important aspects of safety in open cast as well as underground mines. It is also important for the students to be fully aware of different strata control techniques adopted in different situations in the field. This also requires to understand the basic concept of strata control mechanism and principle of supports in mining. This course will enable students to comprehend the essential requirements in this area to function effectively.

F) TEACHING AND EXAMINATION SCHEME :

Course Code	Periods/ Week (In Hours)			Scheme of Examination						Credit [L+(T+P)/2]
	L	T	P	Theory			Practical		Total Marks	
				ESE	CT	TA	ESE	TA		
239315 (39)	4	1	-	100	20	20	-	-	140	5

G) DISTRIBUTION OF MARKS AND HOURS :

Sl.No.	Chapter No.	Chapter Name	Hours	MARKS
1	1	Support	20	20
2	2	Powered Supports	15	20
3	3	Stowing	15	20
4	4	Strata Control	15	20
5	5	Subsidence	15	20
Total			80	100

H) DETAILED COURSE CONTENTS:

CHAPTER – 1 SUPPORTS

- 1.1 Timber & Steel supports
- 1.2 Examination of Roof
- 1.3 Roof Bolting
- 1.4 Roof stitching
- 1.5 Cable Bolting
- 1.6 Method of supporting Roadways
- 1.7 Supporting under different Conditions Viz: Pit bottom, crossing , junctions, faulted area, longwall faces, depillaring areas and stopping areas.
- 1.8 Support loads, Systematic Support Rules.
- 1.9 Support plan
- 1.10 Support withdrawal

CHAPTER -2 POWERED SUPPORTS

- 2.1 Powered supports
- 2.2 Principle of Operation of Power supports
- 2.3 Classification of Power supports
- 2.4 Designation of Power Supports
- 2.5 Major Application of Power supports
- 2.6 Hydraulic fluids

CHAPTER -3 STOWING

- 3.1 Principal methods of stowing
- 3.2 Their relative merits and applicability
- 3.3 Hydraulic stowing
- 3.4 Pneumatic Stowing
- 3.5 Mechanical Stowing
- 3.6 Hand Packing
- 3.7 Face arrangements
- 3.8 Pipe wear
- 3.9 Pipe Jams

CHAPTER -4 STRATA CONTROL

- 4.1 Basic concepts of ground movement.
- 4.2 Rock Pressure due to narrow and wide excavation
- 4.3 Failure of roof and floor
- 4.4 Measurement of Strata movement
- 4.5 Definition of Rock burst, Bumps, Gas outbursts, Pot holes

CHAPTER -5 SUBSIDENCE

- 5.1 Basic concept of Subsidence
- 5.2 Damage and loss due to Subsidence
- 5.3 Vertical and lateral movements and their estimation
- 5.4 Angle of fracture and angle of draw
- 5.5 Factors affecting subsidence
- 5.6 Subsidence Control
- 5.7 Protection of surface Structures
- 5.8 Introduction of Protection Pillars including shaft pillars.

I) SUGGESTED INSTRUCTIONAL STRATEGIES:

- ?? Lecture method
- ?? Industrial visits
- ?? Expert lecture
- ?? Demonstration

J) SUGGESTED LEARNING RESOURCES :

(a) Reference Books -

Sl.No.	Title	Author, Publisher, Edition & year
1.	Strata Control in Mines	Chang and Peng
2.	Winning and Working of Coal	R.T. Deshmukh and D.J.Deshmukh
3.	Modern Coal Mining Practices	R.D. Singh
4.	D.G.M.S. Circulars (Tech.) 1995 Onwards	
5.	Longwall Mining	Syed. S. Chang and Peng

(b) Others -

?? Learning Packages

?? Lab Manuals

?? Charts

?? Models

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**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY,
BHILAI**

- A) SEMESTER : III
 B) SUBJECT TITLE : INDUSTRIAL TRAINING
 C) CODE : 239324 (39)
 D) BRANCH/DISCIPLINE : MINING AND MINE SURVEYING

E) RATIONALE:

Industrial Training is one of the most essential components for a diploma graduate in Mining and Mine Surveying. The sole purpose of industrial training is to expose the students to “real life” situations. Different aspect of mining such as geology, exploration, selection of method of working, selection of machines for mining, environmental controls and measures, safety in mines and various statutory provisions can only be understood when the students are exposed to different mine workings. Students will cover different coal and metal mines both underground and opencast in such a way that at the end of the completion of diploma programme, they are conversant with different mining conditions. Industrial training also opens avenues of new learning to the students and apply them during their project and industrial training presentations.

F) TEACHING AND EXAMINATION SCHEME:

Course Code	Periods/Week (In Hours)			Scheme of Examination						Credit $\frac{[L+(T+P)]}{2}$
				Theory			Practical		Total Marks	
239324 (39)	L	T	P	ESE	CT	TA	ESE	TA		
	-	-	1	-	-	-	50	40	90	1

Note: Student will undergo on industrial practical training for 2 months after/before end of semester examination

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

ESE – End of Semester Exam.; CT – Class Test; TA- Teacher’s Assessment of the Training Report.

G) DISTRIBUTION OF MARKS AND DURATION:

Sl. No.	Items	Duration	Marks
1	Preparation of report format	2 Hrs	15
2	Industrial Training	08 Weeks	20
3	Report Writing	01 week	15
4	Report Presentation	01 Hrs.	10
5	Seminar	01 Hrs	10
6	End of the semester exam viva voce	03 Hrs	20
TOTAL		16 Weeks	90

Before going for training, the students will prepare various formats for data collection based on the topic of training assigned to them. The students will be given specific assignments for the period of training. During the course of training students will complete weekly report, assignments and keep weekly attendance updated. On completion of training each student will submit a report of training and make a presentation before the group of students. Teacher assessment will be done during the training, on presentation of training and at the end of semester examination. A seminar will be organized on specific topics identified by the teacher and the students will present their experiences earned during the training on the specific tasks. End of the semester examination will be an external exam.