RADHA GOVIND UNIVERSITY
RAMGARH, JHARKHAND

Department of Mining Engineering

Under Faculty of Engineering and Technology

Choice Based Credit System Curriculum for
Diploma in Engineering

(Effective from Academic Session 2022-23)

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Choice Based Credit System Curriculum for
Diploma in Engineering
SEMESTER I

(Effective from Academic Session 2022-23)

Scheme of Teaching and Examination for

1st Semester of 3 Years Diploma in Engineering (All Branches except Non Tech)

Duration **:14 Weeks**
Contact Hours **:36 Hrs**
Total Marks **: 800**

Sl. No.	Name of Subject	Subject Code	Subject	Teaching Scheme			Examination Scheme					
				L	T	P	Hours of Exam	Full Marks of Subject	Final Exam / committee marks	Internal Assessment	Pass Marks Final / Ext. Exam	Pass Marks in Subjects
1.	Communication Skill – I	101	Theory	3	-	-	3	100	80	20	26	40
2.	Engineering Math – I	102	Theory	3	1	-	3	100	80	20	26	40
3.	Engineering Physics - I	103	Theory	3	-	-	3	100	80	20	26	40
4.	Engineering Chemistry – I	104	Theory	3	-	-	3	100	80	20	26	40
5.	Engineering Graphics – I Th	105	Theory	2	-	-	4	50	40	10	13	20
6.	Fundamental of Computer	106	Theory	2	-	-	3	50	40	10	13	20
7.	Engineering Physics Lab – I	107	Practical	-	-	2	4	50	40	10	13	20
8.	Engineering Chemistry Lab- I	108	Practical	-	-	2	4	50	40	10	13	20
9	Engineering Graphics – I SS	109	Sessional	-	-	4	-	50	30	20	-	25
10	Communication Skill I	110	Sessional	-	-	2	-	50	30	20	-	25
11.	Fundamental of Computer – I	111	Sessional	-	-	2	-	50	30	20	-	25
12.	Workshop – I	112	Sessional	-	-	4	-	50	30	20	-	25
Total Hours of Teaching per week :				**16**	**1**	**16**						

Course Name : 03 Years Diploma in Engineering

Semester : 1st

Subject Title: Communication skills-

I Subject Code : 101

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
L TH	T	P	Full Marks.	External Exam Marks	Internal Exam Marks	External Pas Marks	Total Pass Marks	Duration of External Exams
03	1		100	80	20	26	40	3 Hrs

NOTE:

Internal marks will be allotted on the basis of two snap tests and 2 assignment of equal marks to be conducted by the faculty teaching the subject.

RATIONALE:

The comprehensive knowledge of communication and communication skill is essential for role of technicians in industry. Diploma pass outs are key persons between workforce and management and they need to be most effective in communication skills. The communication often includes grammar of the language in practice which is these days English. The in house practice before the faculty as part of scheme will develop the abilities in students a practical aspect of effective communication. Further exercises have been included for improving oral communication. Practical exposure gives a comprehensive communication skill effectiveness.

OBJECTIVES:

1. Comprehend the given passage
2. Answer correctly the questions on seen and unseen passages
3. Increase the vocabulary
4. Apply rules of grammar for correct writing

Name of the Topic	Hours	Total Marks
PART-II : Application of Grammar • Verbs • Tense • Do as directed (active/passive, Direct/Indirect, affirmative/negative/assertive/interrogat ive, question tag, remove too, use of article, preposition, conjunction, punctuation) • Correct the errors from the sentences.	10	18
PART-III : Paragraph Writing • Types of Paragraph (Narrative, Descriptive, Technical) • Unseen passage for Comprehension.	04	8
PART-IV : Vocabulary Building. • Synonyms • Antonyms • Homophones • Use of Contextual word in a given Paragraph	06	12
PART-V : Soft Skill Development • Speaking Skill • Introduction to Group Discussion • Process of Group Discussion • Leadership skill • Instant public speaking	08	16
PART-VI Etiquettes &Body Language • Telephone etiquettes listening/speaking • Problems of telephonic Conversation • Verbal/ oral etiquettes • Physical appearance • Eye Contact/Body Language • Group Discussion	4	8
Total	42	80

CONTENTS: Theory

Name of Topic	Hours	Marks
PART : 1 TEXT • Comprehension-Responding to Questions from text (Spectrum) • Vocabulary-Understanding meaning of new word from text. • Identifying part of Speech from text.	10	18

List of Assignment :

1. **Building of Vocabulary**
   25 words from the glossary given at the end of each chapter, to be used to make sentences.
2. **Applied Grammar**
   Identify the various parts of speech and insert correct parts of speech in the sentences given by the teachers.
3. **Punctuation**
   Punctuation 20 sentences given by the teachers.
4. **Tenses**
   List 12 tenses and give two examples for each tense.
5. **Dialogue Writing**
   Write at least two dialogues on different situations. (Conversation between two friends, conversation between two politicians etc.)
6. **Identifying the Error**
   Identify the error in the sentences given by the teachers. (20 Sentences)
7. **Idioms and Phrases**
   Use of Idioms and Phrases in sentences. (20 Examples)
8. **Biography**
   Write a short biography on your favorite role model approximately. (250- 300 words with pictures)

ACTIVITIES TO BE CONDUCTED DURING PRACTICALS

01. Student should perform role-plays on the situations given by the teachers. (04 Hours)
02.(e.g. V. Sasikumar & Dhamija 2nd edition (04 Hrs) or Linuga Phon L-21 Multimedia (Desirable)

Reference

- Web Sites for Reference :

Serial No.	Website Address
01	www. edufind.com
02	www.english_the _the_easy_eay.com
03	www.englishclub.com
04	www.english_grammar_lessons.com
05	www.wikipedia.org/wiki/english_grammar

Course Name: 03 Years Diploma in Engineering

Semester : First

Subject Title : Engineering Chemistry-I

Subject Code : 104 / 108

Teaching and Examination Scheme:

Teaching Scheme			Examination					
L	T	P	Full Marks.	External Exam Marks	Internal Exam Marks	External Pas Marks	Total Pass Marks	Duration of External Exams
03			100	80	20	26	40	3 Hrs
Practical		2	50	40	10	13	20	4 Hrs

NOTE:

Internal marks will be allotted on the basis of two snap tests and 2 assignment of equal marks to be conducted by the faculty teaching the subject.

RATIONALE:

Chemistry is a basic science subject which is essential to all engineering courses. It gives knowledge of engineering materials, their properties, related applications & selection of materials for engineering applications.

Due to technological progress there are hazardous effects on environment & human life. The core knowledge of environmental effects will bring awareness in students about the precautions & preventions to be taken to reduce the ill effects.

This subject will generate curiosity of carrying out further development in engineering fields.

OBJECTIVES: The student will be able to:

1. Draw the orbital configuration of different elements.
2. Represent the formation of molecules schematically.
3. Describe the mechanism of electrolysis.
4. Identify the properties of metals & alloys related to engineering applications.
5. Identify the properties of non metallic materials, related to engineering applications.
6. Compare the effects of pollutants on environments & to suggest preventive measures & safety.

Content: Theory

Chapter No.	Name of the Topic	Hours	Marks
01	**Atomic Structure** Definition of Atom, Fundamental Particles of Atom – their Mass, Charge, Location, Definition of Atomic no, Atomic Mass no., Isotopes & Isobars, & their distinction with suitable examples, Bohr's Theory, Definition, Shape of the orbitals & distinction between Orbits & Orbitals, Hund's Rule, Aufbau's Principle (till Atomic no. 30), Definition & types of valency (Electrovalency & Covalency), Octet Rule, Duplet Rule, Formation of Electrovalent & Covalent Compounds e.g. Nacl, $CaCl_2$, MgO, $AlCl_3$, CO_2, H_2O, Cl_2, NH_3,C_2H_4, N_2,C_2H_2.Distinction between electrovalent & covalent compounds.	06	12
02	**Electrochemistry** Electrolytic dissociation, Arrhenius Theory of Ionisation, Degree of Ionisation & factors affecting degree of ionization. Significance of the terms involved in Electrolysis- Such as Conductors, Insulators Dielectrics, Electrolyte, Non Electrolyte,Electrolysis, Electrolytic Cell, Electrodes. Mechanism of Electrolysis. Concept of electrode potential such as reduction potential& oxidation potential. Electrochemical Series, Electrolysis of $CuSO_4$ Solution by using Cu Electrode & Platinum Electrode, Electrolysis of NaCl solution & fused NaCl by using carbon electrode, Faraday's first & second law of Electrolysis & Numericals, Electrochemical Cells & Batteries, Definition, types such as Primary & Secondary Cells & their examples. Construction, Working & Applications of Dry Cell & Lead – Acid Storage Cell, Applications of Electrolysis such as Electroplating & Electro refining, Electrometallurgy & Electrotyping	08	16

03	**Metals & Alloys** **3.1 Metals (Marks:10)** Occurrence of Metals, Definition of Metallurgy, Mineral, Ore, Gangue, Flux & Slag, Mechanical Properties of metals such as Hardness, Toughness, Ductility, Malleability, Tensile strength, Machinability, Weldability, Forging, Soldering, Castability. Stages of Extraction of Metals from its Ores in detail i.e. Crushing, Concentration, Reduction, Refining. Physical Properties & Applications of some commonly used metals such as Fe, Cu, Al, Cr, Ni, Sn, Pb, Zn, Co, Ag, W. **3.2 Alloys (Marks: 08)** Definition of Alloy, Purposes of Making alloy. Preparation Methods, Classification of Alloys such as Ferrous & Non Ferrous & their examples. Composition, Properties & Applications of Alnico, Duralumin, Dutch Metal, German Silver / Nickel Silver, Gun Metal, Monel metal, Wood's Metal, Babbit metal.	10	18
04	**Non Metallic Materials** **4.1 Plastics (Marks: 04)** Definition of Plastic, Formation of Plastic by Addition & Condensation Polymerisation by giving e.g. of Polyethylene & Backelite plastic Respectively, Types of Plastic, Thermosoftening & Thermosetting Plastic, with Definition, Distinction & Compounding of Plastics – Resins, Fillers, Plasticizers, Acceleraters, Pigments & their examples, Engineering Applications of Plastic based on their properties. **4.2 Rubber (Marks: 04)** Natural Rubber: Its Processing, Drawbacks of Natural Rubber, Vulcanisation of Rubber with Chemical Reaction. Synthetic Rubber: Definition, Distinction Between natural & synthetic rubber. Properties of rubber such as elasticity, abrasion resistant, stress & strain and related engg. application. **4.3 Thermal Insulating Materials (Marks: 04)** Definition ,& types. Characteristics of insulators. Thermal insulators. Properties & Applications o f glasswool, Asbestos, Cork.	06	12

05	**Environmental Effects (Awareness Level)** **5.1 Pollution & Air pollution (Marks 10)** Definition of pollution & pollutant, Causes of Pollution, Types of Pollution - Air & Water Pollution. **Air Pollution** Definition, Types of Air pollutants their Sources & Effects, Such as Gases, Particulates, , Radio Active Gases, Control of Air Pollution, Air Pollution due to Internal Combustion Engine & Its Control Methods, Deforestation their effects & control measures. Causes , Effects & control measures of Ozone Depletion & Green House Effects. **5.2 Water Pollution & Wastes (Marks 12)** Definition, Causes & Methods of Preventing Water Pollution, Types of Waste such as Domestic Waste, Industrial Waste, their Physical & Biological Characteristics, Concept & significance of BOD, COD, Biomedical Waste & E – Waste, their Origin, Effects & Control Measures. Preventive Environmental Management (PEM) Activities.	12	22
Total		**42**	**80**

Practical:

Intellectual Skills: 1. Analyse given solution
2. Interpret the results

Motor Skills : 1. Observe Chemical Reactions
2. Measure the quantities Accurately
3. Handle the apparatus carefully

List of Experiments:

01 – 07 Qualitative Analysis of **four salts ,** Containing One Basic & One Acidic Radical Listed below

Basic Radicals:

Pb^{+2}, Cu^{+2}, Al^{+3}, Fe^{+2}, Fe^{+3}, Cr^{+3}, Zn^{+2}, Ni^{+2}, Ca^{+2}, Ba^{+2}, Mg^{+2}, K^{+}, NH^{+}.

Acidic Radicals:

Cl^{-}, Br^{-}, I^{-}, CO_3^{-2}, SO_4^{-2}, NO^{-}.

05 To Determine E.C.E. of Cu by Using $CuSO_4$ Solution & Copper Electrode

06 To standardize $KMnO_4$ using Sodium oxalate.

07 To determine percentage of Fe in the given mohr's salt.

08 To Prepare a chart to showing application of metals like Fe, Cu, Al, Cr, Ni, Sn, Pb, Co.

09 To determine Carbon Monooxide, CO_2 content emission from petrol vehicle

10 To Determine Dissolved Oxygen in a Water Sample.

Reference Books:

Sr. No.	Author	Name of the book	Publisher
01	Jain & Jain	Engineering Chemistry	Dhanpat Rai and Sons
02	S. S. Dara	Engineering Chemistry	S. Chand Publication
03	B. K. Sharma	Industrial Chemistry	Goel Publication
04	S. S. Dara	Environmental Chemistry & Pollution Control	S. Chand Publication
05	Vedprakash Mehta	Polytechnic Chemistry	Jain brothers
06	Uppal	Engineering Chemistry	

Course Name : 03 Years Diploma in Engineering

Semester : First
Subject Title : Engineering Graphics-I

Subject Code : 105

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
L	T	P	Full Marks.	External Exam Marks	Internal Exam Marks	External Pas Marks	Total Pass Marks	Duration of External Exams
02	0	4	50+50	40+30	10+20	13 TH	20+25	4 Hrs (TH)

NOTE:

Internal marks for theory will be allotted on the basis of two snap tests and 2 assignment of equal marks to be conducted by the faculty teaching the subject.

RATIONALE:

Normally Graphical representation are used for expressing intents and contents. Engineering Graphics is the language of engineers. The concepts of Engineering Graphics are used to develop, express the ideas, and conveying the instructions which are used to carry out jobs in the field Engineering. The course illustrates the techniques of graphics in actual practice. This preliminary course aims at building a foundation for the further course in drawing and other allied subjects.

OBJECTIVES:

The student should be able to:-

1) Draw different engineering curves and know their applications.
2) Draw orthographic projections of different objects.
3) Visualize three dimensional objects and draw Isometric Projections.
4) Use the techniques and able to interpret the drawing in Engineering field.
5) Use computer aided drafting packages.

Chapter	Name of Topic		No. of Sheet	No. of Hr.	
				Theory	Practical
01.	1.1 1.2 1.3	Drawing Instruments and sheet layout Letters and Numbers as per BIS: SP46-2003 Scale (Plane and diagonal scale)	02	01	04
02	2.1 2.2 2.3	Curves and Conic Section To draw ellipse by directrix and arc of circle method To draw parabola by directrix and rectangle method To draw hyperbola by rectangle and directrix method.	01	02	04
03	3.1 3.2	Introduction to orthographic projection. Projection of point on principal, auxiliary and profile planes. Idea of shortest distance.	01	01	04
04	 4.1 4.2 4.3	Projection of straight line on principal plane in the following cases. Parallel to both H.P and V.P Inclined to one plane and parallel to other plane. Inclined to both plane.	01	02	04
05	5.1	Projection of different simple shapes eg. Circle, Triangle, Rectangle, Pentagon, & Hexagon on principal plane (Inclined to one plane and to both planes)	01	02	04
06	6.1	Projection of simple solid. Projection of Prism, Pyramid, Cone, Cylinder, and Cube with their axis inclined to one reference plane and parallel to other.	01	02	04
07	7.1 7.2	Section of simple solids with true shape of sectioned portion. Development of solid surfaces eg. Prism, Cylinder, Cone, Pyramid and Cubes.	01	02	04

08	8.1	Isometric Scale and their use in drawing isometric views of single and compound solids. (Simple case only)	01	02	04
09	9.1	Intersection of solids. Curves of intersection of the surfaces of the solids in the following case; a. Prism with Prism b. Cylinder with cylinder c. Prism with cylinder d. Cylinder with cone with different axis.	01	02	04
10	10.1	Prospective Projection	01	02	04
11	11.1	AutoCAD Basics, Layers, multi-layer images, graphic interfaces, different views to be drawn.	03	10	16
		Total-	**14**	**28**	**56**

References:

Sl. No.	Author	Title	Publication
1.	N.D.Bhatt	Engineering Drawing	Charotkar Publishing House
2.	R.K.Dhawan	Engineering Drawing	S.Chand Co.
3.	K.R.Mohan	Engineering Graphics	Dhanpat Rai & Publication Co.
4.	P.J.Shah	Engineering Drawing	----
5.	P.S.Gill	Engineering Drawing	----

Course Name : 03 Years Diploma in Engineering

Semester : First

Subject Title : Engineering Mathematics-1

Subject Code : 102

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
L TH	T	P	Full Marks.	External Exam Marks	Internal Exam Marks	External Pas Marks	Total Pass Marks	Duration of External Exams
03	01		100	80	20	26	40	3 Hrs

NOTE:

Internal marks will be allotted on the basis of two snap tests and 2 assignment of equal marks to be conducted by the faculty teaching the subject.

RATIONALE:

Mathematics provides foundation for all engineering subjects. Deep thought is given while selecting topics of this subject known as “Engineering Mathematics” which intends to teach students basic facts, concepts and principles of mathematics as a tool to analyze engineering problems. It lays down the foundation for understanding core engineering and technology subjects.

OBJECTIVE:

This subject helps the students to develop logical thinking, which is useful in comprehending the principles of all other subjects. Analytical and systematic approach towards any problem is developed through learning of this subject. Mathematics being a versatile subject can be used as a tool at every stage of human life.

Sub Objective:

This subject is divided into four units 1) Algebra, 2) Trigonometry, 3) Coordinate Geometry and 4) Vector. Upon completion of these Units the student shall be able to:

1.1 Use Logarithms in engineering calculations
1.2 Resolve Rational Fraction into sum of Partial Fractions in engineering problems
1.3 Use Matrices for solving engineering problems
1.4 Understand the concept of Binomial Expansion and use of Permutation & Combination

2.1 Solve simple problems on Compound Angles
2.2 Solve problems using the formulae for Multiple and Sub- multiple Angles
2.3 Apply Transformations for solving the problems in Trigonometry
2.4 Use Inverse Trigonometric Functions for solving engineering problems
2.5 Understand Properties of triangles

3.1 Appreciate the concept of position of any point in a plane or in space
3.2 Distance between two points and its application in solving engineering problems
3.3 Solve the problems on straight line
3.4 Solve the problems on Circles

4.1 Appreciate the concept of a new type of physical quantity called Vector
4.2 Algebra of Vectors
4.3 Solve engineering problems like work done, moment of force about a point as well as about a line.

Chapter No.	NAME OF TOPICS	Hours	Marks
	ALGEBRA		
1	**1.1 Prerequisites Revision of** ▪ Arithmetic, Geometric and Harmonic Progressions, ▪ Formula of nth term and sum to n-terms of A.P. and G.P. ▪ Expression of $\sum n$, $\sum n^2$ and $\sum n^3$. ▪ Quadratic equations with real coefficients and relation between their roots & coefficient	01	01
	1.2 Logarithms: ▪ Definition of logarithm (Natural and Common logarithm.) ▪ Laws of logarithm ▪ Examples based on 1.2.1 to 1.2.2	03	04
	1.3 PARTIAL FRACTION ▪ Definition of Polynomial Fraction Proper & Improper Fractions and definition of Partial fractions. ▪ To Resolve proper fraction into partial fraction with denominator containing non repeated linear factors, repeated linear factors and irreducible non repeated quadratic factors. ▪ To resolve improper fraction into partial fraction.	03	06

	1.4 DETERMINANT AND MATRICES. **Determinant** **4 Marks** ▪ Definition and expansion of determinants of order 2 and 3. ▪ Cramer's rule to solve simultaneous equations for 2 and 3 unknowns. **Matrices** **12Marks** ▪ Definition of a matrix of order m X n and types of Matrices with examples. ▪ Algebra of matrices such as equality, addition, subtraction, scalar multiplication and multiplication of two matrices. ▪ Transpose of a matrix. ▪ Minor, Cofactor of an element of a matrix, adjoint of matrix and Inverse of matrix by Adjoint method. ▪ Solution of simultaneous equations containing 2 and 3 unknowns by matrix inversion method. ▪ Idea of Rank of Matrix and their calculation	08	16
	1.5 BINOMIAL THEOREM ▪ Definition of factorial notation, definition of permutation and combinations with formula (without proof). ▪ Derivation of simple identities and solution based on it ▪ Binomial theorem for positive index. ▪ General term, Middle term, independent term and coefficient of x^n ▪ Binomial theorem for negative index (only idea). ▪ Approximate value (only formula)	02	04
2	TRIGONOMETRY		
	2.1 **REVISION** ▪ Measurement of an angle (degree and radian). Relation between degree and radian. ▪ Trigonometrical ratios of 0^0 , 30^0 , 45^0 , 60^0, 90^0, $90^0 \pm \theta$, $180^0 \pm \theta$ and $360^0 \pm \theta$ ▪ Fundamental identities.	01	01
	2.2 TRIGONOMETRIC RATIOS OF ALLIED, COMPOUND, MULTIPLE & SUBMULTIPLE ANGLES Questions based on numerical computations.	03	06
	2.3 Transformation formula of Product into sums or difference and vice versa, simple problems based on it	03	06
	2.4 **INVERSE TRIGONOMETRIC RATIOS** ▪ Definition of inverse trigonometric, ratios, Principal values of	02	04

	inverse trigonometric ratios. ▪ Relation between inverse trigonometric ratios.		
	2.5 PROPERTIES OF TRIANGLE Sine, Cosine, Projection and tangent rules (without proof). Simple problems.	02	04
03	COORDINATE DISTANCES		
	3.1 POINT AND DISTANCES ▪ Distance formula, Section formula, midpoint, centroid of triangle. ▪ Area of triangle and condition of collinearity.	**2**	**04**
	3.2 STRAIGHT LINE ▪ Slope and intercept of straight line. ▪ Equation of straight line in slope point form, slope-intercept form, two-point form, two-intercept form, normal form. General equation of line ▪ Angle between two straight lines condition of parallel and perpendicular lines. ▪ Intersection of two lines. ▪ Length of perpendicular from a point on the line and perpendicular distance between parallel lines.	**05**	**10**
	3.3 CIRCLE ▪ Equation of circle in standard form, centre – radius formula and diameter formula. ▪ General equation of circle, its centre and radius, simple problem	**02**	**04**
	VECTOR ALGEBRA		
	4 VECTORS ▪ Definition of vector, position vector, Algebra of vectors (Equality, addition, subtraction and scalar multiplication) ▪ Dot (Scalar) product with properties. ▪ Vector (Cross) product with properties.	03	06
	4.4 Applications 4.4.1 Work done and moment of force/s about a point & line	**02**	04
	TOTAL:	42	80

LEARNING RESOURCES:

Sr. No.	Title	Authors	Publications
1	Mathematics for Class XI Volume I and II	R. D. Sharma	Dhanpat Rai Publication, New Delhi.
2	Mathematics for Class XII Volume and II	R. D. Sharma	Dhanpat Rai Publication, New Delhi.
3	Co ordinate Geometry	S. L. Loney	S. Chand Publication
4	Trigonometry	S. L. Loney	S. Chand Publication
5	Higher Algebra	H. S. Hall & S. R. Knight	Metric edition, Book Palace, New Delhi
6	Higher Sr. Secondary School Mathematics for XI & XII	R.S. Agrawal	Bharti Bhawan, Patna
7	Vector Algebra	L Prasad	Bharti Bhawan, Patna

Note:
In board examination, question setter may be advised to select 20% questions of objective, 30% of short type and remaining 50% of long type based on basic concepts, formula and calculations respectively.

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Course Name : 03 Years Diploma in Engineering

Semester : First

Subject Title : Engineering Physics-I

Subject Code : 103/ 107

Teaching and Examination Scheme:

Teaching Scheme			Examination					
L	T	P	Full Marks.	External Exam Marks	Internal Exam Marks	External Pas Marks	Total Pass Marks	Duration of External Exams
03	1		100	80	20	26	40	3 Hrs
Practical		2	50	40	10	13	20	4 Hrs

NOTE:

Internal marks will be allotted on the basis of two snap tests and 2 assignment of equal marks to be conducted by the faculty teaching the subject.

RATIONALE:

Basic science forms the foundation of Engineering. In particular Physics provides fundamental facts, principles, l aws, and proper sequence of events to streamline Engineering knowledge.

OBJECTIVES:

Student will be able to:

- Measure given dimensions by using appropriate instruments accurately.
- Select proper measuring instrument on the basis of range, least count & precision required for measurement.
- Differentiate kinetic and kinematics and solve the problems on kinematics and kinetics.
- Use principles of illumination for enhancing work efficiency.
- Analyze variation of sound intensity with respect to distance.
- Identify different factors affecting acoustical planning of buildings.
- Select proper material for intended purpose by studying properties of materials.
- Identify good & bad conductors of heat.
- Identify, analyze, discriminate and interpret logical sequence of field problems with the study of physics.

CONTENTS: Theory

CHAPTER	CONTENT	HOURS	MARKS
1.	**UNITS AND MEASUREMENTS** **1.1** Need of measurement and unit in engineering and science, definition of unit , requirements of standard unit, systems of units-CGS,MKS and SI, fundamental and derived quantities and their units **1.2** Definition of dimensions with examples, principle of homogeneity of dimensions, limitations of dimensions. **1.3** Definition of accuracy, precision and error, estimation of errors – absolute error, relative error and percentage error, rules and identification of significant figures. **(Numericals on percentage error and significant figures)**	**04**	**06**
2	**MECHANICS** **2.1 Motion along a straight line and Force** Concept of scalar and vector quantities, Equations of motion with constant acceleration (derivation not required), Equations of motion of falling body under gravity, Newton's laws of motion, Force, inertia, Action and reaction, tension, , momentum, impulse and impulsive force with practical examples (basic Idea), Conservation of linear momentum, **(Simple problems on linear motion)**	**04**	**10**
	2.2Angular Motion Definition of angular displacement, angular velocity and angular acceleration, relation between linear velocity and angular velocity, definition of simple harmonic motion (SHM), SHM as a projection of uniform circular motion on any diameter, equation of SHM, derivation of displacement, velocity and acceleration of a body executing SHM.	**05**	**08**
3	**GRAVITATION** Newton's laws of gravitation,Newton's gravitational constant (G) and its SI unit, Acceleration due to gravity (g) and its relation with "G",Variation of g with altitude and latitude(deduction not required) **(Simple problems)**	**03**	**06**
4.	**WORK , ENERGY & POWER** Definition of work, energy and power, equations for P.E. & K.E., Work-Energy principle, Representation of work by using graph, work done by a torque (no derivation) **(Numericals on work, potential and kinetic energy)**	**02**	**06**

5.	**GENERAL PROPERTIES OF MATTER** **5.1 Elasticity** Deforming force, restoring force, elastic and plastic body, stress and strain with their types. elastic limit, Hooke's law, Young's modulus, bulk modulus, modulus of rigidity and relation between them (no derivation). **(Numerical on stress, strain and Young's modulus)**	**04**	**08**
	5.2 Surface Tension. Molecular force, cohesive and adhesive force, Molecular range , sphere of influence, Laplace's molecular theory, Definition of surface tension and its S.I. unit, angle of contact, capillary action with examples, shape of meniscus for water and mercury, relation between surface tension , capillary rise and radius of capillary (no derivation),effect of impurity and temperature on surface tension **(Numerical on relation between surface tension, capillary rise and radius)**	**04**	**08**
	5.3 Viscosity Definition of viscosity, viscous force, velocity gradient, Newton's law of viscosity, coefficient of viscosity and its S.I. unit, streamline and turbulent flow with examples, critical velocity, Reynolds's number and its significance, derivation of viscous force for free fall of spherical body through viscous medium, upthrust, terminal velocity, Stoke's law (statement and formula). **(Numerical on coefficient of viscosity, Reynolds number and Stoke's formula)**	**04**	**08**
CHAPTER	**CONTENT**	**HOURS**	**MARKS**
6	**HEAT** **Transmission of heat and expansion of solids:** Three modes of transmission of heat -conduction, convection and radiation, good and bad conductor of heat with examples, law of thermal conductivity, coefficient of thermal conductivity and its S.I. unit, Definition of linear, aerial and cubical expansion and relation between them. (no derivation) (Numericals on law of thermal conductivity, and coefficients of expansions)	**04**	**08**
7	**ACOUSTICS** **7.1 Sound** Definition of wave motion, amplitude, period, frequency, and wavelength, relation between velocity, frequency and wavelength , longitudinal and transverse wave, definition of stationary wave , node and antinode, forced and free vibrations, definition of resonance with examples, derivation of formula for velocity of sound with end correction. **(Numericals on relation $v = n\lambda$ and resonance)**	**04**	**06**

	7.2 Acoustics of Building Acoustics-concept and definition, Intensity and loudness of sound, echo, Reverberation standard reverberation time, Sabine's formula. Conditions for good acoustics, Factors affecting Acoustical planning of auditorium. **(Numericals on Sabine's formula)**	**04**	**06**
	TOTAL	**42**	**80**

Practical:

Skills to be developed

1) **Intellectual skills-**

Proper selection of measuring instruments on the basis of range, least count, precision and accuracy required for measurement.

Analyze properties of matter & their use for the selection of material.

To verify the principles, laws, using given instruments under different conditions.

To read and interpret the graph.

To interpret the results from observations and calculations.

To use these results for parallel problems.

2) ***Motor skills-***

Proper handling of instruments.

Measuring physical quantities accurately.

To observe the phenomenon and to list the observations in proper tabular form.

To adopt proper procedure while performing the experiment.

To plot the graphs.

*L*ist of Experiments:

1. To know your Physics Laboratory.
2. To use Vernier Callipers for the measurement of dimensions of given object.
3. To use Micrometer Screw Gauge for the measurement of dimensions (Length, Thickness, Diameter) of given object.
4. To use spherometer for the measurement of thickness of a given glass piece.
5. To calculate Young's modulus of elasticity of steel wire by Vernier method
6. To study capillary phenomenon and to verify that the height of liquid in capillary is inversely proportional to the radius of capillary
7. To determine coefficient of viscosity of given liquid using Stoke's Method
8. To calculate the Linear Thermal coefficient of expansion for copper by using Pullinger's apparatus.
9. To determine refractive index of a glass using glass slab by pin method. ($\sin i/\sin r=\mu$).
10. To determine the velocity of sound by using resonance tube.

Reference Books:

Sr. No.	Name of book	Author	Publisher & Address
1.	Physics-I	V. Rajendran	Tata McGraw- Hill raw- Hill publication, New Delhi
2.	Applied physics	Arthur Beiser	Tata McGraw- Hill raw- Hill Publication, New Delhi
3.	Engineering Physics	by R.K.Gaur and S.L.Gupta	Dhanpat Rai Publication, New Delhi.
4.	Fundamentals of Physics	Resnick ,Halliday & Walker	Wiley India Pvt. Ltd.
5.	Core Physics-I	A. Kumar	Bharti Bhavan
6.	Pradeep's Fundamental Physics-XI	K.L. Gomber & K.L Gogia	Pradeep Publication
7.	S. Chand's Principles of Physics-XI	V.K Mehta & Rohit Mehta	S. Chand Publication
8.	Dinesh New Millennium Physics-XI	S. K Sharma	Dinesh Publication

Course Name:- All Branches of Diploma in Engineering

Semester: First

Subject Title: Fundamental of

Computer Subject Code; 106/111

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
L	T	P	Full Marks.	External Exam Marks	Internal Exam Marks	External Pas Marks	Total Pass Marks	Duration of External Exams
02	0		50	40	10	13	20	3 Hrs
Sessional		2	50	30	20		25	

NOTE:

Internal marks will be allotted on the basis of two snap tests and 2 assignment of equal marks to be conducted by the faculty teaching the subject.

RATIONALE:

In Engineering Education role of computers and its knowledge is day by day increasing and every documentation and analysis requires basic fundamentals of computers. The accessibility to internet and presentation techniques are essential elements these days which is fully dependent on knowhow of computers irrespective of branches or discipline.

OBJECTIVES:

Student will be able to:

1. Understand a computer system that has hardware and software components, which controls and makes them useful.
2. Understand the operating system as the interface to the computer system.
3. Use the basic function of an operating system.
4. Set the parameter required for effective use of hardware combined with and Application software's.
5. Compare major OS like Linux and MS- Windows.
6. Use file managers, word processors, spreadsheets, presentation software's and Internet.
7. Have hands on experience on operating system and different application software.
8. Use the Internet to send mail and surf the World Wide Web.

CONTENTS : Theory

Chapter	Name of Topic	Hr	Marks
1.	**Fundamentals of Computer** 1.1 Introduction 1.2 Type of Computer 1.3 Components of PC 1.4 Inputs & Output Devices 1.5 Computer Languages 1.6 Memory of Computer	4	6
2.	**Introduction to MS Office** 3.1 MS- Word : Introduction, Starting MS-Word Screen and its Components, Elementary Working with MS-Word 3.2 MS- Excel: Introduction, Starting MS-Excel, Basics of Spreadsheet, MS- Excel Screen and its Components, Elementary Working with MS-Excel. 3.3 MS –Power Point: Introduction, Starting MS-PowerPoint, Basics of PowerPoint, MS-PowerPoint Screen and Its Components, Elementary Working with MS-PowerPoint.	8	12
3.	**Introduction to Internet** 4.1 What is Internet? 4.2 Computer Communication and Internet. 4.3 WWW and Web Browsers. 4.4 Creating own Email Account. 4.5 Networking and types.	4	6
4.	**Introduction to HTML and Software** 5.1 Introduction to HTML. Working of HTML 5.2 Creating and loading HTML pages, tags. 5.3 Structure of on HTML, Document, Stand Alone Tags. 5.4 Formatting text, Adding Images, Creating hyper Links, Tables. 5.6 Cyber security. 5.7 Computer virus.	8	10
5.	**Information Technology** 6.1 Current IT Tools. 6.2 Social networking, mobile computing, cloud computing. 6.3 Introduction of IOT and IOE 6.4 Computer Application in various fields like Data analysis, database management, artificial intelligence.	6	6
	Total	30	40

List of Practical Exp- 1

Identification of different part of computer system and peripherals

Exp – 2: Operations on operating system

1. Create a new folder and do the following:
   a. Make a new folder in it.
   b. Rename the initial folder.
   c. Opening a new file.
   d. Creating document in note pad.
   e. Move the initial folder.
   f. Copy the initial folder.
   g. Delete the initial folder
2. Implement the various well known features of Windows operating system such as Notepad, WordPad, Calculator, System tools etc. enclosed in Start→Programs→Accessories.
3. Implement various display properties by right clicking on the Windows Desktop.
4. Explore the taskbar of Windows.
5. Set the wall paper and screen saver.
6. Set the date /time.

Exp.3 Basic operations on MS Word

1. Create a document and
   a. Put Bullets and Numbers
   b. Apply various Font parameters.
   c. Apply Left, Right, and Centre alignments
   d. Apply Hyperlinks
   e. Insert pictures
   f. Insert ClipArt
   g. Show the use of Word Art
   h. Add Borders and shading
   i. Show the use of Find and Replace.
   j. Apply header/footers

Exp- 4 Advance operations on MS Word

2. Create any document and show the use of File→Versions.
3. Create any document and show the difference between paste and paste special.
4. Create any document and show the use of Washout/Watermark.
5. Implement the concept of mail merge.
6. Implement the concept of macros.
7. Implement the concept of importing a file/document.
8. Implement the concept of merging the documents.
9. Create a student table and do the following :

a. Insert new row and fill data
b. Delete any existing row.
c. Resize rows and columns.
d. Apply merging/ splitting of cells
e. Apply sort.
f. Apply various arithmetic and logical formulas.
g. Apply various arithmetic and logical formulas.

10. Create your resume using General Templates.

Exp- 5 Basic operation on electronic spreadsheet/excel

1. Computer the division of each and every student of a class.
2. Generation of Electricity Bill
3. Generation of Telephone Bill
4. Generation of Salary statement of an employee
5. Generation of Mark Sheet of a student.
6. To compute mean / median / mode.
7. Generation graph to show the production of goods in a company during the last five years.
8. Compare the cost, overheads and sales figure of a company for last three years through appropriate chart.

Exp – 6 Advance operations on electronic spreadsheet

1. Generation the following worksheet

Roll No.	Marks
2050	67
2051	49
2052	40
2053	74
2054	61
2055	57
2056	45

and do the following:

a. Create chart of the marks.
b. Compute sum of marks using auto sum, auto calculate and sum function.
c. Compute average of marks.
d. Show pass or fail if marks are above 50 or less than 50
e. Put header and footer in the spread sheet.

Importing and exporting data from other files.
Program development in excel using simple commands.

Exp – 7 Power Point Presentation preparation

1. Make a presentation of College Education System using
    a. Blank Presentation
    b. From Design Template
    c. From Auto Content Wizard

Exp – 8 Animation and various effect in Power Point Presentation, exporting and importing contents from word/excel

1. Make a presentation on "Wild Life " and apply the following:
    a. Add audio and video effects
    b. Apply various Color Schemes
    c. Apply various animation schemes.
    d. Apply slide show

Exp – 9 Simple program in HTML

1. Create any webpage using following HTML tags:
    a. Background Colour
    b. Font (Colour, Size, Face)
    c. Bold / Italic / Underline
    d. Big / Small
    e. H 1, H 2, etc.
    f. Marquee
    g. Ordered / Unordered List
    h. Data list
2. Create Employee Table and apply various operations on it using HTML. Also put Border around the table.
3. Create Internal and External Hyperlinks in a Webpage.
4. Implement the concept of Frames in a Webpage.
5. Insert an image in a Webpage.
6. Design Home page of your Institute
7. Design Web page for tourism spots in your area
8. Prepare your CV and link on the web page
9. Use animation of image in a web page
10. Insert a table and perform table handling in web page

Exp – 10 Basics of Internet, surfing, email account opening and transactions through email account

1. Connect the Internet; open any website of your choice and save the Web Pages.
2. Search any topic related to your syllabus using any search engine and download the relevant material.
3. Create your E-Mail ID on any free E-Mail Server.
4. Login your E-Mail ID and do the following:

a. Read your mail
b. Compose a new Mail
c. Send the Mail to one person
d. Send the same Mail to various persons
e. Forward the Mail
f. Delete the Mail
g. Send file as attachment

5. Surf Internet using Google to find information about yours state college.
6. Surf Internet using Google to find Tourism information about your state.
7. Surf Internet using Yahoo to find Hotel around your state

Text Books:

i) C.S. French "Data processing and Information Technology ", BPB Publications.
ii) P.K Sinha Computer Fundamentals , BPB Publications
iii) Guy Hart-Davis “The ABCs of Microsoft Office Professional Edition", BPB Publication.
iv) Karl Schwartz, “Microsoft Windows 98 Training Guide"

Course Name : 03 Years Diploma in Engineering

Semester : First

Subject Title : Workshop-I

Subject Code : 112

Teaching and Examination Scheme:

Teaching Scheme			Examination					
L T H	T	P	Full Marks.	External Exam Marks	Internal Exam Marks	External Pas Marks	Total Pass Marks	Duration of External Exams
01		4	50	30	20	--	25	---

Rationale:

Engineering diploma technician is expected to know basic workshop practice. like Wood working, Sheet metal. The students are required to identify, operate, control various machines, select and use various tools and equipments related to Wood working and sheet metal processes together with exposure to fabrication soldering and joint making of various types.

Objectives:

The student will able to

- Know basic workshop processes.
- Read and interpret job drawing.
- Identify, select and use various marking, measuring, holding, striking and cutting tools & equipments.
- Operate, control different machines and equipments.
- Inspect the job for specified dimensions
- Produce jobs as per specified dimensions.
- Adopt safety practices while working on various machines.

CONTENTS:

Sr.No.	Details Of Theory Contents	Jobs	Theory (hr)	Practice(hr)
01	**CARPENTRY SHOP** 1. Introduction. 2. Various types of woods. 3. Different types of tools, machines and accessories. 4. Practice Job a. Preparation of cross lap joints. b. T Lap joints c. Dovetail Joints d. Wood turning	04	04	**14**
02	**FITTING SHOP**: 1. Introduction 2. Various marking, measuring, cutting, holding and striking tools. 3. Different fitting operation like chipping, filing, right angle, marking, drilling, tapping etc. 4. Working Principle of Drilling machine, Tapping dies its use. 5. Safety precautions and safety equipments. 6. Practice 3 Jobs (V groove, Square notch, Fitting of two parts)	03	03	12
03	**SHEET METAL SHOP.** 1. Introduction 2. Various types of tools, equipments and accessories. 3. Different types of operations in sheet metal shop. 4. Soldering and riveting. 5. Safety precautions 6. Practice Jobs (Making funnel, tray, cylinder)	03	03	14
04	**TURNING SHOP** 1. Introduction 2. Various marking, measuring, cutting, holding and striking tools. 3. Working Principle of Drilling machine, Tapping dies its use. 4. Drilling and Tapping 5. Turning: Plain, taper 6. Threading and Knurling 7. Safety precautions and safety equipments.	**03**	**04**	**16**
	Total	13	14	56

Skill to be developed:

Intellectual Skills:

1. Ability to read job drawing
2. Ability to identify and select proper material, tools, equipments and machine.
3. Ability to select proper parameters (like cutting speed, feed, depth cut use of lubricants)

Motor Skills:

1. Ability to set tools, work piece, and machines for desired operations.
2. Ability to complete job as per job drawing in allotted time.
3. Ability to use safety equipment and follow safety procedures during operations.
4. Ability to inspect the job for confirming desired dimensions and shape.
5. Ability to acquire hands-on experience.

Notes: 1] The Faculty/ Instructor shall give demonstration to the students by preparing a specimen job as per the job drawing.
2] The workshop diary shall be maintained by each student duly signed by Faculty/Instructor of respective shop

Books:

- S.K. Hajara Chaudhary- Workshop Technology-Media Promotors and Publishers, New Delhi
- B.S. Raghuwanshi- Workshop Technology- Dhanpat Rai and sons, New Delhi
- R K Jain- Production Technology- Khanna Publishers, New Delhi
- H.S.Bawa- Workshop Technology- Tata McGraw Hill Publishers,New Delhi
- Kent's Mechanical Engineering Hand book- John Wiley and Sons, New York
- Electronics Trade & technology Development Corporation.(A Govt. of India undertaking) Akbar Hotel Annex, Chanakyapuri, New Delhi- 110 021

Learning Materials Transparencies, CBT Packages developed by N.I.T.T.E.R. Bhopal.

RADHA GOVIND UNIVERSITY
RAMGARH, JHARKHAND

Department of Mining Engineering

Under Faculty of Engineering and Technology

Choice Based Credit System Curriculum for
Diploma in Engineering
SEMESTER II

(Effective from Academic Session 2022-23)

Scheme of Teaching and Examination for

2nd Semester of 3 Years Diploma in Engineering (All Branches except Non Tech)

Duration of Semester : **14 Weeks**
Student Contact Hours : **36 Hrs** Total
Marks : **800**

Sl. No.	Name of Subject	Subject Code	Subject	Teaching Scheme			Examination Scheme					
				L	T	P	Hours of Exam	Full Marks of Subject	Final Exam / committee marks	Internal Assessment	Pass Marks Final / Ext. Exam	Pass Marks in Subjects
1.	Communication Skill – II	201	Theory	3	-	-	3	100	80	20	26	40
2.	Engineering Math – II	202	Theory	3	1	-	3	100	80	20	26	40
3.	Engineering Physics - II	203	Theory	3	-	-	3	100	80	20	26	40
4.	Engineering Chemistry - II	204	Theory	3	-	-	3	100	80	20	26	40
5.	Programming in C	205	Theory	3	-	-	3	100	80	20	26	40
6.	Engineering Physics II	206	Practical	-	-	2	3	50	40	10	13	20
7.	Engineering Chemistry II	207	Practical	-	-	2	3	50	40	10	13	20
8.	Programming in C	208	Sessional	-	-	4	3	50	30	20	-	25
9.	Workshop Practices	209	Sessional	-	-	4	4	100	60	40	-	50
10.	Professional Practice I	210	Sessional	-	-	4	-	50	30	20	-	25
Total Hours of Teaching per week :				**15**	**1**	**16**						

Total Marks : Theory : Practical : Sessional :
L : Lecture, T : Tutorial P : Practical

Note: 1. Period of Class hours should be of 1 hrs duration as per AICTE norms.

2. Remaining Hrs every week has been marked for students for Library and Student Centered Activities.

3. Drawing / Graphics / Practical / Sessional examinations will be held at parent institution.

4. Board will depute examiner for Practical examination.

5. Regarding sessional examination the parent institution will form a three member committee and this committee will examine the sessional records and hold viva of the examinee for 60 % marks allotted to the subject. Marks for remaining 40 % will be provided by the Faculty concerned on the basis of evaluation of each job / work throughout the semester.

Course Name: All Branches of Diploma Engineering

Semester : Second

Subject Title: Communication Skills

Subject Code: 201

Teaching and Examination Scheme:

Teaching Scheme			Examination					
L	T	P	Full Marks.	External Exam Marks	Internal Exam Marks	External Pas Marks	Total Pass Marks	Duration of External Exams
03	1		100	80	20	26	40	3 Hrs

NOTE:
Internal marks will be allotted on the basis of two snap tests and 2 assignment of equal marks to be conducted by the faculty teaching the subject.

Rationale:

The Students have been already been exposed to the Language Skills pertaining to English, leading to a better understanding of English & use of grammar, developing a base for the language. Now with a view to achieve some mastery over the language & to develop Communication Skills, which is the main objective of this subject, the basic concepts of communication, Non-verbal and written skills have been Introduced.

Objectives:

The Students will be able to:

1) Understand and use the basic concepts of communication and principles of effective communication in an organized set up and social context.
2) Give a positive feedback in various situations, to use appropriate body language & to avoid barriers for effective communication.
3) Write the various types of letters, reports and office drafting with the appropriate format.

Contents: Theory

Chapter	Name of the Topic	Hours	Marks
01	**Introduction to communication:** 1.1 Definition, communication cycle., 1.2 The elements of Communication: sender- message – channel- Receiver –Feedback. 1.3 Concept of Communication Process. 1.4 Stages in the process: defining the context, knowing the audience, designing the message, encoding, selecting proper channels, transmitting, receiving, decoding and giving feedback. (Case lets.)	04	08
02	**Types of communication** 2.1 Formal Communication. 2.2 Formal: Types – a) Vertical Communication. b) Horizontal Communication. 2.3 Informal: Types – a) Diagonal Communication. 2.4 Verbal Vs Non-Verbal Communication. 2.5 Verbal: Types-a) Oral Communication. b) Written Communication. 2.6 Non-Verbal: Types- a) Body Language. b) Graphic Language.	06	10
03	**Principles of Effective Communication :** 3.1 Principles of Effective Communication. (One example each.) 3.2 Communication barriers & how to overcome them. 3.3 Developing effective messages: Thinking about purpose, knowing the audience, structuring the message, selecting proper channels, minimizing barriers & facilitating feedback. (Examples: Writing articles for newspapers, magazines.)	04	08
04	**Non verbal- graphic communication**: 4.1 Non- verbal codes: A- Kinesecs , B- Proxemics , C – Haptics D-Vocalics , E- Physical appearance. F -Chronemics , G –Artifacts. (One example each.) 4.2 Aspects of Body Language. Types of Body Language. (One example each.) 4.3 Interpreting visuals & illustrating with visuals like tables, charts & graphs.	06	12

05	**Formal written skills :** 5.1 Office Drafting: Circular, Notice, and Memo. 5.2 Job Application with resume. 5.3 Business correspondence: Enquiry, Order letter, Complaint letter, and Adjustment letter. 5.4 Report writing: Accident report, Fall in production, Progress Report,, Investigation Report. 5.5 Defining, Describing Objects &Giving Instructions. 5.5.1 Defining Objects- Appearance, It's Use. 5.5.2 Describing Objects- Purpose, Components, Functions, Applications. 5.5.3 Giving Instructions- Precise, Directive, Imagistic Statements of a futuristic stance.	10	20
06	**Oral Skills :** 6.1 Phonetics and Phonology - Introduction - Phonetics symbols - Consonants/vowels/Dipthongs - Stress and Intonation 6.2 Discussion Skills - Importance of group discussion - Leadership skills - Team management 6.3 Presentation Skills - Importance of presentation - Planning of presentation - Handling stage fright 6.4 Mock Interview - The Interview process - Pre-Interview preparation - Answering strategies	12	22
	Total	**42**	**80**

Assignments:

1. Communication Cycle (With the Help of Diagram) + Any two communication situations to be represented with the help of Communication Cycle. (Use Pictures)
2. Communication Situations (List of 5 Communication situations stating the type of communication viz; Vertical, Horizontal, Diagonal.
3. Barriers That Hinder a Particular Communication Situation. (State the type of barrier, and how to overcome them). (04 Caselets)
4. Writing articles (two) in keeping with the parameters of developing effective messages. (Collect samples from newspapers, articles, Internet and pate them in the assignment.)

5. Business Letters: a) Job Application with Resume. b) Enquiry Letter.
   c) Order Letter.
   d) Complaint Letter.
6. Non-Verbal Communication:
   a) Body Language: Five Illustrations of appropriate use of Body Language used on the part of student in formal and Informal setups. (Example- formal setup- classroom
   b) Graphic Language: Five Illustrations of the use of Signs, Symbols, Colours, Maps, Graphs, Charts in day to day life.
7. Presentation Skills: Select topic (current issues) and ask students to give a class presentation as per the principles of effective communication and paste these topics as an Non-Verbal Codes: Kinesics, Physical Appearance, Haptics. (Collect five pictures per group of five students on the above mentioned non-verbal codes, analyse and discuss them in the class. Ask the students to paste these pictures along with explanation in their individual files.

GUIDELINES: Teachers can make use of group discussions, class presentations, role plays, simulations, caselets, listen and repeat drills with the help of cassettes etc to give a hand on experience for students.

Students should maintain the Institute Files to write all the eight assignments with aprper Index and get it duly certified.

Books:

Sr. No.	Author	Title	Publisher
01	SBTE, Mumbai.	Text book of Communication Skills.	SBTE, Mumbai.
02	M.Ashraf Rizvi	Effective Technical Communication	Tata McGraw Hill Companies.
03	Krushna Mohan, Meera Banerji	Developing Communication Skills	Macmillan
04	Joyeeta Bhattacharya	Communication Skills.	Reliable Series
05	Jayakaran	Every ones guide to effective writing.	Apple Publishing.
06	Website: www.mindtools.com/page8.html-99k		
07	Website: www.khake.com/page66htm/-72k		
08	Website: www.BM Consultant India.Com		
09	Website: www.letstak.co.in		
10	Website: www.inc.com/guides/growth/23032.html-45k		

Course Name : 03 Years Diploma Engineering

Semester : Second

Subject Title : Engineering

Chemistry-II Subject Code : 204 / 207

Teaching and Examination Scheme:

Teaching Scheme			Examination					
L	T	P	Full Marks.	External Exam Marks	Internal Exam Marks	External Pas Marks	Total Pass Marks	Duration of External Exams
03			100	80	20	26	40	3 Hrs
Practical		2	50	40	10	13	20	4 Hrs

NOTE:

Internal marks will be allotted on the basis of two snap tests and 2 assignment of equal marks to be conducted by the faculty teaching the subject.

RATIONALE:

This syllabus of chemistry of 2^{ND} semester for all the branches of Diploma Engineering has been given the name "Engineering Chemistry". In this it is intended to make students learn about the Engineering Materials and their appropriate uses, Lubrication process and protection of machines in different working environments, quality of water and its treatment as per the requirement, corrosion and its control by various methods.

OBEJECTIVE:

The student will be able to:

1. Suggest the appropriate use of metals, alloys and non-metallic material in engineering.
2. Knowledge of corrosion of metal and control methods.
3. Knowledge of choosing suitable lubricants for smooth running machines.
4. Implementing the knowledge and utilization of water and water treatment to serve the requisites of a particular use.

Contents: Theory

Chapter	Name of the Topic	Hours	Marks
1.	**Electrochemistry:** Conductivity of Electrolytes – Concept of Ohms Law, Specific Conductance, Specific Resistance, Equivalent Conductivity & Molar Conductance, Variation of Specific, Molar and Equivalent Conductance with dilution. Concept of: Cell Constant, PH, POH and Buffer solution. Numerical based on PH and POH. Application of PH and Buffer solution.	**04**	**08**
2.	**Metals and Alloys** **2.1 Metals:** Definition of Metallurgy, Brief introduction of the terms involved in metallurgy. Metallurgy of Iron: Resources of Fe, Important Ores of Iron, Extraction process, Smelting in Blast Furnace, Chemical Reactions in Blast Furnace. Composition of Pig Iron. Engineering applications of Pig Iron, Cast Iron, wrought Iron or Malleable Iron. Metallurgy of Copper: Important ores of Copper, Extraction of Copper from chief ore. Engineering properties of Copper and applications. Metallurgy of Aluminium: Important Ores of Aluminium, Extraction of Aluminium from Alumina by Electrolytic Reduction Process, Electrolytic Refining of Aluminium, Engineering Properties of Aluminium & Uses. **2.2 Alloys:** **Ferrous Alloys** Various methods of steel making, Composition, Properties &Applications of Plain Carbon Steel (Low Carbon, medium Carbon, High Carbon & Very Hard Steel) & Effect of Various Alloying Elements (Cr, W, V, Ni, Mn, Mo, Si) etc. on Steel. **Non-Ferrous Alloys:** Copper Alloys–Brass, Bronze, Nickel Silver or German Silver, their Composition, Properties & Applications. Aluminium Alloys – Duralumin, Magnalium, their Composition, Properties & Applications Other Alloys: Definition, Compositions, Properties &Applications of Soft Solder, Tinmann's Solder, Brazing Alloy, Plumber's Solder, Rose Metal.	**12**	**24**

3	**<u>Non-Metallic Engineering Matrerial</u>** **3.1 Ceramics:** Definition, Properties & Engineering Applications, Types – Structural Ceramics, Facing Material, Refractories, Fine Ceramics, Special Ceramics. **3.2 Refractories:**	**06**	**12**

	Definition, Properties, Applications & Uses of Fire Clay Bricks, Silica Bricks and Masonry Bricks. **3.3 Composite Materials:** Definition, Properties, Advantages, Applications & Examples. **3.4 Adhesives:(Marks 4)** Definition, Characteristics, Advantages of adhesives, examples such as phenol-formaldehyde resin, urea formaldehyde resin, epoxy resin- their properties and applications as an adhesives.		
4	**Water:** Characteristics, Sources, Impurities, Hard & Soft Water, Causes of Hardness, Types of Hardness, Degree of Hardness, Boiler and Steam Generation, Scale & Sludge Formation – Causes, Disadvantage, Softening Methods such as Boiling, Clark's, Soda Ash, Lime Soda, Zeolite & Ion Exchange Methods with Principle Chemical Reactions. Plumbo solvency & its Removal. Numerical Problems.	**5**	**10**
5	**Corrosion:** Definition of Corrosion, Types of Corrosion (Dry and Wet chemical Corrosion) and their mechanism. Protection of metal from corrosion (Corrosion Control). Application of Protective Coatings like metal coating such as Galvanising, Tinning, Metal Spraying, Sherardizing, Electroplating and Metal Cladding. **Paints & Varnishes:** **Paints** Definition, Characteristics of Good Paint, Constituents & their functions & Examples, Methods of Applications. Introduction to Chemical Resistant Paints, Heat Resistance Paint, Cellulose Paint, Luminous Paints, Emulsion Paints, Metal Paints, Cement Paints, Water Paint or Distempers. **Varnishes:** Definition, Characteristics, Constituents, Types, Composition, Properties & Application of Japans, Enamels, Lacquers.	**09**	**16**

6	**Lubricant and Lubrication:** Lubricant – Definition, Classification with examples. Functions of lubricant, Lubrication – Mechanism of Lubrication (Fluid Film, Boundary and Extreme Pressure). Physical Characteristics of Lubricants Such as Viscosity, Viscosity Index, Oiliness, Volatility, Flash & Fire Point, and Cloud& Pour Point, Chemical Characteristics such as Acid Value or Neutralization Number, Emulsification, Saponification Value, Selection of Lubricants, Characteristics of Transformer oil.	**06**	**10**
	Total	**42**	**80**

List of Practical:

1	To determine neutralization point of Fatty Acid and ammonium hydroxide. Calculate normality and strength of Fatty Acids.
2	To determine the equivalent conductivity of precipitation of $BaCl_2$ with H_2SO_4 by titrating method. Also find the normality and strength of $BaCl_2$ Solution.
3	To verify Faraday's second law of electrolysis.
4	To determine PH of given solution by universal indicator and PH meter.
5	To determine the strength of given hydrochloric acid solution by titrating it against sodium hydroxide solution by using PH meter.
6	To determine thinner content in Oil paint.
7	To determine the flash and fire point of a given sample of lubricating oil.
8	To prepare Phenol formaldehyde resin (Backelite)
9	To determine viscosity of given lubricating oil.
10	To determine the alkalinity of given sample of water to decide the suitability of water for use in industry, steam generation, etc.
11	To determine degree of hardness of water by EDTA method to find the suitability of water in industrial and domestic use.
12	Study of fire clay bricks and furnaces.

Learning Resources Books:

Sl. No	Authors	Nameofthebook	Publisher
1	Jain& Jain	Engineering Chemistry	Dhanpat Raiand Sons
2	S.S. Dara	Engineering Chemistry	S. Chand Publication
3	B. K.Sharma	Industrial Chemistry	Goel Publication
4	S.S.Dara	Environmental Chemistry &Pollution Control	S. Chand Publication
5	Vedprakash Mehta	Polytechnic chemistry	Jain Brothers

Course Name : 03 Years Diploma in Engineering

Semester : Second

Subject Title : Engineering Mathematics-II

Subject Code : 202

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
L TH	T	P	Full Marks.	External Exam Marks	Internal Exam Marks	External Pas Marks	Total Pass Marks	Duration of External Exams
03	01		100	80	20	26	40	3 Hrs

NOTE:

Internal marks will be allotted on the basis of two snap tests and 2 assignment of equal marks to be conducted by the faculty teaching the subject.

Rationale:

The subject is extension of Engineering Mathematics - 1 of First Semester and stepping into the prerequisites to learn Applied Mathematics applicable in engineering solutions. Engineering Mathematics lay down the foundation to understand and express principles and laws involved in other technological subjects. The study of Engineering Mathematics will help to develop the skills essential for new emerging avenues.

Objective:

The student will be able to acquire knowledge of mathematical terms, concepts and principles. They can acquire sufficient mathematical techniques and can develop the ability to apply mathematical methods to solve technical and day to day practical problems.

Sub Objective:

This course is divided into five units. After completion of this course one could become able to learn the following.

1. Intuitive meaning of Function, Limit and Continuity for solving the problems
2. Differentiation and its meaning in engineering situations
3. Applications of the Differentiation

3.1 Understand the Geometrical Applications of Derivatives

3.2 Use Derivatives to find extreme values of functions

3.3 The concept of Derivatives as Rate Measure

3.4 Use Derivatives to find Radius of Curvature.

4. Basic terms of Statistics And Prob

5. Complex Number

5.1 Representation of Complex numbers in various forms

5.2 Definition of complex number, its operations and property.

5.3 De-Moivre's theorem (without proof) and simple problems.

Contents: Theory

Chapter	Name of the Topic	Hour s	Marks
01	**1. Function, Limit and Continuity** 1.1 Function ▪ Definition of variable, constant, intervals and their type ▪ Definition of Function, value of a function and types of functions, Simple Examples ▪ Definition of sinh x, cosh x and tanh x and some hyperbolic identities **1.2 Use the concepts of Limit for solving the problems** ▪ Explain the concept of limit and intuitive meaning of $\lim_{x\to a} f(x)=l$ and its properties. ▪ Derive the Standard limits $\lim_{x\to a}\frac{x^n-a^n}{x-a}$, $\lim_{x\to 0}\frac{\sin x}{x}$, $\lim_{x\to 0}\cos x$, $\lim_{x\to 0}\frac{\tan x}{x}$, $\lim_{x\to 0}\frac{a^x-1}{x}$, $\lim_{x\to 0}\frac{e^x-1}{x}$, $\lim_{x\to 0}(1+x)^{\frac{1}{x}}$, $\lim_{x\to\infty}\left(1+\frac{1}{x}\right)^x$ with simple example. ▪ Evaluate the limits of the type $\lim_{x\to a}\frac{f(x)}{g(x)}$. ▪ Explain the Concept of continuity of a function at a point and in interval with some examples whether a given function is continuous or not.	**06**	**12**

	2. Differentiation and its meaning in engineering situations ▪ Concept of derivative of a function y = f(x) from the first principle as $\lim_{h\to 0}\frac{f(x+h)-f(x)}{h}$ and Standard notations to denote the derivative of a function. ▪ Derivatives of elementary functions like x^n, a^x, e^x, log x, sin x, cos x, tanx, secx, cosecx, cot x and Invise Trigonometrical function using the first principles. ▪ Rules for differentiation of sum, difference, scalar multiplication, product and quotient of functions with illustrative and simple examples. ▪ Differentiation of a function of a function (Chain rule) with illustrative examples such as *(i)* $\sqrt{t^2+\frac{2}{t}}$ (ii) $x^2 \sin 2x$ (iii) $\frac{x}{\sqrt{x^2+1}}$ (iv) $\log(\sin(\cos x))$.etc ▪ Differentiation of a function with respect to another function and also differentiation of parametric functions with examples. ▪ Derivatives of some simple hyperbolic functions (without Proof). ▪ Differentiation of implicit function with examples. ▪ Logarithmic differentiation of some functions with examples like $[f(x)]^{g(x)}$. ▪ Concept of higher order derivatives (second and third order) with examples. ▪ Concept of functions of several variables, partial derivatives and difference between the ordinary and partial derivatives with simple examples.	**12**	**24**

	3. Applications of the Differentiation 3.1 Geometrical Applications of Derivatives ▪ State the Geometrical meaning of the derivative as the slope of the tangent to the curve y=f(x) at any point on the curve. ▪ Equation of tangent and normal to the curve y=f(x) at any point on it. ▪ The concept of angle between two curves and procedure for finding the Angle between two given curves with illustrative examples. 3.2 Use of Derivatives to find extreme values of functions ▪ The concept and condition of increasing and decreasing functions with illustrative examples. ▪ Find the extreme values (maxima or minima) of a function of single variable - simple problems yielding maxima and minima. 3.3 Concept of Derivatives as Rate Measure with illustraribe examples. 3.4 Concept of Derivatives to find Radius of Curvature with illustraribe examples.	**14**	**24**
	4. Statistics ▪ Measures of Central tendency (mean, median, mode) for ungrouped and grouped frequency distribution. ▪ Graphical representation (Histogram and Ogive Curves) to find mode and median ▪ Measures of Dispersion such as range, mean deviation, Standard Deviation, Variance and coefficient of variation. Comparison of two sets of observations.	**04**	**08**
	5. Complex Number. ▪ Represent the complex number in various forms like modulus-amplitude, polar form, Exponential (Euler) form – illustrate with examples ▪ Modulus, Conjugate and Argument of Complex Number and their properties. ▪ Operations on complex numbers (Equality, Addition, Subtraction, Multiplication and Division) with examples. ▪ Square root of complex number ▪ Cube roots of units and their properties, simple problems based on them. ▪ De-Moivre's theorem (without proof) and simple problems.	**6**	**12**
	Total	**42**	**80**

Tutorial: Tutorials are to be used to get enough practice for solving problems. It is suggested that in each tutorial at least five problems should be solved.

Learning Resources:

Books:

Sr. No	Title	Authors	Publications
1	Mathematics: A Textbook for Class XI Part I & II	National Council of Educational Research and Training	
2	Mathematics: A Textbook for Class XII Part I & II	National Council of Educational Research and Training	
3	Mathematics for Class XI Volume I and II	R. D. Sharma	Dhanpat Rai Publication, New Delhi.
4	Mathematics for Class XII Volume I and II	R. D. Sharma	Dhanpat Rai Publication, New Delhi.
5	Higher Engineering Mathematics	B.S Grewal	Khanna Publication, New Delhi
6	Higher Sr. Secondary School Mathematics for XI & XII	R.S. Agrawal	Bharti Bhawan, Patna

Note:
In board examination, question setter may be advised to select 20% questions of objective, 30% of short type and remaining 50% of long type based on basic concepts, formula and calculations respectively.

Course Name : 03 Years Diploma Engineering

Semester : Second

Subject Title : Engineering Physics-II

Subject Code : 203/ 206

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
L	T	P	Full Marks.	External Exam Marks	Internal Exam Marks	External Pas Marks	Total Pass Marks	Duration of External Exams
03			100	80	20	26	40	3 Hrs
Practical		2	50	40	10	13	20	4 Hrs

NOTE:

Internal marks will be allotted on the basis of two snap tests and 2 assignment of equal marks to be conducted by the faculty teaching the subject.

RATIONALE:

Basic science forms the foundation of Engineering. In particular Physics provides fundamental facts, principles, l aws, and proper sequence of events to streamline Engineering knowledge.

Objectives : The Student will be able to :

1. Analyze the basic properties of light.
2. Differentiate between field intensity and potential.
3. List the advantages of optical fibre.
4. Describe principal of working of optical fibre.
5. Differentiate between conductor, Insulator and semi conductor on the basis of band theory.
6. Know simple idea of Nano Technology.
7. Know simple idea of non conventional sources of energy.

Contents : Theory

Chapter	Name of the Topic	Hours	Marks
1.	**LIGHT** **Properties of light** Reflection, refraction, Snell's law, physical significance of refractive index, definition of dispersion of light along with ray diagram. **(Numericals on refractive index)**	**03**	**06**
2.	**Electric Field and Potential** **2.1 Electric field** Electric charge, Coulomb's inverse square law, Definition of unit charge, Electric field, Electric lines of force and their properties, Elect field intensity, Electric flux, Electric flux density. **(Numericals on Coulombs law, Electrical Intensity)**	05	08
	2.2 Electric Potential Concept of potential, Definition and unit, Potential due to point charge using integration method, Potential difference between two points, Definition of dielectric strength and breakdown potential. **(Numericals on electric potential)**	05	08
	2.3 Capacity & Condensers Electrostatics capacity & its S.I unit, Capacity of parallel plate condenser, Condensers in series & parallel (Formula only,no derivation), Uses of condensers. **(Simple problems)**	03	06
3	**CURRENT ELECTRICITY** Ohm's law, Resistance and its unit, Specific resistance, Factors affecting resistance, Kirchhoff's law and its application to Wheat stone bridge circuit.	03	08
4	**Fiber Optics** Introduction, Total internal reflection, critical angle, acceptance angle. Structure of optical fiber, Numerical Aperture, Fiber optic materials, Types of optical fibers, Applications in communication systems. **(Numerical on critical angle, numerical aperture)**	05	08
5	**Band Theory of Solids** Energy levels in solids, Valence & conduction bands, forbidden gap, Conductors, Semiconductors and Insulators,	05	08

	Intrinsic and Extrinsic Semiconductors, p-type and n-type semiconductors, P-N junction diode-forward and reversed biased characteristics.		
6	**MODERN PHYSICS.** **7.1 Photo electricity** Concept of photon, Plank's hypothesis, properties of photon, photo electric effect, Laws of photoelectric effect, work function, Einstein's photoelectric equation(no derivation), Basic Concept of Solar Energy. **(Numericals on Energy of photon, work function, photoelectric equation)**	03	06
	7.2 LASER Properties of laser, Characteristics and applications of Laser	01	04
	7.3 X-rays Introduction to X-rays, production of X-rays using Coolidge tube, minimum wavelength of X-rays, properties and applications. of X-rays **(Numericals on minimum wavelength of x-rays)**	02	06
7	**Introduction to nanotechnology** Definition of nanoscale, nanometer & nanoparticle, applications of nanotechnology- electronics, automobiles, medical, textile, cosmetics, environmental, space and defence.	03	06
8	**Non- Conventional Sources of energy** Introduction- Non Renewable and renewable (Alternate) energy sources, Examples- Solar Energy, Wind Energy, Tidal Energy, Geo-Thermal Energy and Bio-Mass. Advantages and disadvantages of renewable energy.	04	06
	Total	**42**	**80**

Practical :

Skills to be Developed : Intellectual Skills :

- Proper selection of measuring instruments on the basis of range, least count, precision and accuracy required for measurement.
- To verify the principles, laws, using given instruments under different conditions.
- To read and interpret the graph.
- To interpret the results from observations and calculations.
- To use these results for parallel problems.

Motor Skill :

- Proper handling of instruments.
- Measuring physical quantities accurately.
- To observe the phenomenon and to list the observations in proper tabular form.
- To adopt proper procedure while performing the experiment.

List of Experiment :

1. To represent simple harmonic motion with the help of vertical oscillation of spring to determine spring constant (K) (Stiffness Constant).
2. To determine time period of oscillation of compound bar pendulum and calculate acceleration due to gravity (g).
3. To calculate refractive index of material of prism using spectrometer device.
4. To determine effective capacitance of series and parallel combination of capacitors by calculating its reactance.
5. Verification of Ohm's Law.
6. To convert galvanometer into ammeter of required range using appropriate value of shunt.
7. To verify Total Internal Reflection (TIR) phenomenon for given glass slab and to calculate critical angle of incidence.
8. Determination of Energy Gap (Forbidden Gap) of a semi-conductor.
9. To determine I-V characteristics of P-N junction Diode.
10. To verify inverse square law by using photoelectric cell.

Learning Resources:

Sr. No.	Author	Title	Publisher
01.	Arthur Beiser	Applied physics	Tata McGraw-Hill
02.	R.K.Gaur and S.L.Gupta	Engineering Physics	Dhanpatrai and Sons.
03.	Rensic and Halliday	Physics	Wiley publication
04.	Dr. S.K. Kulkarni	Nanotechnology- Principles and practices	Capital publishing company
05.	S.K.Gupta	ABC of Physics	Modern Publisher New Delhi
06.	A.S. Vasudeva	Senior Practical Physics	S.K.Kataria & Sons.
07.	Core Physics-II	A. Kumar	Bharti Bhavan
08.	Pradeep's Fundament al Physics-XII	K.L. Gomber & K.L Gogia	Pradeep Publication
09.	S. Chand's Principles of Physics-XII	V.K Mehta & Rohit Mehta	S. Chand Publication
10.	Dinesh New Millennium Physics-XII	S. K Sharma	Dinesh Publication

Course Name : 03 Years Diploma in Engineering

Semester : Second

Subject Title : Professional Practice-I

Subject Code : 210

Teaching and Examination Scheme:

Teaching Scheme			Examination					
L TH	T	P	Full Marks.	External Exam Marks	Internal Exam Marks	External Pas Marks	Total Pass Marks	Duratio n of External
			50	30	20	---	25	---

Rationale:

Most of the diploma holders are employed in industries. Due to globalization and competition in the industrial and service sectors the selection for the job is based on campus interviews or competitive tests.

While selecting candidates a normal practice adopted is to see general confidence, ability to communicate and attitude, in addition to basic technological concepts.

The purpose of introducing professional practices is to provide opportunity to students to undergo activities which will enable them to develop confidence. Industrial visits, expert lectures, seminars on technical topics and group discussion. These are planned in the semester so that there will be increased participation of students in learning process.

Objectives:

Student will be able to:

1. Acquire information from different sources.
2. Prepare notes for given topic.
3. Present given topic in a seminar.
4. Interact with peers to share thoughts.
5. Prepare a report on industrial visit, expert lecture.

Sr. No.	Activity
1	**Industrial Visits:** Structured industrial visits be arranged and report of the same should be submitted by the individual student, to form part of the term work. Visits to any two of the following : i) Construction site for residential / Public building. ii) Petrol Pump iii) Media Center iv) Small Scale industry. v) Domestic Appliances repair centre vi) Visit public utility place
2	**Lectures by Professional / Industrial Expert to be organized on any three topics of the following suggested areas or any other suitable topics:** i) Pollution control. ii) Fire hazards due to short circuits iii) Fire Fighting / Safety Precautions and First aids. iv) Vedic Mathematics and Abacus. v) Topics related to Social Awareness such as –Traffic Control System, Career opportunities , Communication in Industry, Yoga Meditation, Aids awareness and health awareness
3	**Group Discussion :** The students should discuss in group of six to eight students and write a brief report on the same as part of term work. The topic for group discussions may be selected by the faculty members. Some of the suggested topics are - i) Sports ii) Cultural iii) Discipline and House Keeping iv) Current topic related to Electrical Engineering field.

4	**Literature Survey** Student will be provided an emerging engineering topic for literature survey from Internet and other media. Based on inputs on the topics students will prepare a report and submit the sample for evaluation after due presentation before the faculty.
5	**Presentation preparation and demonstration on live sociao economics technical aspects.** Students in batch of maximum 5 numbers are expected to prepare a power point presentation on a topic with minimum of 20 slides. The topics can be from the following: **a.** Rural vs urban divide **b.** Make in India **c.** Gender equality **d.** Satellite launching programs of India **e.** Global Stake in Economics of India **f.** Super power in making: India **g.** Bottom of the pyramid **h.** Social Responsibility of Individual **i.** Swachh Bharat ABhiyan **j.** Namami Gange Project **k.** Digital India

Course Name : 03 Years Diploma in Engineering

Semester : Second

Subject Title : Programming in C

Subject Code : 205/208

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
L	T	P	Full Marks.	External Exam Marks	Internal Exam Marks	External Pas Marks	Total Pass Marks	Duration of External Exams
03	0		100	80	20	26	40	3 Hrs
Sessional		2	50	30	20		25	3 Hrs

NOTE:

Internal marks will be allotted on the basis of two snap tests and 2 assignment of equal marks to be conducted by the faculty teaching the subject.

Rationale :

These days computer knowledge is essential for engineers. Analysis and logical development of basic entities is any engineering field requires software development which in turn requires a programming tool. The best opted tool for program development paving way for software is C language these days. The advancement of C and subsequent program development utilising the concepts of strings arrays decision making in unconditional and conditional manner is required.

Objectives:

1. Development of flowcharts/algorithms for engineering problem solutions.
2. Structural modular program development for software implementation.
3. Working upon a statistical attributes on different aspects of engineering problem for arriving at best suited solutions.
4. Decision making in various atmosphere and conditions.
5. A tool for better learning and grasp of basics.

Chapter No.	Contents	Hours	Marks
01	**Basics of C** 1.1 Introduction to number system 1.2 Introduction to flowchart and algorithm 1.3 History of C, where C stands 1.4 C character set ,tokens ,constants ,variables, keywords 1.5 C operators (arithmetic, Logical, assignment, relational, increment and decrement, conditional, bit wise, special, operator precedence),C expressions data types. 1.6 Formatted input, formatted output.	**06**	**12**
02	**Decision making** 2.1 Decision making and branching if statement (if, if-else ,else-if ladder, nested if-else) Switch case statement ,break statement. **2.2** Decision making and looping while, do, do-while statements for loop, continue statement**.**	**06**	**10**
03	**Arrays and Strings** 3.1 Arrays Declaration and initialization of one dimensional, two dimensional and character arrays, accessing array elements. 3.2 Declaration and initialization of string variables, string handling functions from standard library (strlen(), strcpy(), strcat(), strcmp()).	**08**	**16**

04	**Functions, Structures** 4.1 Functions Need of functions, scope and life time of variables, defining functions, function call (call by value, call by reference), return values, storage classes. category of function (No argument No return value, No argument with return value, argument with return value), recursion 4.2 Structures Defining structure, declaring and accessing structure members, initialization of structure, arrays of structure.	**08**	**16**
05	**Pointers** 5 Understanding pointers, declaring pointer variable, initialization of pointer variable, accessing address of a variable, pointer expressions, Pointers arithmetic, pointers and arrays, array of pointers	**08**	**16**
06	**File Handling** File System Basics, opening and closing of files, reading and writing in files, File opening modes, string I/O in files.	06	**10**
	Total	42	**80**

List of Experiments

Exp. -1: Introduction to C compiler

Exp. -2: Simple basic program in C language using unconditional branching statements.

Exp. -3: Development of C program using conditional branching and subroutines.

Exp.-4 : Development of program for functions.

Exp. – 5 : Development of program in c for operation of one dimensional arrays.

Exp. – 6 : Development of program in c for operation of Multi-dimensional arrays.

Exp.- 7: Development of program in C for display using in different modes.

Exp.-8: Development of program in C for operation on structures.

Exp.-9 : Development of program in C for operation on pointers.

Exp.-10: Development of program in C for file handling.

Course Name : 03 Years Diploma in

Engineering Semester: Second

Subject Title : Workshop- II

Subject Code : 209

Teaching and Examination Scheme:

Teaching Scheme			Examination					
L TH	T	P	Full Marks.	External Exam Marks	Internal Exam Marks	External Pas Marks	Total Pass Marks	Duration of External Exams
		4	50	30	20	--	25	---

Rationale:

Engineering diploma technicians are expected to know basic workshop practice with special reference to Gas and arc Welding, Gas cutting, Drilling, Tapping, Plumbing and Hot Working Processes. The students are required to select and use various tools and equipments for welding, fitting, tapping drilling, plumbing and forging operations.

Objectives:

The student will able to:

- Know basic workshop processes.
- Read and interpret job drawings.
- Identify, select and use various marking, measuring, and holding, striking and cutting tools & equipments wood working and sheet metal shops.
- Operate, control different machines and equipments.
- Select proper welding rods and fluxes.
- Inspect the job for specified dimensions
- Produce jobs as per specified dimensions.
- Adopt safety practices while working on various machines.

Notes: 1] The F a c u l t y / Instructor shall give demonstration to the students by preparing a specimen job as per the job drawing.

2] The workshop diary shall be maintained by each student duly signed by F a c u l t y / Instructor of respective shop.

CONTENTS: Subject practical content as shown in the table below: Skill to be develop.

Intellectual Skills:

1. Ability to read job drawings.
2. Ability to identify and select proper material, tools and equipments and machines.
3. Ability to select proper parameters (like cutting speed, feed, depth cut use of lubricants) in machine.

Motor Skills:

1. Ability to set tools, work piece, and machines for desired operations.
2. Ability to complete job as per job drawing in allotted time.
3. Ability to use safety equipment and follow safety procedures during operations.
4. Ability to inspect the job for confirming desired dimensions and shape.
5. Ability to acquire hands-on experience

Sr. No.	Details of Syllabus	Job	Theory	Practice
01	**HOUSE WIRIING AND ELECTRICAL FITTING** 1. Introduction 2. Various types of electrical wiring 3. Safety precautions 4. Preparation of different type of joints 5. Wiring of two way switching system 6. Wiring of two bulb, one fan one power point with a fuse connection. 7. Introduction to commonly used equipments, earth resistance measurement 8. Fault finding and repairing of common household appliances	03	02	10
02	**Electronics** 1. Introduction to different types of components 2. Soldering practice 3. Soldering of a pyramid 4. Soldering of a battery eliminator circuit/charger 5. Soldering on PCB 6. Introduction to desoldering and practice 7. Introduction to CRO and other electronic measuring instrument	03	02	10
03	**WELDING SHOP** 1. Introduction to equipments and accessories used in welding 2. Gas, Arc, Spot, welding practice 3. Lap welding practice 4. Butt welding practice 5. Spot welding practice	03	04	12
04	**PLUMBING SHOP** 1. Introduction. 2. Various marking, measuring, cutting, holding and striking tools. 3. Different types of G.I. & PVC pipes, flexible pipes used in practice. 4. Piping layout. 5. G.I. & PVC pipes fittings and accessories, Adhesive solvents- chemical action,	03	03	12

05	**Black Smithy Shop** 1. Introduction to tools and techniques 2. Preparation of commonly used instruments such as flat chisel, ring, screw driver.	03	03	
		Total 15	**14**	**56**

Skill to be developed:

Intellectual Skills:

1. Ability to read job drawing
2. Ability to identify and select proper material, tools, equipments and machine.
3. Ability to select proper parameters (like cutting speed, feed, depth cut use of lubricants) in machine.

Motor Skills:

1. Ability to set tools, work piece, and machines for desired operations.
2. Ability to complete job as per job drawing in allotted time.
3. Ability to use safety equipment and follow safety procedures during operations.
4. Ability to inspect the job for confirming desired dimensions and shape.
5. Ability to acquire hands-on experience.

01	**TURNING SHOP** Note: 1] One job related to Plane and Taper turning, threading and knurling 2] One job related to Drilling and tapping 3] Batch size should be selected depending on volume of work. 4] Job allotted should comprise of 6-8 hours of actual working 5] Student shall calculate the cost of material and labor cost for their job from the drawing.
02	**WELDING SHOP** **Note:** 1] One job of standard size (Saleable/marketable article shall be preferred) 2] Batch size should be selected depending on volume of work . 3] Job allotted should comprise of 6-8 hours of actual working operations. 4] Student shall calculate the cost of material and labor required for their job from the drawing.
03	**PLUMBING SHOP** • Demonstration of PVC pipe joint with various fittings. • Exercise for students on preparing actual pipeline layout for PVC pipe. Preparing actual drawing and bill of material.

(Note: Utility item are not to be assessed

Books:

Sr. No.	Author	Title	Publisher
01	S.K. Hajara Chaudhary	Workshop Technology	Media Promotors and Publishers, New Delhi
02	B.S. Raghuwanshi	Workshop Technology	Dhanpat Rai and Sons, New Delhi
03	R K Jain	Production Technology	Khanna Publishers, New Delhi
04	H.S.Bawa	Workshop Technology	Tata McGraw Hill Publishers,New Delhi
05	--	Kent's Mechanical Engineering Hand book	John Wiley and Sons, New York

Video Cassettes / CDS

- Learning Materials Transparencies, CBT Packages developed by NITTER Bhopal.

RADHA GOVIND UNIVERSITY
RAMGARH, JHARKHAND

Department of Mining Engineering

Under Faculty of Engineering and Technology

Choice Based Credit System Curriculum for
Diploma in Engineering

SEMESTER III

(Effective from Academic Session 2022-23)

Scheme of Teaching and Examination for

3rd Semester of 3 Years Diploma in Mining Engineering

Duration of Semester : **06 Months**
Student Contact Hours : **36 Hrs**
Total Marks : **800**
Effective from : **2022 -23 Session**

S. NO.	Name of Subject	Subject Code	Subject	Teaching Scheme			Examination Scheme					
				L	T	P	Hours of Exam	Credit	Full Marks	Final Exam /End Sem marks	Internal Assessment	Pass Marks
1.	Mathematics-III	301	Theory	3			3	4	100	80	20	40
2.	Introduction to Mining	MIN303	Theory	3			3	3	100	80	20	40
3.	Mine Surveying-I	MIN304	Theory	3			3	3	100	80	20	40
4.	Mine Geology-I	MIN305	Theory	3			3	3	100	80	20	40
5.	Engineering Mechanics	MIN306	Theory	3			3	3	100	80	20	40
6.	Mine Surveying-I Lab	MIN307	Practical			2	4	2	50	40	10	20
7.	Mine Geology-I Lab	MIN308	Practical			2	4	2	50	40	10	20
8.	Engineering Mechanics Lab	MIN309	Practical			2	4	2	50	40	10	20
9.	Practical Training Report-I	MIN310	Sessional					4	100	60	40	50
10.	Development of Life Skills	302	Sessional			2		4	50	30	20	25
			TOTAL	15		8		30	800			

Note:

1. Period of Class hours should be of 1 hrs duration as per AICTE norms.
2. Remaining Hrs every week has been marked for students for Library and Student Centered Activities.
3. Drawing / Graphics / Practical / Sessional examinations will be held at parent institution.
4. Board will depute examiner for Practical examination.
5. Regarding sessional examination the parent institution will form a three member committee and this committee will examine the sessional records and hold viva of the examinee for 60 % marks allotted to the subject. Marks for remaining 40 % will be provided by the Faculty concerned on the basis of evaluation of each job / work throughout the semester

Diploma in Mining Engineering

Semester: 3rd SEM
Subject Title: Mathematics-III
Subject Code: 301

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
L TH	T	P	Full Marks.	External Exam Marks	Internal Exam Marks	External Pass Marks	Total Pass Marks	Duration of External Exams
03	01		100	80	20	26	40	3 Hrs

NOTE: Internal marks will be allotted on the basis of two snap tests and 2 assignment of equal marks to be conducted by the faculty teaching the subject.

Rationale:

The subject is extension of Engineering Mathematics – 1 & 2 of First year and stepping into the prerequisites to learn Applied Mathematics applicable in engineering solutions. Engineering Mathematics lay down the foundation to understand and express principles and laws involved in other technological subjects. The study of Engineering Mathematics will help to develop the skills essential for new emerging avenues.

Objective:

The student will be able to acquire knowledge of mathematical terms, concepts and principles. They can acquire sufficient mathematical techniques and can develop the ability to apply mathematical methods to solve technical and day to day practical problems and to execute management plans with precision.

Course Objective:

This course is divided into five units. After completion of this course one could become able to learn the following.

1. Intuitive meaning and Methods of finding integration definite integration and its properties.
2. Application of Integration in finding Area, volume of irregular shapes.
3. Methods of solving differential equation of first order and first degree.
4. Methods for finding approximate roots by using bisection, Regula-falsi, Newton- Raphson method, Gauss elimination, Jacobi and Gauss- Seidal methods.
5. Use of Binomial, Normal and Poisson distributions for solving different examples.
6. Use of Laplace transform for solving problems of Differential Equations.
7. Use of Fourier series for expansion of function at the given intervals

Chapter	Name of the Topic	Hours	Marks
01	**Integration:** 1.1 Definition of integration as anti-derivative. Integration of standard function. 1.2 Rules of integration (Integrals of sum, difference, scalar multiplication). 1.3 Methods of Integration. 1.3.1 Integration by trigonometrical transformation. 1.3.2 Integration by substitution 1.3.3 Integration by parts. 1.3.4 Integration of rational and irrational functions. 1.3.5 Integration by Partial fractions.	7	16
	1.4 Definite Integration. 1.4.1 Concept of definite integrations with examples. 1.4.2 Properties of definite integral with simple problems.	3	
	1.5 Applications of definite integrals. 1.5.1 Area under the curve. 1.5.2 Area bounded by two curves.	3	
02	**Differential Equation** 2.1 Definition of differential equation, order and degree of differential equation. Formation of differential equation. 2.2 Solution of differential equations of first order and first Degree such as variable separable form, reducible to Variable separable, Homogeneous and Linear Differential Equation.	6	16
	2.3 Applications of Differential equations. 2.3.1 Rectilinear motion (motion under constant and variable acceleration) 2.3.2 Newton's Law of Cooling	3	
03	**Numerical Methods** **3.1 Solution of algebraic equations** Bisection method, Regula falsi method and Newton– Raphson method.	3	16
	3.2 Solution of simultaneous equations containing 3 unknowns		

	3.2.1 Gauss elimination method. 3.2.2 Jacobi's Iterative method. 3.3.3 Gauss Seidal method.	3	
	3.4 Numerical Differentiation & Integration. 3.4.1 Newton's forward and backward difference formulae for first and second order differentiation at any point. 3.4.2 Numerical integration Trapezoidal rule and Simpson's 1/3rd rule.	3	
04	**4.1 Probability:** 4.1.1 Definition of random experiment, sample space, event occurrence of event and types of events (impossible, mutually exclusive, exhaustive, equally likely) 4.1.2 Definition of probability, addition and multiplication theorems of probability.	05	16
	4.2 Probability Distribution 4.2.1 Binomial distribution. 4.2.2 Poisson's distribution. 4.2.3 Normal distribution 4.2.4 Simple examples based on above .	05	
05	**Laplace Transform** **5.1** Definition of Laplace transforms Laplace transform of standard functions. 5.2 Properties of Laplace transform such as Linearity, first shifting, second shifting, multiplication by t^n, division by t. 5.3 Inverse Laplace transforms. Properties-linearly first shifting, second shifting. Method of partial fractions,	3	16
06	**Fourier Series** 6.1 Definition of Fourier series (Euler's formula). 6.2 Series expansion of continuous functions in the intervals $(0,2l),(-l,l),(0,2\pi),(-\pi,\pi)$	3	
07	Linear Programming **7.1** Introduction **7.2** Solution of Linear Programming problem (LPP) by Graphical Method.	3	
	TOTAL	56	80

Learning Resources:

Text Book:

Sr. No	Title	Authors	Publications
1	Higher Engg. Mathematics	B. S. Grewal	Dhanpat Rai

Ref. Books:

Sr. No	Title	Authors	Publications
1	Engineering Mathematics	H.K.Das	S.Chand & Company LTD, New Delhi
2	Higher Engineering Mathematics	B.V,Ramana	Mcgraw Hill Education (India) Private limited , New Delhi
3	Practical Mathematics	I.B. Prasad	Khanna
4	Introductory Method of Numerical Analysis	S.S.Shastri	P.H.I
5	Linear Programming	G. Hadley	
6	A text book for class 12, Part- I & II	NCERT	NCERT, Delhi

Note:

In board examination, question setter may be advised to select 20% questions of objective, 30% of short type and remaining 50% of long type based on basic concepts, formula and calculations respectively.

Course Outcomes :

After studying the contents of the syllabus in detail the students will be able to:-

1. Integrate algebraic equation using rule of basic integration.
2. Solve by direct integration method Linear equation of first order including Homogeneous and Non-homogeneous Linear equations and also method of separation of variables.
3. Understand discrete and continuous probability distribution and be able to find mean and standard deviation and use the Uniform distribution.
4. Define (mathematically) Unit step, Unit impulse, Laplace transforms, its properties, Inverse and applications to solve ordinary differential equations.
5. define Fourier series including half range series, Harmonic analysis and variety of its applications.

Diploma in Mining Engineering

Semester: 3rd SEM
Subject Title: Introduction to Mining
Subject Code: MIN303

Course Objectives:

1. The students are expected to enhance the technical knowledge on exploratory drilling, drivage of inclines, Adits and shaft sinking
2. The students are expected to possess ability to identify, formulate and solve engineering problems in drilling and shaft sinking.
3. The students are expected to possess ability to use the techniques, skills, and modern engineering tools necessary for mine development practices.
4. Work effectively as an individual and as a member of a multidisciplinary team.

UNIT -I Introduction to Mineral & Important Mining Organizations

Definition of minerals. Uses of important minerals mined e.g. Coal, Iron ore, copper, zinc, bauxite, gold, manganese, mica, uranium etc. Important Organizations involved like DGMS, IBM, GSI, CIL, MECL, CIMFR, CMPDIL etc. their role and functions.

UNIT -II Mining Terminology & Definition.

Common terminologies used in coal mining. Common terminologies used in metal mining. Common terminologies used in mine ventilation and environment. Common terminologies used in mine supports. Simple definition, explanation, purposes and sketches.

UNIT -III Explosives & Accessories

Common explosive bases, Properties of Explosives, High Explosive & Low explosive, their Comparison. Permitted explosives their types, composition, properties, uses, advantages & Disadvantages. Brand names of some commonly used explosive of each type. A detonator, common Types of detonators, Plain detonators, instantaneous and delay action detonators their construction, Uses, comparison etc. Low tension & high-tension detonators. Safety fuses, detonating cords, Detonating relays. Exploders.

UNIT -IV Shot Firing

Drilling patterns for shot firing on machine cut face, in stone drift etc. Shot firing tools Face preparation for shot firing, Preparation of priming charge, charging of hole in coal and rock in Under Ground working only, Direct and inverse initiation, shot firing circuits, procedure of shot firing of holes in gassy mine, precautions. Simultaneous & delay firing. Solid blasting, conditions to be satisfied before Doing solid blasting, advantages of solid blasting, drilling patterns used with Solid Blasting

UNIT -V Introduction to coal mining method.

Classifications of method of working Board & Pillar Open cast method. Long wall. Applicability condition for selection of each methods of working. Layout of each method. Advantages & disadvantages

REFERENCE BOOKS:

Author	Title	Year of Publication	Publisher
G.K. Pradhan	Explosive and Blasting Techniques	1996	Mintech publication Bhubaneswar.
S.K. Das	Explosives and Blasting Techniques	1993	Lovely Prakashan Dhanbad.
D.J. Deshmukh	Mining Technology Vol.- I	1995	Central techno publication, Nagpur

Course Outcomes:

After undergoing the course of study the student shall be able to

1. State the various organizations engaged in coal and noncoal mining, their role and functions.
2. Understand various technical terms, operations involved in coal & noncoal mining.
3. Understand properties of explosives, procedure of conducting shot firing operation in underground coalmines with due regards to safety.
4. Understand the procedure of erection of temporary supports in underground coalmines.
5. State the major method of extraction of coal used in underground coal mines, their conditions of applicability.

Diploma in Mining Engineering

Semester: 3rd SEM
Subject Title: Mine Surveying-I
Subject Code: MIN304

Course Objectives:-

1. The students are expected to enhance the technical knowledge on linear measurements by chain surveying & tape surveying, compass surveying and plane table surveying.
2. The students are expected to possess ability to identify, formulate, and solve engineering problems in leveling.
3. The students are expected to posses ability to use the techniques, skills and modern engineering tools necessary for mine surveying.
4. Work effectively as an individual and as a member of multidisciplinary team.

UNIT -I Introduction To Surveying.

Definition of surveying, objects of surveying, Plane and Geodetic surveying. Classification & Basic Principles of surveying.

Chain Surveying:
Principle of chain surveying. Equipment in chain surveying, cross staff, optical square its principle Different operations in chain surveying,

Ranging:
Direct & reciprocal ranging. Line ranger structure principle of working and its use.

Chaining:
Chaining on flat & slopping ground, obstacle in chaining (No numerical). Errors in changing. Offsetting.

UNIT -II Compass Surveying.

The Prismatic & Surveyors compass, their Comparison.
Bearing of a line: Definitions: True & Magnetic Meridian; True and Magnetic bearings, Fore & Back bearings, Declination. Whole circle bearing system & Quadrantal Bearing system.
Conversion of bearings from one system to other. Calculation of angles from bearings. Calculation of bearings from angles.
Local attraction: Sources, detection & its elimination. Magnetic Dip & Magnetic declination. Calculation of True bearings.
Traversing with compass: Closed and open traverse; plotting a compass traverse; Checks for open & Closed traverse; Closing error, Graphical adjustment of closing error.

UNIT -III Plane Table Surveying

Introduction, Plane table and its accessories, Temporary adjustments of Plane table, centering, Levelling. Orienting the plane table by method of back sighting by method of magnetic needle. Methods of plane tabling Radiation, Intersection, Traversing, Resection method. Advantages & Disadvantages of plane table survey, Errors in plane table survey.

UNIT -IV Levelling

Definitions of the terms used in Levelling. Concept of datum, Back sight, Foresight stations, change Point, height of instrument. Dumpy and tilling level Construction and temporary adjustments Levelling staff, their types balancing of back sight and Fore sight distances Holding and Reading the staff, simple and differential levelling, and booking of readings.
Reduction of Levels by Collimation System and by Rise and Fall System. Arithmetic Check, Computation of Missing Readings.

Classification of Levelling: Differential, Reciprocal, and Fly Levelling, Profile Levelling, Cross-Sectioning. Plotting of a Profile and Cross-Section. Difficulties in Levelling, Common mistakes in Levelling. Permanent adjustments of Dumpy & Tilting Level. Study and use of level: Auto set level, Temporary adjustments.

UNIT -V Contouring

Introduction and concept, definitions, purpose, Characteristic of Contour line, contour interval, Factors affecting contour interval, Horizontal equivalent. Methods of locating contours Direct method, Indirect method. Interpolation of contours by estimation, arithmetical and by graphical method. Plotting of contour maps. Uses of contour map.

Reference Books:

Author	Title	Year of publication	Publisher
T. P. Kanetkar & S. V. Kulkarni	Surveying and leveling Vol. I & II	1995	Pune Vidyapith Griha Prakashan Pune.
B.C. Punmia	Surveying-I & II		
Amarjit Aggarwal.	Surveying & Levelling	1992	H.Tata International Publication, Delhi- 51

Course Outcomes:

Students will be able to:-

1. Acquire skills of using various survey instruments.
2. Develop skills of preparation of mine plan & section.
3. Understand and apply principles and method of survey to conduct subsidence survey.
4. Carryout and suggest the repairs needed to survey instruments.
5. Understand and apply various statutory provisions of regulation while preparing mine plan & section.

Diploma in Mining Engineering

Semester: 3rd SEM
Subject Title: Mine Surveying-I Lab
Subject Code: MIN307

LIST OF EXPERIMENTS:

1. Demonstration of measuring chain, tape, ranging road, peg, arrow, optical square, line ranger.
2. Laying and ranging a chain line and taking offsets by tape on either side.
3. Chain and cross-staff survey for finding out area of a given field.
4. Perform temporary adjustment of prismatic compass and observing fore & back bearing and calculation of included angles from observed bearings.
5. Measure fore & back bearing of five sided closed traverse, identify stations affected by local attraction and calculate corrected bearings.
6. Methods of plane Tabling- orientation of plane table by back sighting and locating details by intersection method.
7. Demonstration of Dumpy level and tilting level.
8. Carrying out, Temporary adjustments of dumpy level and conduct simple levelling, recording readings in levelling book and apply arithmetic check.
9. Differential levelling with Dumpy level- recording in level book, reduction of levels by both Methods, apply arithmetic check.

Diploma in Mining Engineering

Semester: 3rd SEM
Subject Title: Mine Geology-I
Subject Code: MIN305

Course Objectives:

1. To Study the formation of earth sphere.
2. To provide knowledge on the structural Chemical and physical characteristics of minerals.
3. To Study the Petrographic characteristics, components, detailed chemical composition and The different mineral that make up the Rocks.
4. To Classify common physical properties and differentiate mineral and rocks.
5. To provide a good understanding of how Earth's rocks deform at different levels of Lithosphere.
6. To determine the nature, location and extent of coal resources in a particular situation.

UNIT-I

General geology: Branches, Sub branches, scope, origin of earth, continental Drift, Isostacy. Mineralogy: Definition, Classification of minerals and Physical and Chemical Properties of Minerals, properties of common minerals like Quartz, feldspar, Mica, Pyrite, Chalcopyrite, Galena, Hematite, Magnetite, Chromite, Psilomelane etc.

UNIT-II

Petrology: Igneous rocks: Magma and Lava, extrusive and intrusive forms. Classification and description of common igneous rocks (Granite, Dolerite, Gabbro, Basalt, Pegmatite)
Sedimentary Rocks: Sedimentation process; classification and description of common sedimentary rocks (Conglomerate, sandstone, shale, Limestone).Metamorphic Rocks: Process of metamorphism, classification & description of common metamorphic rocks (Slate, Marble, Quartzite, Gneiss, Schist)

UNIT- III

Physical Geology: Erosion & weathering, River& wind erosion, Earth quake, Volcano
Geological Map: Drawing of Geological section of maps, Description of Geological maps, characteristics of contour line.

UNIT- IV

Structural Geology: Strike and Dip, Apparent Dip and True Dip, Dip-Strike Problems, Folds-Classification & Recognition in Field, Faults-Classification & Recognition in Field, Unconformity-Classification & Recognition in Field, Joints and Cleavages, Outlier and Inlier.

UNIT- V

Coal Geology: Physical & chemical properties, Origin, occurrence and distribution, Ranks of coal Banded constituents of coal. Structural features of coal seam. Commercial classification of coal.

Reference Books :

1. A text book of Geology, P.K. Mukherjee
2. Physical Geology, A.K. Dutta
3. Structural Geology, S.W. Chiplonkar

Course Outcome:

1. The students are expected to enhance the technical knowledge on shape, Size, mass & density of Earth, earth, age of structure of the earth.
2. This Course is designed to give students a fundamental understanding of various minerals.
3. The Students are able to classify different types of Rocks and their relationship.
4. Students are able to identify common Rocks & Minerals and Interpret how they form.

Diploma in Mining Engineering

Semester: 3rd SEM
Subject Title: Mine Geology-I Lab
Subject Code: MIN308

LIST OF EXPERIMENTS:

1. Identification of Minerals in Sets, Colour, Forms, Cleavage, Fracture, Lusture, and Strike using Mohr's scale, Hardness.
2. Identification of Various Minerals on the basis of physical Properties in hand specimens.
3. Identification of Igneous Rocks in hand specimen
4. Identification of Sedimentary Rocks in hand specimen.
5. Identification of Metamorphic Rocks in hand specimen.
6. Measure the Dip and Strike of Inclined Plane using Bronton Compass.

Diploma in Mining Engineering

Semester: 3rd SEM
Subject Title: Engineering Mechanics
Subject Code: MIN306

Course Objectives:

Mechanics mainly deals with problems connected with motion or equilibrium of material and bodies and resulting interaction between them. Its purview come varieties of general and specialized engineering discipline connected with mining structures, machine mechanism or their parts.

Basic understanding of the concept and principles involved in mechanics is essential. Application of the principles to engineering situation relevant to mining should be emphasized.

UNIT -I Basic Concept

Introduction of Engineering Mechanics, Rigid bodies, Basic and derived units, Kinetics and Kinematics, Scalar and Vector quantities, System of units, International system of units.

UNIT -II Force, Resolution & composition of forces

Definition of force, unit of force, Effect of force Absolute and gravitational unit, characteristics of a Force, System of forces, Coplanar and on Coplanar forces, concurrent and non-concurrent forces, Parallel forces
Laws of forces, parallelogram law of Forces, Triangle Law of Force, Law of polygon of forces, Principle of physical impedance of force, Principle of Transmissibility.
Composition of forces, Resolution of forces, Forces acting in a various Quadrants.
Definition of moments and its units in SI System, Types of Moment, Definition of Couple, type of Couple, varignon's theorem of moments, Resultant &Equilibrant force.

UNIT -III Equilibrium

Definition of Equilibrium Laws of Equilibrium, Analytical condition of equilibrium, Graphical conditions of equilibrium, Finding reaction of simply supported, overhang beams graphically, Free body diagrams, equilibrium of parallel forces & non parallel forces.
Lami's Theorem and its application
Beam reactions –Definition of beam, span. Types of beams, simply supported beam carrying concentrated loads and uniformly distributed loads.

UNIT -IV Friction

Concept of friction, Importance of friction in engineering. Useful and harmful effects of friction, Types of friction, Laws of friction, Limiting Equilibrium, Limiting friction, Coefficient of friction, Angle of friction, Angle of repose, Relation between co- efficient of friction and Angle of friction. Equilibrium of bodies on level surface, Inclined plane with external forces acting in various directions. (Numerical)

UNIT -V Centroid and Center of Gravity

Introduction, Difference between centroid and center of gravity, Method of finding out Centroid and center of gravity of regular figures such as Triangle, Rectangle, Circle, Semicircle, Trapezoidal.
Center of gravity Solids, Sphere, Hemisphere, Cone, Frustum of cone, Pyramid Cylinder and hollow Solids.

UNIT -VI Transmission of power by Belt and Rope

Types of belts, Velocity ratio, Follower, driver, slip.
Friction in belt, ratio of tension in belt, power transmitted by belt & ropes.

UNIT -VII Strength oh materials.

Concept of Elastic, Plastic and Rigid Bodies. Concept of axial loads, axial stresses (Compressive & tensile), axial strains, lateral strain, piossons ratio, volumetric strain, Composite section under axial load, modular ratio. Concept of bi axial &triaxial stresses. Definition of bulk modulus. Concept of temperature stresses.
Elastic constants, concept of shear load, shear stresses & shear strain, modulus of rigidity, relation between 'E', 'C' and 'K'**.**

UNIT -VIII Moment of Inertia.

Concept of moment of inertia, moment of inertia for plane areas such as rectangle, triangle , circle, semicircle and quarter circle. Parallel axis and perpendicular axis theorem, moment of inertia of composite sections.

UNIT -IX Shear force & bending moment.

Concept of shear force and bending moment. Definition sign convention. Relation, between bending moment shear force and rate of loading. Shear force & bending moment diagrams for simply supported beams, overhanging beams, and cantilever beams subjected to point loads and uniformly distributed loads, point of contraflecture.

Reference Books:

Author	Title	Publisher
Khurmi	Strength of Materials	New delfi S.Chand & CO.
Timoshenko & Young	Engg. Mechanics	New York:Mcgraw Hills.
Singer	Engg.Mechanics	London: Harper & Row
Ramanutham	Applied Mechanics	Delhi: Dhanpat Rai & Sons
Timo Sanko	Applied Mechanics	Delhi: Dhanpat Rai & Sons

Course Outcomes:

After undergoing the course of study the student shall be able to

1. Understand relationship of physical processes,Kinetics,and Kinematics.
2. Understand the basic concepts and system of forces.
3. Apply the concept of centroid & centre of gravity
4. Determine moment of inertia.
5. Analyze the rigid bodies under translation and rotation with and without considering forces.
6. Identify and solve problems related to types of power transmission system.

Diploma in Mining Engineering

Semester: 3rd SEM
Subject Title: Engineering Mechanics Lab
Subject Code: MIN309

LIST OF EXPERIMENTS:-

1. Verification of Law of Polygon of forces.
2. Study of forces in the members of JIB-CRANE.
3. Verification of Lami's theorem.
4. Verification of Equilibrium of parallel forces on beam.
5. Comparison of Co-efficient of friction between different surfaces.
6. Simple Wheel and Axle.
7. Differential Axle and Wheel.
8. Simple Screw jack.
9. Two sheave and three sheave pulley block.
10. Study of U.T.M.
11. Tension test on mild steel.
12. Drawing S.F.D. & B.M.D. for six problems (Simply supported & cantilever beams with different types of loading). On A2 size drawing sheet.

Diploma in Mining Engineering

Semester: 3rd SEM
Subject Title : Practical Training Project-I
Subject Code: MIN310

Teaching and Examination Scheme:

Teaching Scheme*			Examination Scheme					
L	T	P	Full Marks	External Exam Marks	Internal Exam Marks	External Pas Marks	Total Pass Marks	Duration of External Exams
Sessional 1 (MIN310)			100	60	40		50	

***Practical Training of 30 To 45 Days**

COURSE OBJECTIVES:

Learning from textbooks, lectures and other study material does not suffice for holistic learning. Practical, hands-on learning is essential for better understanding of work processes and business functions.

The practical training activity is important for students to relate their theoretical knowledge to practical aspects of the studied courses, in terms of mining unit operations, process and concepts, and impact of its activities on health, safety, environment and society.

Benefits of industrial visits to diploma students:

1. Industrial visits help them gain hands-on experience of how industry operations are executed
2. Industry visits bridge the gap between theoretical training and practical learning in a real-life environment
3. Industry visits provide opportunity for active/interactive learning experiences in-class as well outside the classroom environment
4. With industry visits, students are able to better identify their prospective areas of work in the overall organizational function.
5. Industry visits help enhance interpersonal skills and communication techniques.
6. Students become more aware of industry practices and regulations during industry visits.
7. Industry visits broaden the outlook of students with exposure to different workforces from different industries.

Course Outcomes:

After undergoing the course of study the student shall have

1. Exposure to actual working environment
2. Acquisition of skills needed at actual work place to be supplemented by training
3. Follow safety practices and regulations inside the industry
4. Develop employability skills
5. Prepare reports

Strategy Of Implementation:

Conducting Industrial visits, seminars, group discussion, and practical assignments on different topics shall complete the curriculum for the subject.

Diploma in Mining Engineering

Semester: 3rd SEM
Subject Title : Development of Life Skills
Subject Code: 302

Rationale:

In today's competitive world, the nature of organizations is changing at very rapid speed. In this situation the responsibility of diploma holder is not unique. He will be a part of a team in the organization. As such the individual skills are not sufficient to work at his best.

This subject will develop the student as an effective member of the team. It will Develop the abilities and skills to perform at highest degree of quality as an individual as well as a member of core group or team. Such skills will enhance his capabilities in the field of searching, assimilating information, managing the given task, handling people effectively, solving challenging problems.

THE SUBJECT IS CLASSIFIED UNDER HUMAN SCIENCE.

Objectives:

The students will be able to:

1. Develop team spirit i.e. concept of working in teams
2. Apply problem solving skills for a given situation
3. Use effective presentation techniques
4. Apply techniques of effective time management
5. Apply task management techniques for given projects
6. Enhance leadership traits
7. Resolve conflict by appropriate method
8. Survive self in today's competitive world
9. Face interview without fear
10. Follow moral and ethics
11. Convince people to avoid frustration

CONTENTS: Interaction by faculty / professiona

Chapter	Name of the Topic	Suggested HOURS
1	**SOCIAL SKILLS** Society, Social Structure, Develop Sympathy And Empathy.	01
2	Swot Analysis – Concept, How to make use of SWOT.	01
3	**Inter personal Relation** Sources of conflict, Resolution of conflict , Ways to enhance interpersonal rela	02

4	**Problem Solving** **I)STEPS IN PROBLEM SOLVING,** 1)Identify and clarify the problem, 2)Information gathering related to problem, 3)Evaluate the evidence, 4)Consider alternative solutions and their implications, 5)Choose and implement the best alternative, 6)Review II) **Problem solving technique**.(any one technique may be considered) 1) Trial and error, 2) Brain storming, 3) Lateral thinking	**02**
5	**Presentation Skills** Body language -- Dress like the audience Posture, Gestures, Eye contact and facial expression. STAGE FRIGHT, Voice and language – Volume, Pitch, Inflection, Speed, Pause Pronunciation, Articulation, Language, Practice of speech. Use of aids –OHP,LCD projector, white board	**03**
6	**Group discussion and Interview technique** – Introduction to group discussion, Ways to carry out group discussion, Parameters— Contact, body language, analytical and logical thinking, decision making **INTERVIEW TECHNIQUE** Necessity, Tips for handling common questions.	**03**
7	**Working in Teams** Understand and work within the dynamics of a groups. Tips to work effectively in teams, Establish good rapport, interest with others and work effectively with them to meet common objectives, Tips to provide and accept feedback in a constructive and considerate way , Leadership in teams, Handling frustrations in group.	**02**
8	**Task Management** Introduction, Task identification, Task planning ,organizing and execution, Closing the task	**02**
	TOTAL	**16**

CONTENTS: PRACTICAL -

List of Assignment: (Any Eight Assignment)

1. SWOT analysis: - Analyse yourself with respect to your strength and weaknesses, opportunities and threats. Following points will be useful for doing SWOT.
   a) Your past experiences,
   b) Achievements,
   c) Failures,
   d) Feedback from others etc.
2. Undergo a test on reading skill/memory skill administered by your teacher.
3. Solve the true-life problem.
4. Form a group of 5-10 students and do a work for social cause e.g. tree plantation, blood donation, environment protection, camps on awareness like importance of cleanliness in slump area, social activities like giving cloths to poor etc.(One activity per group)
5. Deliver a seminar for 10-12 minutes using presentation aids on the topic given by your teacher.
6. Watch/listen an informative session on social activities. Make a report on topic of your interest using audio/visual aids. Make a report on the programme.
7. Conduct an interview of a personality and write a report on it.
8. Discuss a topic in a group and prepare minutes of discussion. Write thorough description of the topic discussed
9. Arrange an exhibition, displaying flow-charts, posters, paper cutting, photographs etc on the topic given by your teacher.

Note: - Please note that these are the suggested assignments on given contents/topic. These assignments are the guide lines to the subject teachers. However the subject teachers are free to design any assignment relevant to the topic. The **term work** will consist of any eight assignments.

Mini Project on Task Management: Decide any task to be completed in a stipulated time with the help of teacher. Write a report considering various steps in task management.

LEARNING RESOURCES:
BOOKS:

Sr. No	Title of the book	Author	Publisher
1	Adams Time management	Marshall Cooks	Viva Books
2	Basic Managerial Skills for All	E.H. Mc Grath , S.J.	Pretice Hall of India
3	Body Language	Allen Pease	Sudha Publications Pvt. Ltd.
4	Creativity and problem solving	Lowe and Phil	Kogan Page (I) P Ltd
5	Decision making & Problem Solving	by Adair, J	Orient Longman
6	Develop Your Assertiveness	Bishop , Sue	Kogan Page India
7	Make Every Minute Count	Marion E Haynes	Kogan page India
8	Organizational Behavior	Steven L McShane and Mary Ann Glinow	Tata McGraw Hill
9	Organizational Behavior	Stephen P. Robbins	Pretice Hall of India, PvtLtd
10	Presentation Skills	Michael Hatton (Canada – IndiaProject)	ISTE New Delhi
11	Stress Management Through Yoga and Meditation	--	Sterling Publisher Pvt Ltd
12	Target setting and Goal Achievement	Richard Hale ,Peter Whilom	Kogan page India
13	Time management	Chakravarty, Ajanta	Rupa and Company
14	Working in Teams	Harding ham .A	Orient Longman

INTERNET ASSISTANCE

1. http://www.mindtools.com
2. http://www.stress.org
3. http://www.ethics.com
4. http://www.coopcomm.org/workbook.htm
5. http://www.mapfornonprofits.org/
6. http://www.learningmeditition.com http://bbc.co.uk/learning/courses/
7. http://eqi.org/
8. http://www.abacon.com/commstudies/interpersonal/indisclosure.html
9. http://www.mapnp.org/library/ethics/ethxgde.htm
10. http://www.mapnp.org/library/grp_cnfl/grp_cnfl.htm
11. http://members.aol.com/nonverbal2/diction1.htm
12. http://www.thomasarmstron.com/multiple_intelligences.htm
13. http://snow.utoronto.ca/Learn2/modules.html
14. http://www.quickmba.com/strategy/swot/

Subject Title : Professional Practices-II (Group -II)

Rationale:

Most of the diploma holders join industries. Due to globalization and competition in the industrial and service sectors the selection for the job is based on campus interviews or competitive tests.

While selecting candidates a normal practice adopted is to see general confidence, ability to communicate and their attitude, in addition to basic technological concepts.

The purpose of introducing professional practices is to provide opportunity to students to undergo activities which will enable them to develop confidence. Industrial visits, expert lectures, seminars on technical topics and group discussion are planned in a semester so that there will be increased participation of students in learning process.

Objectives:

Student will be able to:

1. Acquire information from different sources
2. Prepare notes for given topic
3. Present given topic in a seminar
4. Interact with peers to share thoughts
5. Prepare a report on industrial visit, expert lecture

Sl. No.	Activity Heads	Activities	Suggested Hrs
1.	Acquire information from different sources	Topic related to the branch and current area of interest i.e. articles in internet on which research or review is undergoing may be decided for the students group. The group may be restricted to maximum 5 students. Literature survey from Internet , print media and nearby practices may be undertaken. Minimum of 10 to 15 papers may be suggested for reading to get an overview and idea of matters.	12
2.	Prepare notes for given topic	Making review or concept to be penned down in form of a article .(the article or review may be of 8 – 10 pages length in digital form of 12 font size in Times New Roman font)	4
3.	Present given topic in a seminar	A seminar or conference or work shop on branch related topic is to be decided and all students in group of 5-6 students may be asked to present their views.	4
4.	Interact with peers to share thoughts	A power point presentation of the article prepared in stage 2 may be presented before the classmates and faculty members.	4
5.	Prepare a report on industrial visit, expert lecture	A topic on best practices and product / software development may be assigned to the student group. The group may be asked to prepare a survey, come to opinion making and list out the activities to develop the activities with SWOT analysis.	12

RADHA GOVIND UNIVERSITY
RAMGARH, JHARKHAND

Department of Mining Engineering

Under Faculty of Engineering and Technology

Choice Based Credit System Curriculum for
Diploma in Engineering

SEMESTER IV

(Effective from Academic Session 2022-23)

Scheme of Teaching and Examination for

4th Semester of 3 Years Diploma in Mining Engineering

Duration of Semester : **06 Months**
Student Contact Hours : **36 Hrs.**
Total Marks : **800**
Effective from : **2022 -23 Session**

S .NO.	Name of Subject	Subject Code	Subject	Teaching Scheme			Examination Scheme					
				L	T	P	Hours of Exam	Credit	Full Marks	Final Exam /End Sem marks	Internal Assessment	Pass Marks
1.	Underground coal mining	MIN402	Theory	3			3	3	100	80	20	40
2.	Mine Ventilation	MIN403	Theory	3			3	3	100	80	20	40
3.	Mine Surveying-II	MIN404	Theory	3			3	3	100	80	20	40
4.	Mine Geology-II	MIN405	Theory	3			3	3	100	80	20	40
5.	Environmental Studies	MIN406	Theory	3			3	3	100	80	20	40
6.	Mine Ventilation Lab	MIN407	Practical			2	4	2	50	40	10	20
7.	Mine Surveying-II Lab	MIN408	Practical			2	4	2	50	40	10	20
8.	Geology-II Lab	MIN409	Practical			2	4	2	50	40	10	20
9.	Minor Project-1	MIN410	Sessional			2		4	100	60	40	50
10.	Professional Practice II	401	Sessional			2		4	50	30	20	25
			TOTAL	15				29	800			

Note:

1. Period of Class hours should be of 1 Hrs. duration as per AICTE norms.
2. Remaining Hrs... every week has been marked for students for Library and Student-Centered Activities.
3. Drawing / Graphics / Practical / Sessional examinations will be held at parent institution.
4. Board will depute examiner for Practical examination.
5. Regarding sessional examination the parent institution will form a three-member committee and this committee will examine the sessional records and hold viva of the examinee for 60 % marks allotted to the subject. Marks for remaining 40 % will be provided by the Faculty concerned on the basis of evaluation of each job / work throughout the semester.

Diploma in Mining Engineering

Semester: 4th SEM
Subject Title: Underground Coal Mining
Subject Code: MIN402

Course Objective:

1. Discuss the theories of coal, classification of coal, choice of coal mining method and distribution of coal in India.
2. Explain the board and pillar mining, depillaring by stowing method, and caving method.
3. Discuss the longwall mining of extraction of coal underground mines.
4. Explain thick seam mining and room & pillar mining.

UNIT -I BORD AND PILLAR METHOD

Factors influencing, Choice of Mining methods, Classification of method of working, board and pillar method of coal mining, Classification of Board and pillar mining method, Design of board and pillar method Size of panel, barrier, pillar, Width of boards, Mining Process, Development, Development by blasting off the solid, coal cutting Machine, Problems in the extraction of pillars Principles of pillar extraction, splitting of pillars, Factors influencing choice of pillar extraction Extraction of pillar in Thick and steep seam with caving Extraction of pillar in Thick and steep seam with stowing, line of extraction and numbering of Pillars, Advantage and disadvantage of Board and Pillar method,

UNIT -II LONGWALL METHOD

Applicability, Design of Longwall panel, factors affecting length of Longwall face, barrier width, gate road length, Longwall advancing, Longwall retreating, Cyclic Longwall, non-cyclic Longwall, different machine used, layout of DERD manpower calculation, Thick seam working with Longwall top slicing and sub level, Longwall caving and stowing

UNIT -III MINING OF THICK COAL SEAM

Choice of method of thick coal seam Slice mining, Main slicing Method, Inclined Slicing, Horizontal Slicing, Diagonal slicing, Sublevel Caving, Working steep and moderately thick seam

UNIT -IV SUBSIDENCE IN COAL MINES

Theories of subsidence, Vertical and Normal theories, Dome theory, Beam or plate theory, Trough Theory, Continuum theory, Particulate theory, Mechanics of development of subsidence, Engineering, parameter of subsidence Angle of Drew, Angle of fracture, Prediction of subsidence Prevention of subsidence damage,

UNIT -V STRATA CONTROL IN COAL MINES

Characteristic of coal measure strata, Theories of Mechanics of strata behaviors, Theories of Mechanics of strata behaviors, Effect of mining parameter in strata control, Roof Fall and fracture, due to mining Board and pillar working, Long wall working, roof support, Timber support, Steel support, Power support, Roof bolt.

Reference Books:

Author	Title	Publisher
T.N. Singh	Underground winning of coal	Oxford and IBM
S.K. Das	Modern coal mining Technology	Lovely Prakashan, Dhanbad
D.J. Deshmukh	Elements of mining technology	Central techno publication ,Nagpur
R.D. Singh	Principles and practice of modern coal mining	New age International (p) limited, New delhi

Course Outcome:

1. The students are expected to enhance the technical knowledge on extraction of coal by board & pillar mining and longwall mining.
2. The students are expected to possess ability to identify, formulate and solve the problems of extraction of coal from the underground mines.
3. The students are expected to possess ability to use the techniques, skills, and modern engineering tools necessary for thick seam mining and room & pillar mining.
4. Work effectively as an individual and as a member of a multidisciplinary team.

Diploma in Mining Engineering

Semester: 4th SEM
Subject Title: Mine Ventilation
Subject Code: MIN403

Course Objective:

1. Determine the quantity of air flow in mine roadways and mine ducts.
2. Discuss the mine doors, regulators, stoppings, air crossing and air locks.
3. Explain types of mine fans, their characteristics, suitability and selection of fans
4. Discuss the auxiliary and booster fans, series and parallel operation of fans.
5. Explain ventilation survey in underground mines and computer application in mine ventilation.

UNIT -I MINE AIR

Different Gases / Damps found in mines, Definition of damps, their threshold limits, physiological effects, source of production and detection, Degree of gassiness of seam. Flame safety lamps, its principle, construction, safety features, and comparison. Detection of Methane by flame safety lamp. Methanometer its principle of working, construction. Principle of other method of detection of methane (description of equipment not required)

UNIT -II MINE CLIMATE

Purpose and standards of ventilation, standards for minimum & maximum velocity of air for different locations. Pressure, ventilating press, waterguage. Temperature, sources of heat in mines. Moisture content of mine air relative humidity, wet bulb temperature, measurement of relative humidity. Cooling power of mine air determination of coiling power, methods of improving cooling power of mine air, effect of heat and humidity on miners.

UNIT -III NATURAL VENTILATION

Natural ventilation Pressure, geothermic gradient, Factors causing NVP, Effect of seasonal changes on direction of Natural ventilation, limitation of Natural ventilation. Motive coluMIN, calculation of natural ventilation pressure.

UNIT -IV ARTIFICIAL VENTILATION

Different types of fans used in mines: centrifugal & axial flow, their principle of working, Exhaust & forcing type. Purposes of evasee& volute casing. Reversal of air current, and characteristics curves of fans. Fans in series and parallel, Comparison between axial flow &Centrifugal fan; exhaust & forcing Fan. Fan laws Manometric efficiency overall efficiency, theoretical depression produced by fan. Numerical on fan laws.

UNIT -V DISTRIBUTION & COURSING OF AIR IN MINES

Laws of air flow in Mines, Atkinson's formula, splitting, advantages & disadvantages, Numerical on splitting, equivalent orifice. Numerical on equivalent orifice. Ventilation appliances, Auxiliary ventilation: Different methods, advantages & disadvantages, hazards associated with auxiliary ventilation, precautions required. Booster fan: purpose, dangers associated, Precautions before installation. Numerical on Booster fan, Ascensional and Descensional ventilation, Advantages and disadvantages.

UNIT -VI VENTILATION SURVEY

Scope and importance of ventilation survey, survey interval and location of survey station, Ventilation Plan. Measurement of quantity & pressure difference, anemometer, pitot static tube, Manometer. Conduct of Pressure & quantity survey, precautions during and before conducting ventilation survey.

Reference Books:

Author	Title	Publisher
D.J. Deshmukh	Elements of Mining Technology Vol II	Central techno publication, Nagpur
G.B. Misra	Mine Environment & Ventilation	Oxford University Press, Calcutta
M.A. Ramlu	Mine Disaster & Mine Rescue	Oxford University Press, Calcutta

Course Outcomes:

After undergoing the course of study the student shall be able to

1. Take measurement of quantity of air, pressure, humidity and cooling power of the mine air, and take corrective action if these do not meet the desired standards.
2. Detect presence of inflammable and toxic/noxious gases in the mine and take precautions to remove the some and make the working places safe.
3. Provide and maintain ventilation appliances in their districts so as to ensure compliance with standards of ventilation prescribed.
4. Generally appreciate the ventilation system of a mine as a whole and importance of maintaining safe and comfortable working conditions inside the mine.

Diploma in Mining Engineering

Semester: 4th SEM
Subject Title : Mine Ventilation Lab
Subject Code: MIN407

List Of Experiments:

1. Demonstration of co-detector and measurement of carbon monoxide using Co-detector.
2. Demonstration of Methanometer and measurement of methane using Methanometer.
3. Dismantling & assembling of different types of Flame safety lamps.
4. Detection of Methane using flame safety lamp
5. Demonstration of whirling hygrometer and determination of relative humidity using whirling hygrometer.
6. Demonstration of Kata thermometer and determination of cooling power by Kata thermometer.
7. Demonstration of water gauge and measurement of fan water gauge.
8. Demonstration of centrifugal mine fan.
9. Demonstration of Reversal arrangement of centrifugal mine fan.
10. Demonstration of Axial flow fan.
11. Demonstration of various ventilation devices.
12. Demonstration of vane Anemometer and determination of quantity by Anemometer.
13. Demonstration of velometer and measurement of air velocity by velometer.
14. Demonstration of Inclined manometer and pitot static tube and determination of velocity pressure.
15. Study of ventilation plan and conventional signs used in it.

Diploma in Mining Engineering

Semester: 4th SEM
Subject Title: Mine Surveying-II
Subject Code: MIN404

Course Objective:

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

1. Comprehend principle of tachometry & its application in measurement of distance.
2. Explain principle of triangulation & trilateration.
3. Explain principles of correlations by different methods.
4. Define various terms in connection with cove setting, laying out of curves by different methods.
5. Explain different methods of stope surveying, transfer of stope. faces to mine Plan
6. Explain the basic principle of global positioning systems & total station.

UNIT -I TACHEOMETRY

Define stadia & its principle.
Explain diaphragm, reticules, tacheometer, instruments constants.
Find out height & distance from stadia intercepts, tangential systems, movable hair method.

UNIT -II TRIANGULATION AND TRILATERATION.

State purpose & principle involved in triangulation & trilateration method. Classify various methods of triangulation survey primary, secondary & tertiary colliery Triangulation. Develop concept about reconnaissance survey. Describe methods of measuring angle, types of theodolite used in triangulation survey. Describe the methods of base line measurement using E.D.M. Define tape correction. State construction of triangulation station of permanent nature.

UNIT -III Correlation of surface and underground survey

State direct correlation by traversing & optical methods. Describe orientation by wires in two shafts. Explain correlation by mines in vertical shafts. State co-planning/ alignment, weissbach triangle weis-quadrilateral methods, precise magnetic correlation.

UNIT -IV Setting out curves

State elements of curves. Define designation of curves, simple, compound & reverse curves. Explain setting out of surface & underground curves by chords & offsets, chords and angle, tangent and offset, plate layers method. Describe various setting out by chain & one theodolite, two theodolites. Define super elevation, transition and vertical curves.

UNIT -V Stope Surveying

Explain tape triangulation, instrumental survey. Determine stope face.
State preparation of stope planes, plotting the stope station, plotting of stope face to the mine plan.
Find out area of extraction by Planimeter and calculation of triangle thereof.

UNIT -VI G.P.S. & Total Station

Explain the basic principles of global positioning system & total station.
Introduction to DGPS.

Recommended Books

Sl. No.	Title of the Book	Name of Authors
1	Surveying Vol I	E.Mason
2	Surveying and Levelling	T.P. Kanetkar
3	Geodetic Surveying Vol I	David Clerk
4	Mineral Economics	Sinha & Sharma

Course Outcomes:

1. Determine RLs of stations and distances between stations using Tacheometric survey using given data
2. To consider advantages of Triangulation and the Limitations.
3. The students will able to use the theodolite along with chain/tape,compass on the field.
4. Acquire skills of using advanced survey Instruments.
5. Describe how satellite communications systems are used in Global Positioning.

Diploma in Mining Engineering

Semester: 4th SEM
Subject Title: Mine Surveying-II Lab
Subject Code: MIN408

List of Experiments:

1. Demonstration of theodolite reading the vernier.
2. Temporary adjustments of theodolite & measurement of horizontal angle by repetition method.
3. Measurement of horizontal angle by reiteration method.
4. Observation of magnetic bearing of a line by Theodolite by compass attachment.
5. Measurement of deflection angle by Theodolite by taking an open traverse of 4 – 5 sides.
6. Prolongation of a survey line with the help of a Theodolite.
7. Measurement of Vertical angles using theodolite.
8. To find constants of a given tacheometer.
9. Determining the reduced level and horizontal distance of an in accessible object by Tachometer.
10. Setting out a simple circular curve by offsets from long chord
11. Setting out a simple circular curve by sub cord produced method.
12. Setting out a simple circular curve by (single Theodolite method) Rankine's method.
13. Demonstration of EDM.
14. Demonstration of micro optic theodolite.
15. Demonstration of Total station.

Diploma in Mining Engineering

Semester: 4th SEM
Subject Title: Mine Geology-II
Subject Code: MIN405

Course Objective:

After undergoing the course of study, the student shall be able to

1. Identify landforms in field
2. Explain the relation of landforms for mineral deposit and mining activity
3. Outline stratigraphy of India and mineral deposits
4. Identify the fossils
5. Explain the principle of formation of mineral deposit
6. Describe mode of occurrence, distribution and uses of ores.
7. Investigate minerals in field using geological, geophysical, geochemical method of prospecting
8. Mark the mineral prospect zone using remote sensing techniques.

UNIT -I GEOMORPHOLOGY

Definition of landform, Forces changing the landforms, Endogenic Exogenic, Geomorphic agents and their landforms, landforms produced by mass movement, Fluvial Landforms, Aeolian landforms Glacial landforms, coastal landforms, landform produced by groundwater

UNIT -II PALEONTOLOGY

Definition of fossil, Mode of preservation of fossil, Uses of fossils, Classification of animal and plant kingdom, Morphology and geological range of occurrence of animal fossils - order Foraminifera(Phylum protozoa),class corals (phylum Coelenterata) ,phylum brachiopoda, class gastropoda(phylum mollusca and class trilobite, Morphology and geological range of occurrence plant fossils-Glassopteris, gangamopteris, Ptolophillum

UNIT -III STRATIGRAPHY

Principles of stratigraphy, standard stratigraphic and time scale Tectonic divisions of India Stratigraphy of India, Stratigraphic succession, lithology, distribution and economic mineral deposits of Precambrian basement in Singhbhum and Dharwar, Stratigraphic succession ,lithology, distribution and economic mineral deposits of Cuddapah supergroup, vindhyan supergroup and Gondwana super group.

UNIT -IV ECONOMIC GEOLOGY

Definition of ore, gangue, tenor, process of formation of ore deposits, morphology of principal type of ore deposits Classification of ore deposits, Origin, mode of occurrence, distribution and uses of gold, iron, copper, manganese, chromium, Aluminum, Pb, zinc and petroleum, Metalorganic provinces of India, ore deposit through geological time in India.

UNIT -V GEOLOGICAL MAPPING

Features of geological maps, topography, lithology, geological structure, signs and symbols, field equipment, For geological mapping, features of toposheet, Method of collection of sample, completion and tracking of outcrop.

REFERENCE BOOKS:

Author	Title	Publisher
Praveen Singh	Engineering and General Geology	Catson Educational Series
Umeshwar Prasad	Economic Mineral Deposit	CBS Publisher, New Delhi
D K Todd	Ground Water Hydrology	Willey and Sons, New York

Course Outcome:

1. The Student will understand and evaluate the concept of region in geography and its role and relevance in regional planning.
2. Student will able to document field observations and collection of fossils and process fossils in the lab
3. The Students will transforms a stratigraphic cross section into a historical summary that expresses Environmental states and changes.
4. The Students will able to Recognize common ore minerals in hand samples and under the microscope.
5. Demonstrate proficiency in basic mapping skills such as Locating formational contacts, drawing a map and Cross - Section.

Diploma in Mining Engineering

Semester: 4th SEM
Subject Title: Mine Geology-II Lab
Subject Code: MIN409

LIST OF PRACTICALS:

1. Outcrop map preparation and interpretation. (Any Ten including Horizontal, Vertical and Inclined/Fault & fold outcrop)
2. Toposheet interpretation and preparation of geological map on toposheet (Jharia, Raniganj and Rajmahal coal fields)
3. Identification of ore mineral": Galena, Chalcopyrite, Magnetite, Hematite)
4. Identification of fossils : Trilobite, Gastropots, Glassopteries, Gangamopteris, foraminifera.
5. Identification of landforms in satellite image : Fluvial, Aeolian, Glacitr, Landform.
6. Interpretation of satellite image for Demarcation of outcrops of Vindhyan Supergroup, Cuddapah Supergroup, Singhbhum group on it.

Diploma in Mining Engineering

Semester: 4th SEM
Subject Title : Environmental Studies
Subject Code: MIN406

UNIT-I: THE MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES

Definition, scope and importance, Need for public awareness.

UNIT-II: NATURAL RESOURCES

Renewable and non renewable resources:

a) Natural resources and associated problems

Forest resources: Use and over-exploitation, deforestation, case studies, Timber extraction, mining, dams and their effects on forests and tribal people.
Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dam's benefits and problems.
Mineral Resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
Food Resources: World food problems, changes caused by agriculture and over grazing, effects of modern agriculture, fertilizers- pesticides problems, water logging, salinity, case studies.
Energy Resources: Growing energy needs, renewable and non- renewable energy sources, use of alternate energy sources, case studies
Land Resources: Land as a resource, land degradation, man induces land slides, soil erosion, and desertification.

b) Role of individual in conservation of natural resources.
c) Equitable use of resources for sustainable life styles.

UNIT-III: ECO SYSTEMS

- Concept of an eco system
- Structure and function of an eco system.
- Producers, consumers, decomposers.
- Energy flow in the eco systems.
- Ecological succession.
- Food chains, food webs and ecological pyramids.
- Introduction, types, characteristic features, structure and function of the following eco systems:
  - Forest ecosystem
  - Grass land ecosystem
  - Desert ecosystem.
  - Aquatic eco systems (ponds, streams, lakes, rivers, oceans, estuaries)

UNIT-IV: BIODIVERSITY AND IT'S CONSERVATION

- Introduction-Definition: genetics, species and ecosystem diversity.
- Biogeographically classification of India.
- Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values
- Biodiversity at global, national and local level.
- India as a mega diversity nation.
- Hot-spots of biodiversity.
- Threats to biodiversity: habitats loss, poaching of wild life, man wildlife conflicts.
- Conservation of biodiversity: in-situ and ex-situ conservation of biodiversity

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UNIT V: ENVIRONMENTAL POLLUTION

Definition Causes, effects and control measures of:

a. Air pollution
b. Water pollution
c. Soil pollution
d. Marine pollution
e. Noise pollution
f. Thermal pollution
g. Nuclear hazards

Solid waste Management: Causes, effects and control measures of urban and industrial wastes
Role of an individual in prevention of pollution
Pollution case studies
Disaster management: Floods, earth quake, cyclone and land slides

UNIT VI: SOCIAL ISSUES AND THE ENVIRONMENT

- Form unsustainable to sustainable development
- Urban problems related to energy
- Water conservation, rain water harvesting, water shed management
- Resettlement and rehabilitation of people; its problems and concerns, case studies
- Environmental ethics: issues and possible solutions
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies.
- Wasteland reclamation
- Consumerism and waste products
- Environment protection Act
- Air (prevention and control of pollution) Act
- Water (prevention and control of pollution) Act
- Wildlife protection act
- Forest conservation act
- Issues involved in enforcement of environmental legislations
- Public awareness

Recommended Books:

1. Textbook of Environmental studies, Erach Bharucha, UGC
2. Fundamental concepts in Environmental Studies, D D Mishra, S Chand & Co Ltd

Course Outcomes:

After undergoing the course of study the student shall have

1. Exposure to actual working environment
2. Acquisition of skills needed at actual work place to be supplemented by training
3. Follow safety practices and regulations inside the industry
4. Develop employability skills
5. Prepare reports

Diploma in Mining Engineering

Semester: 4th SEM
Subject Title: Minor Project Phase-I
Subject Code: MIN410

Teaching and Examination Scheme:

Teaching Scheme*			Examination Scheme					
L	T	P	Marks	Internal Exam Marks	External Exam Marks	External Pass Marks	Total Pass marks	duration of external Exam
0	0	2	100	60	40	-	50	-

Course outcome:

After undergoing the course of study the student shall be able to

1. Prepare a report of a problem in mining area.
2. Identify the problems related to mining by visiting the project area.
3. Suggest appropriate method to resolve the problems.
4. Competent to visualize the problem in the form of report.

Content:

1. Each student has to submit a project report (other than practical training report) under the guidance of a supervisor (Lecture) from the institute.
2. The topic of project will be deicide by the supervisor.
3. The topic of project will cover the micro study or investigation or innovation concern to unsolved/unseen problems of mining.
4. Project may be also concern to fulfill the gap between curriculum and industry.
5. Project may be aim to skilling the students with research aptitude by adopting Cognitive and Psychomotor domain of learning.
6. Supervisor will examine the report of project submitted by the student. The evaluation of project will be in the light of learning domain. That is Cognitive and Psychomotor.
7. Framing the title of project, supervisor has to decide the objective or outcomes of project on the basis of element of learning domain.

Diploma in Mining Engineering

Semester: IV Sem
Subject Title : Development of Life Skills
Subject Code: 401

Rationale:

In today's competitive world, the nature of organizations is changing at very rapid speed. In this situation the responsibility of diploma holder is not unique. He will be a part of a team in the organization. As such the individual skills are not sufficient to work at his best.

This subject will develop the student as an effective member of the team. It will Develop the abilities and skills to perform at highest degree of quality as an individual as well as a member of core group or team. Such skills will enhance his capabilities in the field of searching, assimilating information, managing the given task, handling people effectively, solving challenging problems.

THE SUBJECT IS CLASSIFIED UNDER HUMAN SCIENCE.

Objectives:

The students will be able to:

1. Develop team spirit i.e. concept of working in teams
2. Apply problem solving skills for a given situation
3. Use effective presentation techniques
4. Apply techniques of effective time management
5. Apply task management techniques for given projects
6. Enhance leadership traits
7. Resolve conflict by appropriate method
8. Survive self in today's competitive world
9. Face interview without fear
10. Follow moral and ethics
11. Convince people to avoid frustration

CONTENTS: Interaction by faculty / professional

Chapter	Name of the Topic	Suggested HOURS
1	**SOCIAL SKILLS** Society, Social Structure, Develop Sympathy And Empathy.	01
2	Swot Analysis – Concept, How to make use of SWOT.	01
3	**Inter personal Relation** Sources of conflict, Resolution of conflict , Ways to enhance interpersonal rela	02

4	**Problem Solving** **I)STEPS IN PROBLEM SOLVING,** 1)Identify and clarify the problem, 2)Information gathering related to problem, 3)Evaluate the evidence, 4)Consider alternative solutions and their implications, 5)Choose and implement the best alternative, 6)Review **II) Problem solving technique**.(any one technique may be considered) 1) Trial and error, 2) Brain storming, 3) Lateral thinking	**02**
5	**Presentation Skills** Body language -- Dress like the audience Posture, Gestures, Eye contact and facial expression. STAGE FRIGHT, Voice and language – Volume, Pitch, Inflection, Speed, Pause Pronunciation, Articulation, Language, Practice of speech. Use of aids –OHP,LCD projector, white board	**03**
6	**Group discussion and Interview technique** – Introduction to group discussion, Ways to carry out group discussion, Parameters— Contact, body language, analytical and logical thinking, decision making **INTERVIEW TECHNIQUE** Necessity, Tips for handling common questions.	**03**
7	**Working in Teams** Understand and work within the dynamics of a groups. Tips to work effectively in teams, Establish good rapport, interest with others and work effectively with them to meet common objectives, Tips to provide and accept feedback in a constructive and considerate way , Leadership in teams, Handling frustrations in group.	**02**
8	**Task Management** Introduction, Task identification, Task planning ,organizing and execution, Closing the task	**02**
	TOTAL	**16**

CONTENTS: PRACTICAL -

List of Assignment: (Any Eight Assignment)

1. SWOT analysis:- Analyse yourself with respect to your strength and weaknesses, opportunities and threats. Following points will be useful for doing SWOT.
   a) Your past experiences,
   b) Achievements,
   c) Failures,
   d) Feedback from others etc.
2. Undergo a test on reading skill/memory skill administered by your teacher.
3. Solve the true life problem.
4. Form a group of 5-10 students and do a work for social cause e.g. tree plantation, blood donation, environment protection, camps on awareness like importance of cleanliness in slump area, social activities like giving cloths to poor etc.(One activity per group)
5. Deliver a seminar for 10-12 minutes using presentation aids on the topic given by your teacher.
6. Watch/listen an informative session on social activities. Make a report on topic of your interest using audio/visual aids. Make a report on the programme.
7. Conduct an interview of a personality and write a report on it.
8. Discuss a topic in a group and prepare minutes of discussion. Write thorough description of the topic discussed
9. Arrange an exhibition, displaying flow-charts, posters, paper cutting, photographs etc on the topic given by your teacher.

Note: - Please note that these are the suggested assignments on given contents/topic. These assignments are the guide lines to the subject teachers. However the subject teachers are free to design any assignment relevant to the topic. The **term work** will consist of any eight assignments. **Mini Project** on Task Management: Decide any task to be completed in a stipulated time with the help of teacher. Write a report considering various steps in task management.

LEARNING RESOURCES:
BOOKS:

Sr. No	Title of the book	Author	Publisher
1	Adams Time management	Marshall Cooks	Viva Books
2	Basic Managerial Skills for All	E.H. Mc Grath , S.J.	Pretice Hall of India
3	Body Language	Allen Pease	Sudha Publications Pvt. Ltd.
4	Creativity and problem solving	Lowe and Phil	Kogan Page (I) P Ltd
5	Decision making & Problem Solving	by Adair, J	Orient Longman
6	Develop Your Assertiveness	Bishop , Sue	Kogan Page India
7	Make Every Minute Count	Marion E Haynes	Kogan page India
8	Organizational Behavior	Steven L McShane and Mary Ann Glinow	Tata McGraw Hill
9	Organizational Behavior	Stephen P. Robbins	Pretice Hall of India, PvtLtd
10	Presentation Skills	Michael Hatton (Canada – IndiaProject)	ISTE New Delhi
11	Stress Management Through Yoga and Meditation	--	Sterling Publisher Pvt Ltd
12	Target setting and Goal Achievement	Richard Hale ,Peter Whilom	Kogan page India
13	Time management	Chakravarty, Ajanta	Rupa and Company
14	Working in Teams	Harding ham .A	Orient Longman

INTERNET ASSISTANCE

1. http://www.mindtools.com
2. http://www.stress.org
3. http://www.ethics.com
4. http://www.coopcomm.org/workbook.htm
5. http://www.mapfornonprofits.org/
6. http://www.learningmeditition.com http://bbc.co.uk/learning/courses/
7. http://eqi.org/
8. http://www.abacon.com/commstudies/interpersonal/indisclosure.html
9. http://www.mapnp.org/library/ethics/ethxgde.htm
10. http://www.mapnp.org/library/grp_cnfl/grp_cnfl.htm
11. http://members.aol.com/nonverbal2/diction1.htm
12. http://www.thomasarmstron.com/multiple_intelligences.htm
13. http://snow.utoronto.ca/Learn2/modules.html
14. http://www.quickmba.com/strategy/swot/

Subject Title : Professional Practices

Rationale:

Most of the diploma holders join industries. Due to globalization and competition in the industrial and service sectors the selection for the job is based on campus interviews or competitive tests.

While selecting candidates a normal practice adopted is to see general confidence, ability to communicate and their attitude, in addition to basic technological concepts.

The purpose of introducing professional practices is to provide opportunity to students to undergo activities which will enable them to develop confidence. Industrial visits, expert lectures, seminars on technical topics and group discussion are planned in a semester so that there will be increased participation of students in learning process.

Course Objectives:

Student will be able to:

1. Acquire information from different sources
2. Prepare notes for given topic
3. Present given topic in a seminar
4. Interact with peers to share thoughts
5. Prepare a report on industrial visit, expert lecture

Sl. No.	Activity Heads	Activities	Suggested Hrs..
1.	Acquire information from different sources	Topic related to the branch and current area of interest i.e. articles in internet on which research or review is undergoing may be decided for the students group. The group may be restricted to maximum 5 students. Literature survey from Internet , print media and nearby practices may be undertaken. Minimum of 10 to 15 papers may be suggested for reading to get an overview and idea of matters.	12
2.	Prepare notes for given topic	Making review or concept to be penned down in form of a article .(the article or review may be of 8 – 10 pages length in digital form of 12 font size in Times New Roman font)	4
3.	Present given topic in a seminar	A seminar or conference or work shop on branch related topic is to be decided and all students in group of 5-6 students may be asked to present their views.	4
4.	Interact with peers to share thoughts	A power point presentation of the article prepared in stage 2 may be presented before the classmates and faculty members.	4
5.	Prepare a report on industrial visit, expert lecture	A topic on best practices and product / software development may be assigned to the student group. The group may be asked to prepare a survey, come to opinion making and list out the activities to develop the activities with SWOT analysis.	12

RADHA GOVIND UNIVERSITY
RAMGARH, JHARKHAND

Department of Mining Engineering

Under Faculty of Engineering and Technology

Choice Based Credit System Curriculum for
Diploma in Engineering

SEMESTER V

(Effective from Academic Session 2022-23)

Scheme of Teaching and Examination for

5th Semester of 3 Years Diploma in Mining Engineering

Duration of Semester : **14 Weeks**
Student Contact Hours : **36 Hrs**
Total Marks : **800**

Effective from : **2022 -23 Session**

S. NO.	Name of Subject	Subject Code	Subject	Teaching Scheme			Examination Scheme					
				L	T	P	Hours of Exam	Credit	Full Marks	Final Exam /End Sem marks	Internal Assessment	Pass Marks
1.	Surface Mining Technology	MIN502	Theory	3			3	3	100	80	20	40
2.	Mine Machinery-I	MIN503	Theory	3			3	3	100	80	20	40
3.	Mine Environment	MIN504	Theory	3			3	3	100	80	20	40
4.	Underground Metal Mine	MIN505	Theory	3			3	3	100	80	20	40
5.	Elective-I 1. Mine Hazard And Safety 2.Mine Reclamation & Closure 3.Pollution Control Engg.	MIN506X	Theory	3			3	3	100	80	20	40
6.	Mine Machinery-I Lab	MIN507	Practical			2	4	2	50	40	10	20
7.	Mine Environment Lab	MIN508	Practical			2	4	2	50	40	10	20
8.	Application of GIS & AUTOCAD in mining.	MIN509	Practical			2	4	2	50	40	10	20
9.	Practical Training Report-II	MIN510	Sessional			2		4	100	60	40	50
10.	Development of Life Skills	501	Sessional			4		4	50	30	20	25
			TOTAL	**15**		**12**		**29**	**800**			

Note:

1. Period of Class hours should be of 1 hrs duration as per AICTE norms.
2. Remaining Hrs every week has been marked for students for Library and Student Centered Activities.
3. Drawing / Graphics / Practical / Sessional examinations will be held at parent institution.
4. Board will depute examiner for Practical examination.
5. Regarding sessional examination the parent institution will form a three member committee and this committee will examine the sessional records and hold viva of the examinee for 60 % marks allotted to the subject. Marks for remaining 40 % will be provided by the Faculty concerned on the basis of evaluation of each job / work throughout the semester

Diploma in Mining Engineering

Semester: 5th SEM
Subject Title: Surface Mining Technology
Subject Code: MIN502

Course Objective:

1. To choose proper surface mining methods to different mineral deposits depending on their geo- mining conditions.
2. To design and analyze basic elements of surface mine.
3. To learn various methods of surface mining.
4. To choose various methods of transportation in any opencast mine.
5. To learn the construction & working of various machineries used in open cast mine.

UNIT -I INTRODUCTION TO OPENCAST MINING

Classification of Surface Mining methods, Factors affecting choice of opencast mining methods; Advantages and disadvantages of opencast mining Stripping Ratio: Maximum allowable stripping ratio, Overall stripping ratio, Break- even stripping ratio Benches parameters: Height, width, angle of slope, toe, crest, statutory provisions regarding height, width, angle of slope etc.

UNIT -II OPENING UP OF DEPOSIT

Unit operations involved, site preparation, Box cut, Entry system in opencast mines Opencast mine layout, factor determining choices of layout, overburden excavation, Disposal of overburden, overcasting etc. Sample layouts for Lime Stone, Copper, Coal, Iron ore deposits, method of work, machines required, manpower, OMS etc.

UNIT -III OPENCAST MINING MACHINERY

Classification of Excavating equipment, selection, choices of opencast mining machinery. Excavators shovel, Rope shovel, hydraulic shovel, application, advantages, disadvantages, comparison Rope shovel and hydraulic shovel, operating parameter, output of a shovel. Various attachments to shovel. Back hoe, operating parameter, application. Dragline, operating parameters, applicability, working, advantages, disadvantages, comparison with shovel. Bucket-wheel and Bucket chain excavators. Application, advantages & disadvantages, operation, working methods by Bucket wheel excavator, terrace cut, Dropping cut etc. Rippers. Scrappers, bulldozer etc. Surface miner its application, working. In pit crushing system, Precautionary measures while use of HEMM.

UNIT -IV OPENCAST EXPLOSIVES

Explosives used in opencast mine, ANFO, slurry explosive, emulsion explosives, Heavy ANFO explosive,
LOX, their properties, composition etc.Boosters.Initiation system, non-electric initiation system, Raydets,
Nonel, Shock Tubes, electronic detonators, etc.Bulk explosive system, site mixed slurry, site mixed Emulsion, Bulk-loading system. Advantages, ANFO precautions while mixing, handling and use, Conditions for using bulk explosives

UNIT -IV BLASTING PRACTICE IN OPENCAST MINES

Bench blasting terminology, Blast hole geometry, hole depth, burden, spacing, sub grade drilling, bottom change, column charge, stemming height.. Factors to be considered while blast designing Simple numerical on blast design for the bench of surfaces mine.
Single and multiple rows blasting their comparison, Sequence of blasting in single & multiple row. Precautions while charging and firing of holes in deep hole blasting, deck charging, muffled blasting, control blasting techniques, secondary blasting/breaking in opencast mines.
Transport of Explosives in bulk, precautions while drilling and blasting of deep holes.

UNIT -V ENVIRONMENTAL ASPECTS OF OPENCAST MINING

Environmental aspects of opencast mining Fly rock, ground vibration, air blast their causes & prevention. Noise pollution, water pollution, Degradation of land, land reclamation.
Salient features of environment protection Act, EMP and Environment impact assessment.
Slope stability: Causes of un-stability, forms of failure preventive measures.

Reference Books:

Author	Title	Publisher
G.K. Pradhan	Explosive and Blasting Techniques	Mintech publication Bhubaneshwar.
S.K. Das	Surface Mining Technology	Lovely Prakashan Dhanbad.
S.K. Das	Explosives and Blasting Techniques	Lovely Prakashan Dhanbad.
D.J. Deshmukh	Elements of Mining Technology Vol I	Central techno publication, Nagpur
G.B. Misra	Surface Mining	Oxford University Press, Calcutta

Course Outcomes:

1. Apply knowledge of surface mining for understanding, formulating and solving problems related with the opencast mine.
2. Acquire knowledge and hands-on competence in applying the concepts in the design and development of opencast mine
3. Work effectively with other engineering and science teams.

Diploma in Mining Engineering

Semester: 5th SEM
Subject Title: Mine Machinery-I
Subject Code: MIN503

Course Objective:

1. The Student should be able to Identify the Units of Work & Energy of Power and of Voltage and be able express and understanding of the meaning of such Concept.
2. To Introduce the concepts of Ideal Synchronous Machines and Polyphase Induction Machine.
3. To Introduce the Students to the general structure of the network for transferring Power from Generating Stations to the Consumers.
4. To give an overview of Internal Combustion Engines.
5. State Specific conditions under which a compressor is expected to Operate.

UNIT - I ELECTRIC CIRCUIT

Resistance, Current, Voltage, Work, Power and Energy Ohm's Law AC Current – Three phase & Single-phase Storage Batteries- Constructing & working.

UNIT -II ELECTRICAL MACHINE

DC Machine: Construction & principles of operating, Magnetization and load characteristics of series, shunt and compound generators and motors. Motor starter, speed control and their field of applications.
AC Motors: Construction and principles of operation, types of transformers, Efficiency and Regulations, Auto transformer
Single phase Transformer: Construction and principles of operation, types of transformers, Efficiency and Regulations, Auto transformer.

UNIT -III POWER SUPPLY SYSTEM

Transmission & distributing of Electrical power by overhead lines and cables Types of cables, layout of underground cables, shaft cables protection system and switchgear for mines like Relays, circuit breaker and fuses. Electronic Components, Fundamental of Semi- conductor, P & N Types, P N Junction, Diodes & their Applications, Special Diodes, Transistor, Amplifiers

UNIT IV MACHINES

Internal Combustion Engine: Classification, Otto cycle, Diesel cycle. Two stroke & four stroke petrol engine. Two stroke & four stroke Diesel engine. Different systems like fuel injection, fuel ignition for petrol & diesel engines.
Air compressor: Classification, Definitions of different terms such as inlet pressure, discharge pressure, capacity, theoretical power, break power, free air delivery.
Compressor efficiencies, Working of reciprocating Compressor. Single stage & multistage.

Linter cooling, After cooling, Conditions of maximum efficiency, Uses of compressed air (no

Derivation and proof of formula.)

Rotary compressor: Roots blower, vane type blower, screw compressor, turbo blower, turbo

Brakes & Clutches:
Breaks : Classification, Construction & working of block brakes, internal expanding
brakes, hydraulic brakes, vacuum brakes (no numerical problems)

Clutches : Construction & working of plate clutches, cone clutches,centrifugal clutch, claw clutch (no numerical problems)
Hydraulics & Hydraulic machines: Properties of fluid, components of hydraulic circuits and their symbols, constructional details and working of hydraulic of shaper and hydraulic press.

UNIT -V WIRE ROPES

Classification of different types of wire ropes, Stranded rope, Non stranded rope, Different types of stranded rope, Different types of Non stranded rope, Lays of rope, Different definition like Space factor, static load, dynamic load, factor of safety.
Selection of wire rope, Care and maintenance in ropes, Types of deterioration in the ropes Testing of wire ropes. Types of Rope capping, White metal capping
(cone socket type capel),Wedge type capping (Reliance rope capel), Capping with split capel and rivets (Split capel), Recapping, Rope splicing procedure

Reference Books:

AUTHOR	TITLE	PUBLISHER
EDWARD HUGES	ELECTRICAL TECHNOLOGY	
H.COTTON	ELECTRICAL TECHNOLOGY	C.B.S PUBLISHER
B.L.THERAJA	ELECTRICAL TECHNOLOGY	S. CHAND
MALVINO	ELECTRONIC PRINCIPLES	
P.L BALLANEY	THERMAL ENGINEERING	
AVNER	ENGINEERING METALLURGY	MCGRAW HILL
R.S KHURMI	THEORY OF MACHINES	S. CHAND
D.J DESHMUKH	E M T VOL-3	CENTRAL TECHNO. PUBLICATION NAGPUR

Course Outcomes:

After undergoing the course of study the student shall be able to

1. Have general knowledge of electrical supply system
2. Understand basic principles of motors, transformers, instruments etc.
3. Understand and implement different units and standards of measurements.
4. Understand the working of I.C. Engines
5. Understand the working of different types of compressors.
6. Supervise installation, maintenance of ropes and attachments; safe operation and understand the methods of dealing with breakdowns.

Diploma in Mining Engineering

Semester: 5th SEM
Subject Title: Mine Machinery-I Lab
Subject Code: MIN507

List of Experiments:

1. Experiment to verify Ohm's Law .
2. Experiment on Speed control of DC Motor.
3. Experiment on Speed control of AC Motor.
4. To Perform Open Circuit and Short Circuit test on Single Phase Transformer.
5. To study the characteristics of regulated D.C Power supply.
6. To study about 4 stroke Diesel Engine and 4 Strokes petrol engine.
7. To Determine Mechanical and Volumetric Efficiency of the two stage acting Reciprocating air Compressor.
8. Performance Parameter of I.C Engine
9. Diesel/Petrol Testing

Diploma in Mining Engineering

Semester: 5th SEM
Subject Title: Mine Environment
Subject Code: MIN504

Course Objective:

1. Enables the students to understand the airflow in sufficient quantity and quality to dilute contaminants to safe concentrations in all parts of the facility where personnel are required to work or travel.
2. Enables the students to understand the ventilation requirements.
3. Students will be able in selecting appropriate mine fans and design suitable ventilation structures.
4. To learn ventilation methods and strata monitoring instruments.
5. The students will have better understanding about methods of ventilating long wall faces and Bord. and pillar method of mining

UNIT I: MINE ATMOSPHERE

Pollution of Mine Atmosphere, Mine Gases, Their Origin, Occurrence, Effects and Detection, Methane Drainage. Monitoring System for Mine environment, Analysis of Mine air.

UNIT II: MINE HEAT & HUMIDITY

Heat & humidity in mine , atmosphere and its effects , Cooling power of mine air , Assessment of comfort conditions , Air conditioning of Mines ,Surface , Underground and divided installations , Spot coolers.

UNIT III: Mine Dust

Classification, physiological effect, measurement of dust concentration, dynamics of small particles, sampling of air borne dust, prevention and suppression of dust.

UNIT IV: Mine Illumination

Types of portable lamps, maintenance and examination, Lamp room design and organization, Percentage and accumulation tests, Lighting from mains, Photometry and illumination surveys, standard of illumination for Underground and open cast workings.

UNIT V: Inundation

Inundation: Surface and underground causes of Inundation and its prevention, water dams, bulkhead doors, Procedure of and precaution while approaching old water logged areas, pattern of bore holes, Dewatering, burn side safety boring apparatus, Standard of lighting in underground & opencast mines, cap lamps, its construction, maintenance and care, cap lamp

room. M*ine* rescue: Introduction, classification of mine rescues apparatus, modern self contained breathing apparatus, its construction, application and scope. Common tests of self contained compressed oxygen breathing apparatus, Chemical oxygen self-rescuers, gas mask, filter self-rescuers: their construction, application and limitations. Fresh air hose type breathing apparatus, Fresh air base: location, personnel & equipments required

Reference Books:

1. *D.J. DESHMUKH VOL I, II*
2. *Mine Environment & Ventilation, G.B. Mishra*
3. *Mine Disaster & Mine Rescue, M.A. Ramlu*

Course Outcomes:

1. The students are expected to enhance the technical knowledge on origin, occurrence, effects, and detection of various mine gases, air conditioning of surface and underground mining.
2. Work effectively as an individual and as a member of a multidisciplinary team.

Diploma in Mining Engineering

Semester: 5th SEM
Subject Title: Mine Environment Lab
Subject Code: MIN508

List of Practical to be performed: 10

1. Detection of presence and accumulation of firedamp in mine atmosphere.
2. Detection of presence and accumulation of CO in mine atmosphere
3. Study of various techniques of methane drainage.
4. Study of surface air conditioning plant.
5. Study of Underground air conditioning plant.
6. Study of different types of ventilation devices.
7. Study of cap lamp used in underground mine.
8. Design of a cap lamp room for a large underground coal mine.
9. Study of gravimetric dust sampler.
10. Study of thermal precipitator dust sampler.
11. Study of Flame safety lamps used in underground mine.

Diploma in Mining Engineering

Semester: 5th SEM
Subject Title: Underground Metal Mine
Subject Code: MIN505

Course Objective:

1. Enables the students to select suitable methods of working underground metal mines and decide the necessary parameters of mine construction.
2. The students will have good knowledge about the various advanced methods of metal Mining and special mining techniques to overcome the field issues.
3. To understand the various advanced and recent methods of metal mining.
4. The students will have basic concept on metal mining methods, mine design, development and operations of metal mines. They will also know about novel methods of metal mining and its applications.

UNIT - I UNDERGROUND DEVELOPMENT

Terminology used in metal mines, Types of ore bodies, Types of ore bodies, Types of underground opening, location of openings, Opening up of a mineral deposit by vertical shaft, inclined shaft, Adit, Level interval, factor considered while deciding level interval/length of back, Drivages of raises and winzes, Driving manually, Modern methods Alimak, long hole method, Drop raising, raise boring, Common supports in metal mines.

UNIT - II UNSUPPORTED STOPING METHODS

Classification and choice of stoping, Methods, Open stoping methods, underhand, overhand, Breast stoping, sublevel stoping, Blast hole stoping, VCR , Shrinkage method, their conditions of Applicability, Sequence of Development, stoping operation, Cycle of operations etc. System of removal of ore from stope. Supported & caving methods: Artificially supported methods cut and fill, square set, stull stoping Methods. Their applicability, stope Preparation, stoping operation, cycle of operation, relative merits and demerits etc. Caving methods - Top slicing, Sublevel caving and block caving methods, applicability, stope preparation stoping, cycle of operation etc.

UNIT - III SHAFT SINKING

Size, shape, Factors considered for location of shaft, marking center, and shaft-centering arrangement, sinking of shaft below rock head- operation of drilling, charging and blasting and mucking operation. Disposal of debris, Shaft lining: Temporary lining, Permanent lining of shaft: Brick, monolithic, reinforced concrete lining, shaft tubing's etc., Walling scaffold, rider, ledge formation, underpinning, water garland crib etc. Special method of shaft sinking**:** Different special methods of shaft sinking, condition of applicability of each method, Description etc., Widening and Deepening of shaft.

UNIT - IV BORING

Purpose of boring, classification of boring methods, applicability of boring methods, Drill Bits for various types of drilling/boring, Surface arrangement, assembly, working of Rotary boring, Screw and hydraulic feed mechanism, Core recovery, core barrels, Recover of broken tools, Bits, Bore hole survey, Deviation of boreholes.

Reference Books

1. Elements of Mining Technology Vol I, II, D.J. Deshmukh
2. Surface Mining, G.B. Mishra

Course Outcomes:

1. Develop the understanding of metal mining Industry.
2. Sketc.h the Development of a working Underground metal Mines.
3. Acquire knowledge and hands-on competence in applying the concepts in the design of metal mine.
4. Recommend the various support system for Underground metal mine working.

Diploma in Mining Engineering

Semester: 5th SEM
Subject Title: 1. Mine Hazard & Safety (Elective)
Subject Code: MIN5061

Course Objective:

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

1. Testing of different mine gases. Physiological effect on miners, detection of fire damp by flame safety lamp, explains the method of gas testing by CO- detectors & Methanometer.
2. Explain how firedamp is emitted in mines.
3. Explain causes of mine fires & spontaneous heating.
4. Define explosion, explain causes & elaborate necessary steps required for prevention of coal dust & firedamp explosion.
5. Explain the effect of noise & vibration on miners & mine structures & other surface structure.
6. Explain rescue and recovery work when mine hazard occurs

UNIT - I MINE GASES & GAS TESTING

Composition of atmospheric air. Different mine gases, their properties and physical effects .
State fire damps, black damp, stink damp, white damp and after damp in mines.
Describe flame safety lamp & its working principle.
Explain gas testing by flame safety lamp by accumulation test & percentage test.
State precaution for gas testing.
Describe various parts of flame safety lamp, special features.
State limitations of flame safety lamp.

UNIT- II EMISSION OF FIREDAMP IN U/G WORKINGS

Describe gradual exudation, blower & outbursts of firedamp in U/g workings.

UNIT - III DEFINE FIRES & SPONTANEOUS HEATING

Define incubation period
Define spontaneous heating and its causes and effects.
State preventive measures against spontaneous heating.
Explain CO/O_2 ratio & CO_2/O_2 ratio.

UNIT - IV MINE EXPLOSION

Describe coal dust explosion & fire damp explosion with their causes & prevention.
State inflammability of coal dust & fire damp.
Explain Coward's diagram.
State prevention, suppression & treatment of dust.
Describe sampling of dust in Mines.
Stone dust barrier.

UNIT - V NOISE AND VIBRATION.

Explain the effect of noise & vibration on miners & mine structures & other surface structure with
respect to statutory provision.

UNIT - VI MINE RESCUE AND RECOVERY

Proto-IV, Proto-V, Drager BG-174, Self rescuer, Smoke helmet, Gas mask.
Construction of Rescue brigade and their role in rescue and recovery operation.
Mine Rescue rules 1985 Annexure I, II, III.

Learning Resources:		
Sl. No.	Title of the Book	Name of Authors
1	Mine Ventilation	G B Mishra
2	EMT - II	D J Deshmukh
3	Coal Mine Practices	E Mason
4	UMS Vol - I	
5	Coal mine Regulations - 2017	
6	Mine Rescue	M A Ramlu

Course Outcomes:

Student will gain knowledge and able to understand the importance of health and safety including the role of safety risk assessment in mining Industry.

1. Understanding the various types of hazards present in mining operations, such as falls , explosions and toxic gas exposure.
2. Identifying and evaluating potential safety risks and hazards associated with mining activities.
3. Applying safety procedures and protocols to mitigate risks and prevent accidents in mining operations.
4. Demonstrating proficiency in the use of personal protective equipment (PPE) and other safety measures in a mining environment.
5. Understanding and complying with relevant safety regulations and standards in the mining industry.
6. Developing and implementing safety training programs for mining personnel.

Diploma in Mining Engineering

Semester: 5th SEM
Subject Title: 2. Mine Reclamation & Closure
Subject Code: MIN5062

Course Objective:

1. Provide the basis for estimating the financial liability associated with a mining project. The objective of rehabilitating a typical exploration site is to minimize long-term environmental liability by maintaining geotechnical stability, restoring native ecosystems, striving to achieve a more beneficial land use, etc.
2. Provide ideas and process about closing a mines, how to do reclamation and necessity of reclamation.
3. Understanding the principles and importance of mine reclamation and closure in the mining Industry.
4. Identifying and Evaluating environmental impacts and risks associated with mining activities.
5. Understanding the regulatory frameworks and guidelines for mine reclamation and closure.
6. Developing skills in designing and implementing mine reclamation plans , considering factors Such as site-specific conditions , landscape restoration and long-term stability.

UNIT - I LAND RECLAMATION

Economical and technical aspects of reclamation of mined out land. Reclamation Methods: Back filling, outside dumps and their stability.

UNIT - II SOIL HANDLING

Top soil handling, assessment of soil productivity potential, re-vegetation, factors for plant Growth, parameters for soil quality and their importance. Reclamation plan and land use plan, general requirements of protection of hydrologic balance.

UNIT - III SOIL EROSION

Erosion of soil, types of erosion, estimation of top soil erosion. Landscaping of disturbed land, estimation of reclamation cost and benefits, use of reclaimed land and structures.

UNIT - IV MINE CLOSURE

Mine Closure Planning: Importance, methodology, statutes concerning mine closure. Land reclamation as post mining operation, Statutes concerning reclamation of mined out area.

Reference Books:

1. Surface Mining Technology, S.K. Das
2. Elements of Mining Technology Vol I, D.J. Deshmukh

Course Outcome:

1. Understanding the legal and regulatory framework surrounding mine reclamation and closure
2. Evaluating and assessing the environmental impact of mining operations.
3. Developing and implementing effective mine closure plans
4. Knowledge and skills in reclaiming and restoring disturbed mine sites.
5. Understanding the social, economic, and cultural aspects and impact of mine closure on local communities.
6. Applying advanced technologies and best practices in mine Reclamation and closure.

Diploma in Mining Engineering

Semester: 5th SEM
Subject Title: 3. Pollution Control Engg.
Subject Code: MIN5063

Course Objective

1. To learn various kind of pollutants and their causes and preventive measures. To know the salient features of environmental laws in India.
2. To know the various types of occupational diseases in the mine.
3. Understanding the principles and concepts of environmental pollution and its impacts.
4. Identifying and evaluating various sources of pollution in different industries and sectors.
5. Applying Engineering principles and practices to design and implement effective pollution control systems.
6. Analyzing and Interpreting environmental data related to pollution control.

UNIT I ENVIRONMENTAL POLLUTION

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

UNIT II AIR POLLUTION

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

UNIT III WATER POLLUTION

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

UNIT IV LAND POLLUTION

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

UNIT V NOISE POLLUTION

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

Reference Books :

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

Course outcomes:

1. Understanding the various types of environmental pollutant and their sources.
2. Identifying and evaluating the potential impacts of pollution on human health, eco-system and the environment.
3. Applying Engineering principles and practices to design and implement effective pollution control measures.
4. Assessing the performance and efficiency of pollution control technologies and systems.
5. Analyzing and Interpreting environmental data to assess pollution level and trends.
6. Developing strategies and techniques for pollution, prevention and mitigation.

Diploma in Mining Engineering

Semester: 5th SEM
Subject Title: Application of AUTOCAD & GIS in Mining
Subject Code: MIN509

Teaching and Examination Scheme:

Teaching Scheme*			Examination Scheme					
L	T	P	Full Marks	External Exam Marks	Internal Exam Marks	External Pas Marks	Total Pass Marks	Duration of External Exams
Sessional (MIN509)		2	100	80	20		40	4 hrs

***Duration of year is considered 28 weeks**

To give emphasis on scientific and systematic exploitation of coal / minerals and to ensure sustainability of the resources, mining industry has realized the importance of technologies such as, GIS and Auto CAD for mining.

Use of GIS for mining has brought about a revolution by ensuring cost efficient and detailed studies of the concerned area. GIS for mining help in creation of maps that are an amalgamation of all the information regarding the concerned area.

Further, a system can be design to improve mine production efficiency, provide data query, information analysis and technical decision support for mine. It can be a GIS integrated system based on AutoCAD that can support image-text interactive queries and automatic drawing.
For this a basic knowledge of GIS software and Auto CAD software is required.

Course Outcomes:

After undergoing the course of study the student shall be able to

1. Topographical & Physiographical mapping
2. Mineral mapping to identify potential mineral zones
3. Geological database creation
4. Map updation for mineral exploration
5. Surface mapping
6. Data Analysis and Report Generation
7. Assist in the preparation of blueprints and other engineering plans
8. Create precise 2- and 3-dimensional drawings

Suggestive Works:

Demonstration and Concept building: Introduction to GIS, Hardware and Software requirements, Scanning of maps, Printing of maps, Geographic Data, Spatial Data, Non-spatial Data input

1. Map Scale: Type and conversion, Vertical Exaggeration, Enlargement and reduction
2. Map Projection: Concept, Classification, Polyconic Projection, Mercator Projection
3. Representation of Statistical Data: Choropleths, Isopleths dots unimodel, two dimensional and 3 dimensional diagrams
4. Relief Representation Techniques: Profile identification and representation of land forms from toposheets
5. Demonstration of Raster and Vector model for representing geographic features using GIS
6. Demonstration of attributes and spatial data in GIS
7. Preparation of Topographical sheet using GIS
8. Preparation of Physiographical mapusing GIS
9. Creation of geological database using GIS
10. Surface mapping using GIS
11. Data Analysis and Report Generation
12. Demonstration of CAD techniques for drawing
13. Draw rectangles and circles with cross-hatching and automatic dimensioning using Auto CAD Software
14. Demonstration of used of AutoCAD in mine design
15. Demonstration of common features for manipulation of 3D drawing in CAD
16. Preparation of CAD generated drawing.

Strategy Of Implementation:

Conducting practical, Industrial visits, seminars, group discussion, and assignment on different topics shall complete the curriculum for the subject.

Reference Books:

AUTHOR	TITLE	PUBLISHER
RL SINGH	Element Of Practical Geography	Kalyani Publishers
BG TAMASKAR & V M DESHMUKH	Geographical Interpretation Of Indian Topographical Maps	Orient Longman Ltd.
F.E. CROXTON,DJ COWDEN & S KLEIN	Applied General Statistics	Practice Hill India
K RAMAMURTI	Map Interpretation	Racks Printer
K.K GUPTA & V.C TYAGI	Working With Map	Survey Of India

Diploma in Mining Engineering

Semester: 5th SEM
Subject Title: Practical Training Report-II
Subject Code: MIN510

Teaching and Examination Scheme:

Teaching Scheme*			Examination Scheme					
L	T	P	Full Marks	External Exam Marks	Internal Exam Marks	External Pas Marks	Total Pass Marks	Duration of External Exams
Sessional (MIN510)			100	60	40		50	

***Practical Training of 30 To 45 Days**

Course Objectives:

Learning from textbooks, lectures and other study material does not suffice for holistic learning. Practical, hands-on learning is essential for better understanding of work processes and business functions.

The practical training activity is important for students to relate their theoretical knowledge to practical aspects of the studied courses, in terms of mining unit operations, process and concepts, and impact of its activities on health, safety, environment and society.

Benefits of industrial visits to diploma students:

1. Industrial visits help them gain hands-on experience of how industry operations are executed
2. Industry visits bridge the gap between theoretical training and practical learning in a real-life environment
3. Industry visits provide opportunity for active/interactive learning experiences in-class as well outside the classroom environment
4. With industry visits, students are able to better identify their prospective areas of work in the overall organizational function.
5. Industry visits help enhance interpersonal skills and communication techniques.
6. Students become more aware of industry practices and regulations during industry visits.
7. Industry visits broaden the outlook of students with exposure to different workforces from different industries.

Course Outcomes:

After undergoing the course of study the student shall have

1. Exposure to actual working environment
2. Acquisition of skills needed at actual work place to be supplemented by training
3. Follow safety practices and regulations inside the industry
4. Develop employability skills
5. Prepare reports

Strategy Of Implementation:

Conducting Industrial visits, seminars, group discussion, and practical assignments on different topics shall complete the curriculum for the subject.

Diploma in Mining Engineering

Semester: 5th SEM
Subject Title: Development of Life Skills
Subject Code: 501

Rationale:

In today's competitive world, the nature of organizations is changing at very rapid speed. In this situation the responsibility of diploma holder is not unique. He will be a part of a team in the organization. As such the individual skills are not sufficient to work at his best.

This subject will develop the student as an effective member of the team. It will Develop the abilities and skills to perform at highest degree of quality as an individual as well as a member of core group or team. Such skills will enhance his capabilities in the field of searching, assimilating information, managing the given task, handling people effectively, solving challenging problems.

THE SUBJECT IS CLASSIFIED UNDER HUMAN SCIENCE.

Objectives:

The students will be able to:

1. Develop team spirit i.e. concept of working in teams
2. Apply problem solving skills for a given situation
3. Use effective presentation techniques
4. Apply techniques of effective time management
5. Apply task management techniques for given projects
6. Enhance leadership traits
7. Resolve conflict by appropriate method
8. Survive self in today's competitive world
9. Face interview without fear
10. Follow moral and ethics
11. Convince people to avoid frustration

CONTENTS: Interaction by faculty / professional

Chapter	Name of the Topic	Suggested HOURS
1	**SOCIAL SKILLS** Society, Social Structure, Develop Sympathy And Empathy.	01
2	Swot Analysis – Concept, How to make use of SWOT.	01
3	**Inter personal Relation** Sources of conflict, Resolution of conflict , Ways to enhance interpersonal rela	02

4	**Problem Solving** **I)STEPS IN PROBLEM SOLVING,** 1)Identify and clarify the problem, 2)Information gathering related to problem, 3)Evaluate the evidence, 4)Consider alternative solutions and their implications, 5)Choose and implement the best alternative, 6)Review II) **Problem solving technique**.(any one technique may be considered) 1) Trial and error, 2) Brain storming, 3) Lateral thinking	**02**
5	**Presentation Skills** Body language -- Dress like the audience Posture, Gestures, Eye contact and facial expression. STAGE FRIGHT, Voice and language – Volume, Pitch, Inflection, Speed, Pause Pronunciation, Articulation, Language, Practice of speech. Use of aids –OHP,LCD projector, white board	**03**
6	**Group discussion and Interview technique** – Introduction to group discussion, Ways to carry out group discussion, Parameters— Contact, body language, analytical and logical thinking, decision making **INTERVIEW TECHNIQUE** Necessity, Tips for handling common questions.	**03**
7	**Working in Teams** Understand and work within the dynamics of a groups. Tips to work effectively in teams, Establish good rapport, interest with others and work effectively with them to meet common objectives, Tips to provide and accept feedback in a constructive and considerate way , Leadership in teams, Handling frustrations in group.	**02**
8	**Task Management** Introduction, Task identification, Task planning ,organizing and execution, Closing the task	**02**
	TOTAL	**16**

CONTENTS: PRACTICAL -

List of Assignment: (Any Eight Assignment)

1. SWOT analysis:- Analyze yourself with respect to your strength and weaknesses, opportunities and threats. Following points will be useful for doing SWOT.
   a) Your past experiences,
   b) Achievements,
   c) Failures,
   d) Feedback from others etc.
2. Undergo a test on reading skill/memory skill administered by your teacher.
3. Solve the true life problem.
4. Form a group of 5-10 students and do a work for social cause e.g. tree plantation, blood donation, environment protection, camps on awareness like importance of cleanliness in slump area, social activities like giving cloths to poor etc.(One activity per group)
5. Deliver a seminar for 10-12 minutes using presentation aids on the topic given by your teacher.
6. Watch/listen an informative session on social activities. Make a report on topic of your interest using audio/visual aids. Make a report on the programme.
7. Conduct an interview of a personality and write a report on it.
8. Discuss a topic in a group and prepare minutes of discussion. Write thorough description of the topic discussed
9. Arrange an exhibition, displaying flow-charts, posters, paper cutting, photographs etc. on the topic given by your teacher.

Note: - Please note that these are the suggested assignments on given contents/topic. These assignments are the guide lines to the subject teachers. However the subject teachers are free to design any assignment relevant to the topic. The **term work** will consist of any eight assignments.

Mini Project on Task Management: Decide any task to be completed in a stipulated time with the help of teacher. Write a report considering various steps in task management.

LEARNING RESOURCES:
BOOKS:

Sr. No	Title of the book	Author	Publisher
1	Adams Time management	Marshall Cooks	Viva Books
2	Basic Managerial Skills for All	E.H. Mc Grath , S.J.	Pretice Hall of India
3	Body Language	Allen Pease	Sudha Publications Pvt. Ltd.
4	Creativity and problem solving	Lowe and Phil	Kogan Page (I) P Ltd
5	Decision making & Problem Solving	by Adair, J	Orient Longman
6	Develop Your Assertiveness	Bishop , Sue	Kogan Page India
7	Make Every Minute Count	Marion E Haynes	Kogan page India
8	Organizational Behavior	Steven L McShane and Mary Ann Glinow	Tata McGraw Hill
9	Organizational Behavior	Stephen P. Robbins	Pretice Hall of India, PvtLtd
10	Presentation Skills	Michael Hatton (Canada – IndiaProject)	ISTE New Delhi
11	Stress Management Through Yoga and Meditation	--	Sterling Publisher Pvt Ltd
12	Target setting and Goal Achievement	Richard Hale ,Peter Whilom	Kogan page India
13	Time management	Chakravarty, Ajanta	Rupa and Company
14	Working in Teams	Harding ham .A	Orient Longman

INTERNET ASSISTANCE

1. http://www.mindtools.com
2. http://www.stress.org
3. http://www.ethics.com
4. http://www.coopcomm.org/workbook.htm
5. http://www.mapfornonprofits.org/
6. http://www.learningmeditition.com http://bbc.co.uk/learning/courses/
7. http://eqi.org/
8. http://www.abacon.com/commstudies/interpersonal/indisclosure.html
9. http://www.mapnp.org/library/ethics/ethxgde.htm
10. http://www.mapnp.org/library/grp_cnfl/grp_cnfl.htm
11. http://members.aol.com/nonverbal2/diction1.htm
12. http://www.thomasarmstron.com/multiple_intelligences.htm
13. http://snow.utoronto.ca/Learn2/modules.html
14. http://www.quickmba.com/strategy/swot/

RADHA GOVIND UNIVERSITY
RAMGARH, JHARKHAND

Department of Mining Engineering

Under Faculty of Engineering and Technology

Choice Based Credit System Curriculum for
Diploma in Engineering

SEMESTER VI

(Effective from Academic Session 2022-23)

Scheme of Teaching and Examination for

6th Semester of 3 Years Diploma in MINING ENGINEERING

Duration of Semester : **14 Weeks**
Student Contact Hours : **36 Hrs**
Total Marks : **800**
Effective from : **2022 -23 Session**

S. NO.	Name of Subject	Subject Code	Subject	Teaching Scheme			Examination Scheme					
				L	T	P	Hours of Exam	Credit	Full Marks	Final Exam /End Sem marks	Internal Assessment	Pass Marks
1.	Mine Legislation & General Safety	MIN601	Theory	3			3	3	100	80	20	40
2.	Mine Machinery-II	MIN603	Theory	3			3	3	100	80	20	40
3.	Rock Mechanics	MIN604	Theory	3			3	3	100	80	20	40
4.	Mine & Mineral Economics	MIN605	Theory	3			3	3	100	80	20	40
5.	Elective-II 1.Mineral Dressing 2.Remote Sensing &GIS 3.Mine Plan & Design	MIN606X	Theory	3			3	3	100	80	20	40
6.	Mine Machinery-II Lab	MIN607	Practical			2	4	2	50	40	10	20
7.	Rock Mechanics Lab	MIN608	Practical			2	4	2	50	40	10	20
8.	Mine Plan & Design Lab	MIN609	Sessional			2	4	4	50	40	10	25
9.	Major Project Phase-II	MIN610	Sessional			2		4	100	60	40	50
10.	Professional Practices	602	Sessional			4		4	50	30	20	25
	Total			**15**		**12**		**31**	**800**			

Note:

1. Period of Class hours should be of 1 hrs duration as per AICTE norms.
2. Remaining Hrs every week has been marked for students for Library and Student Centered Activities.
3. Drawing / Graphics / Practical / Sessional examinations will be held at parent institution.
4. Board will depute examiner for Practical examination.
5. Regarding sessional examination the parent institution will form a three member committee and this committee will examine the sessional records and hold viva of the examinee for 60 % marks allotted to the subject. Marks for remaining 40 % will be provided by the Faculty concerned on the basis of evaluation of each job / work throughout the semester.

Diploma in Mining Engineering

Semester: 6th SEM
Subject Title: Mine Legislation & General Safety
Subject Code: MIN601

Course Objective:

After undergoing the course of study, the student shall be able to

1. Provide and maintain the health and sanitary, first aid and medical appliances/facilities as per the provisions of Mines Act & Rules.
2. Supervise and enforce compliance of provisions of Regulations, from subordinate staff as per duties allotted to them under these regulations.
3. Prepare and maintain plans and section as per the provisions of mines regulations.
4. Enforce compliance of provisions related to access and egress under regulations.
5. Supervise and carryout blasting operations and enforce compliance by provisions of regulation related to explosives and blasting.
6. Take precaution and prevent accidents due to fall of roofs, explosive and blasting.

Detailed Contents:

UNIT	CONTENTS
01	**1.** MINES ACT 1952 1 .1 Important definition eg. Adolescent, adult, child, Employed, Mine, Open cast working, Relay, Shift, Serious bodily injury. 1 .2 Provisions under chapter V, 1 .3 Provision for health and safety. 1 .4 Hours & Limitations of Employment, Act 28 to 48. 1.5 Provisions regarding leave with wages, Act 49 to 56
2. MINES RULES 1955 2.1 Provisions regarding health & sanitation, first aid and medical appliances. 2.2 Mines Rules- Provisions connected with leave with wages and over time and welfare amenities. Employment of persons, Rule 46 to 52	

3. COAL MINES REGULATIONS 2017

3.1 Important definitions.

3.2 Duties and responsibilities of workman, competent person & officials. Provisions of Reg. 38, 39, 40, 41,42,43, 44, 45, 46,47, 48, 49,50,53, 56

3.3 Plans and sections Reg. 64, 65, 68, 69

3.4 Means of access & egress. Reg.70 to 75

3.5 Provisions regarding winding in shaft Reg. 76 to 90.

3.6 Transport of men & material Reg. 92 to 103

3.7 Mine working Reg. 104 to 132

3.8 Precautions against dangers from the dust gas & water Reg. 133 to 152.

3.9 Ventilation Reg. 153 to 173

3.1 0 Provisions regarding lighting and safety lamp – Reg. 174 to 182

3.1 1 Explosives & Blasting. Reg. 183 to 207

3.1 2 Provisions regarding machinery, plant & equipment and important provisions on Miscellaneous Regulations.

4. MINE ACCIDENTS

4.1 Types of mine accidents, their classifications,

4.2 Causes of accidents due to fall of roof, explosives and blasting, haulage and winding and their Preventions.

4.3 Cause and prevention of accidents due to, fires, explosions and inundations. Safety statistics, safety drive and organization of safety in the mines/area etc.

5. GENRAL SAFETY

Circulars, Bylaws & Standing orders.

5.1 Philosophy of safety , unsafe acts and conditions

5.2 Accident investigation, precaution and monitoring

5.3 Systematic support rules for coal mine with Board and pillar method of working.

5.4 Conditions for solid blasting with P5 explosives.

5.5 Precautions for use of Auxiliary fan underground.

5.6 Procedure for dealing with misfire.

5.7 Precautions regarding Blown through shots.

5.8 Model standing order in the event of stoppage of main mechanical ventilator.

5.9 Maximum air velocity.

6. INSPECTION PROCEDURE :

Procedure of inspection of old working, Haulage roadways, sinking shaft, working shaft, Winding rope, Sealed off area, subsidence and goaf area.

7. MINES RESCUE RULES :

Important provisions of coal mines rescue rules.

7.1 Organization & equipment in mines.

7.2 Rescue station.

7.3 Conduct of rescue work

Reference Books:

AUTHOR	TITLE	YEAR OF PUBLICATION	PLACE OF PUBLICATION & PUBLISHER
Central Government	Mines Act 1952	Latest Edition	Lovely Prakashan
Central Government	Mines Rules 1955	Latest Edition	Lovely Prakashan
Central Government	Coal Mines Regulation 2017 & MMR1961	Latest Edition	Lovely Prakashan
Central Government	Mine Rescue Rule 1985	Latest Edition	Lovely Prakashan
Central Government	DGMS Circulars	Latest Edition	Shining Printers, Asansol
B.K. Kejriwal	Safety in mines, Kejriwal, BK	Latest Edition	Lovely Prakashan

Course Outcomes:

1. The Act prescribes the duties of the Owner to manage Mines/Mining operation and the Health, Safety in Mines.
2. The Mines Rules, 1955 contain provisions for the welfare of the laborers working in the mines.
3. The Students will be able to describe various aspects of Coal Mines Regulations 2017.
4. The Students will be able to reduce the chances of Accidents in the Mines.
5. The Students will be able to do Inspection in Mines at Regular Interval as Prescribed in Circulars.

Diploma in Mining Engineering

Semester: 6th SEM
Subject Title: Mine Machinery-II
Subject Code: MIN603

Course Objective:

1. The Students expected to enhances the Technical knowledge of Mine Haulage System.
2. To get knowledge on Mine Machinery equipment like winding ropes, Rope Haulage, Headgear Structure.
3. To get knowledge of different types of Conveyors Used in Mines.
4. The Students are expected to enhance the Technical knowledge of different types of Pumps.
5. To get knowledge of various types of Coal Cutting Machines used in Mines.

Unit	Content
1.	**1. Haulage System** 1.1 Different types of haulages 1.2 Description of each haulage system. 1.2.1 Direct rope haulage 1.2.2 Endless rope haulage 1.2.3 Main and Tail rope haulage 1.2.4 Gravity haulage 1.3 Safety devices used on rope haulage system 1.3.1 Stop block/Buffers 1.3.2 Back stay 1.3.3 Monkey catch 1.3.4 Age craft Device 1.3.5 Runaway Switch 1.3.6 Drop Warwick 1.4 Locomotive Haulage different types /Applicability 1.4.1 Diesel locomotive 1.4.2 Electric locomotive 1.4.3 Air compressed locomotive 1.4.4 Battery locomotives. 1.5 Definition of draw bar pull, Ideal gradient,
Super elevation 1.6 Different Types of Conveyor 1.6.1 Chain conveyor 1.6.2 Plate conveyor 1.6.3 Belt conveyor 1.6.4 Condition of Suitability of each type 1.6.5 Advantageous and disadvantages 1.7 Introduction to Arial Ropeways	

2. WINDING IN SHAFT

2.1 Purpose of Winding

2.2 Main equipment used for Winding

- 2.2.1 Head gear
- 2.2.2 Headgear pulley
- 2.2.3 Cage/Skip
- 2.2.4 Winding Rope
- 2.2.5 Winding drum
- 2.2.6 Guides
- 2.2.7 Keps
- 2.2.8 Suspension Gear

2.3 Different types of winding

- 2.3.1 Drum winding
- 2.3.2 Koepe Winding

2.4 Drum winding different types

- 2.4.1 Cylindrical drum
- 2.4.2 Conical drum
- 2.4.3 Cylindroconical drum
- 2.4.4 Bi-cylindroconical drum

2.5 Provisions on winding drum

- 2.5.1 Flanges
- 2.5.2 Depth indicator
- 2.5.3 Mechanical Brakes (different types)
- 2.5.4 Automatic Contrivance

2.6 Angle of fleet

2.7 Guides different types

- 2.7.1 Rigid guides
- 2.7.2 Flexible cable

2.8 Causes of cage oscillation

2.9 Cage suspension Gear Rope Capel

- 2.9.1 D link and bull chain
- 2.9.2 Safety hook
- 2.9.3 Triangular distribution plate
- 2.9.4 Bridle chain

2.10 Different types of keps

- 2.10.1 Rigid keps
- 2.10.2 Davies improved keps gear.

	2.11 List of safety devices used in winding. 2.12 Characteristics curves 2.13 Smooth winding cycle 2.14 Koepe winding		

3.	**MINE PUMPS** 3.1 Sources of water in Mines 3.2 Classification of Mine Pumps 3.3 Reciprocating Pump 3.1.1 Single acting 3.1.2 Double acting 3.1.3 Ram pumps 3.2 Centrifugal Pumps 4.1.1 Turbine Pumps 3.3 Installation of pump 3.4 Operation of pump 3.5 Fitting on pump 3.6 Starting and stopping of pump 3.7 Face pumps 3.8 Characteristics Curves of Centrifugal and turbine pumps. 3.9 Calculations for pump discharge etc. 3.10 Snoring of pump, its prevention. 3.11 Water hammer.		
4.	**COAL CUTTING MACHINE** 4.1 Purpose of coal cutting machine 4.2 Classification of coal cutting Machine. 4.3 Different types of cut 4.4 Different parts of CCM 4.5 Cutting gear arrangements of chain 4.6 Introduction of continuous miner 4.7 Different types of mechanical Loaders.		
5.	**ELECTRIC POWER SUPPLY** 5.1 Types of cables used in mines 5.2 Permanent cable Different types, construction 5.3 Semi flexible cable Different types, construction 5.4 Flexible cable Different types, construction 5.5 Screening of cable 5.6 Cable joint box		

	5.7 Repair of cable 5.8 Bleeding of cable 5.9 Cable care and maintenance during Use and storage		
6.	**GATE END BOX** 6.1 Construction of gate end box 6.2 Safety provision in gate end box 6.3 Pilot Circuit 6.4 Different circuits for protection		

Reference Books

AUTHOR	TITLE	PUBLICATION
DJ DESHMUKH	VOL- III	Central Techno Publication, Nagpur.
S GHATAK	Mine Pump, Haulage, Winding	Coal Field Publisher Asansol

Course Outcomes:

After undergoing the course of study the student shall be able to

1. Supervise the transportation of coal/mineral by different types of rope haulages
2. Provide and maintain the safety devices to be provided on rope haulages.
3. Supervise the operation of locomotive haulages for transportation of mineral/material
4. Supervise the operation of different types of conveyers for transportation of mineral/material
5. Supervise the operation of coal cutting machines and power loaders on the coal faces
6. Supervise the installation and operation of water pumps for dealing with water in mines
7. Supervise the winding of coal/minerals from underground to surface and movement of coal/mineral on the surface.
8. Supervise installation, maintenance of ropes and attachments; safe operation and understand the methods of dealing with breakdowns.
9. Supervise operations of coalface machineries
10. Select most appropriate electrical cable for list of activities
11. Clarify assembly instructions of joint box
12. Provide and maintain the electrical appliances / switchgears etc.
13. Supervise the safe installation and operation of gate and boxes
    Integrate compliance with regulations

Diploma in Mining Engineering

Semester: 6th SEM
Subject Title: Mine Machinery-II Lab
Subject Code: MIN607

LIST OF EXPERIMENTS:

1. Study and sketch of different types of rope haulage
2. Demonstration of different models of safety devices uses on rope haulage
3. Demonstration of different types of drum winder models
4. Demonstration of different parts in cage suspension gear and their function
5. Sketches of different parts
   a. Reliance rope cable
   b. D-link
   c. Safety hook
   d. Triangular distribution plate
   e. Bull chain
   f. Cage.
6. Study of Rope splicing method
7. Study of different types of reciprocating pumps
8. Study of different types of Centrifugal pump
9. Study of face pump
10. Study of different types of coal cutting machines.
11. Identification of different types of Electrical power cables used in mine
12. Study of gate end box and its different circuits.

Diploma in Mining Engineering

Semester: 6th SEM
Subject Title: Rock Mechanics
Subject Code: MIN604

Course Objective:

1. The course provides detailed knowledge on rock properties.
2. This will equip the students with the ability to carry out various tests and monitoring the rock behavior.
3. Students will be able in analysis of analysis of data and solving rock mechanics problem in mining and excavation projects.
4. Data and solving rock mechanics problem in mining and excavation projects.
5. Provides detailed knowledge on rock properties and equips the students with the ability to carry out various tests.
6. Students will be able in analyzing the data and solving rock mechanics problem in mining and excavation projects.

Unit I Introduction to Rock Mechanics

Rock Mass Classification based on strength, hardness, RQD, Bieniawski RMR classification. Concept of stress and strain in rock, stress due to weight of strata, vertical lateral stresses. Stress due to tectonic and orogenic force, Residual stresses, induced stresses. Field stresses, modulus of elasticity poison`s number, Poison`s ratio stress fields. Introduction to elementary

Unit II Rock Mass Properties

Strength Properties: Compressive strength, Tensile Strength, Shear Strength, Flexural Strength. Strength Indices- Point Load Strength index, Impact Strength index, Protodyakonov strength index. Rebound hardness, in-situ stress by flat jack, Cohesion, Young's modulus, poison`s ratio, angle of internal friction. Porosity, Density, Moisture content permeability. Material Characteristics: Brittle material, ductile material, Elastic material, Plastic material. Time dependent properties: creep. Creep curve, factors contributing Creep, deformation.

Unit III Rock Testing

Uniaxial compressive strength, Tensile strength – Brazilian test, bending test. Shear strength test- punch shear test, direct shear test on Rock cube, triaxial method. Determination of strength indices- point load strength index, Protodyakonov strength index, impact strength index. Rock burst, Bumps, causes controlling measures, factors affecting proneness to rock burst/Bumps. Pillar Design- factors considered. Pillar design by tributary area approach, determination of factor of safety.

Unit IV Ground control

Theories of mechanics of strata behavior: Dome or arch theory, Beam theory, Function of roof bolts, Principle of Action Roof Bolts, Varieties of Roof Bolts: Slot and Wedge, Expansion shell, Grouted Roof Bolts and Resin Roof Bolts, Anchorage Testing of Roof Bolts, Bolt density, Code of practice for roof bolting in underground mines, Roof stitching, Principle of Roof stitching, Cable Bolting.

Reference Books:

1. Elements of Mining Technology Vol I, D.J. Deshmukh
2. The elements of mechanics of mining ground, B.S. Verma
3. Rock Mechanics for Engineers, Dr. B.P. Verma

Course Outcomes:

1. **Classify rock masses** using various methods like strength, hardness, RQD, and Bieniawski RMR classification.
2. **Analyze stress and strain conditions** in rock formations, including weight of strata, tectonic forces, and induced stresses. Calculate field stresses and understand the role of elasticity and Poisson's ratio.
3. **Evaluate rock mass properties** including strength (compressive, tensile, shear, flexural), deformability (creep), and physical characteristics (porosity, density, moisture). Apply strength indices and identify material behavior (brittle, ductile, elastic, plastic).
4. **Perform and interpret rock tests** such as uniaxial compression, Brazilian tensile, bending, shear strength tests, and point load testing. Analyze rock burst/bump proneness and design mitigation measures.
5. **Design and analyze ground control methods** using principles of mechanics, including roof bolting theories (beam, dome/arch), different bolt types (slot & wedge, expansion shell, grouted, resin), and cable bolting. Apply code practices for roof bolting and evaluate anchorages and bolt density.

Diploma in Mining Engineering

Semester: 6th SEM
Subject Title: Rock Mechanics Lab
Subject Code: MIN608

LIST OF EXPERIMENTS:

1. Sand bottle method of field density and void ratio
2. Determination of Plastic Limit, Liquid Limit and Shrinkage Limit
3. Falling head permeameter for permeability
4. Direct shear test for soil
5. Preparation of rock sample for laboratory testing.
6. Determination of uniaxial compressive strength of a rock sample.
7. Determination of tensile strength (Brazilian test) of a rock sample.
8. Determination of shear strength. of a rock sample.
9. Determination of point load strength index.
10. Determination of Protodyakonov strength index.
11. Determination of impact strength index.
12. Demonstration of use of flat jack for in-situ stress determination.
13. Demonstration of Closure Meters, Extensometer, Stress cells and Load Cells
14. Demonstration of various Rock bolts.
15. Study of anchorage testing of rock bolts.
16. Demonstration of cable bolting.

STRATEGY OF IMPLEMENTATION:

Conducting theory classes, practical, Industrial visits seminars group discussion, and assignment on different topics shall complete the curriculum for the subject.

REFERENCE BOOKS:

AUTHOR	Title	Publisher
D.J. Deshmukh	Elements of Mining Technology Vol- I	Central techno publication, Nagpur
S.K. Das	Modern Coal mining Technology	Mintech publication Bhubaneshwar.
B.S. Verma	The elements of mechanics of mining ground	Tuhin& Co. Lucknow
Dr. B.P. Verma	Rock Mechanics for Engineers.	Khanna Publication Delhi

Diploma in Mining Engineering

Semester: 6th SEM
Subject Title : Mine & Mineral Economics
Subject Code: MIN605

Course Objective:

After undergoing the course of study the student will be able to

1. List mineral industries in India
2. Classify mineral resources
3. Analyzed mineral inventory of India
4. Describe mineral legislation in India and National mineral policy.
5. Discuss conservation, consumption and substitute of minerals
6. Explain method of sampling and selection of sampling procedure
7. Preparation of samples for computation of reserve and grade
8. Asses the Environment Impact of mining
9. Calculate valuation and depreciation of mining
10. Evaluate mine leasing procedure.
11. Preparation of ores for ores dressing, and outline various method of ore dressing

Unit	Content	Contact Hours
1	**Indian mineral industries scenario** 1.1 **Indian mineral industries at a glance-** Mineral Production, Production of Metals & Alloys ,Foreign Trade, Average Daily Employment in Mines, Consumption of Minerals, Productions of Mineral-based Products **1.2 Mineral laws and legislation in India** 1.2.1 Mines & Minerals (Development & Regulation) Act, 1957with all amendments 1.2.2 Mineral Concession Rules, 1960 with all amendments 1.2.3 Mineral Conservation & Development Rules,1988 with all amendments 1.2.4National Mineral Exploration Trust Rules, 2015 Mines & Minerals (Contribution to District Mineral Foundation) Rules, 2015 1.2.5 Minerals (Evidence of Mineral Contents) Rules, 2015 1.2.6 Mineral (Auction) Rules, 2015 1.2.7 Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rules, 2016 with all amendments 1.2.8 Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rules, 2016 1.2.8 Mineral Conservation and Development Rules, 2017 **1.3 National Mineral Policy** NMP 1993 Huda committee 2005 NMP 2008 **1.4 Mineral resource and reserve-National and International classification system** 1.4.1 JORC Code 1.4.2 UNFC code **1.5 Outlines of National Mineral Inventory** Location, geology , exploration , physicochemical analysis, reserve/resource estimates, parameters of estimation, end-use grade, etc. classification adopted and categorization of reserves/resources along with terminologies and codes assigned to as per UNFC .of minerals in inventory	10

	1.6 Mineral conservation and substitution	
2	**Sampling** principal Estimation of sample size Equipment for sampling Types of sampling Processing of sampling Error and precaution **Salting of sample** Method of salting Precaution against salting	5
3	**Reserve and Grade** Method for computation of reserve- Geometric and Graphic Method Averaging assays-erratic high assay Method of calculation of Average grade	5
4	**Valuing mining properties** **4.1** Valuation of operating mines 4.1.1 Purpose of valuation 4.1.2 Basis of valuation 4.1.3 Factor determining value 4.1.3.1 Annual profit 4.1.3.2 Grade of ore 4.1.3.3 Price of product 4.1.3.4 Cost of production 4.1.3.4.1 Direct and indirect costs 4.1.3.4.2 Accounting General expenses Depreciation Depletion Developing cost 4.1.3.4.3 Rate of production 4.1.4 life 4.1.4.1 ore reserve 4.1.5 present value of future earning 4.1.5.1 Compound interest method 4.1.5.2 Hoskold method 4.1.5.3 Comparison of method 4.1.5.4 Discount for hazard 4.1.5.5 deferment	5
5	**Mine Taxation** Principles of mine taxation The Four R Basic principles Mining Taxation structure Mineral sector taxation method	4
6	**Royalty** Concept of Royalty and its Definition	2

	Royalty Regime in India Royalty on Coal Royalty for Minor Minerals Administration of Royalty Dead Rent	
7	**Mine leasing procedure** **Final mine closure plan**	2
8	**Inventory Control** Category of stores Duties of storekeeper Control of store Store record ABC analysis	2
9	**Environment aspect of mining** Environment and sustainable development Air pollution Noise, Pollution, Water pollution, Environment Impact Assessment(EIA), Component of EIA Process Of EIA Methodology of EIA	5
10	**Ore dressing or beneficiation** Definition Method of ore dressing Preparation of ore for ore dressing	5

Reference Books:

Author	Title	Publis her
K K Chatterjee	An introduction to Mineral economics	New age International Publisher
R T Desmukh	Mineral and Mine Economics	
IBM	Element of mineral exploration	IBM
RNP Arogyaswamy	Courses in mining Geology	Oxford and IBH
H E McKinstry	Mining Geology	Asia Publishing House , New Delhi

Course Outcomes:

1. Analyze the economic viability of mining projects.
2. Apply economic principles to mineral exploration and exploitation.
3. Evaluate the impact of government policies and regulations on the mining industry, such as taxes, royalties, and environmental regulations.
4. Analyze the global market for minerals.
5. Develop strategies for sustainable mining practices

Diploma in Mining Engineering

Semester: 6th SEM
Subject Title: 1. Mineral Dressing
Subject Code: MIN6061

Course Objective:

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

2. **Unit operations**
   Explain the principle of Blake & dodge jaw crushers, gyratory & cone crushers, roll crusher.

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

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

5. **Industrial screening**
   Explain the principle of industrial screening, type of screening (without calculation)

   Explain the operation of classifier & their application.

6. **Gravity concentration**
   Explain the general principles of wilfly table & its operation.

   Develop elementary idea regarding the operation jigs.

7. **Heavy media separation**

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

8. **Floatation**

Comprehend elementary principle of froth floatation, practical utility of frother, collection, modifiers & depressants. Describe & illustrate floatation cell.

9. **Magnetic & Electrostatic Separators**

Explain the principle of operation of magnetic & electrostatic separators.

Describe the application of separators in mineral dressing.

Reference 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.

Diploma in Mining Engineering

Semester: 6th SEM
Subject Title: 2. Remote Sensing & GIS
Subject Code: MIN6062

Course Objective:

1. Student will understand potential application of remote sensing/GIS applications
2. Enable students to learn the background to general image processing and GIS operation in order to extract and manage spatial information
3. Students will Understand advanced surveying techniques such as remote sensing and geodetic surveying

Unit I

Basic concepts of remote sensing, airborne and space borne sensors, present status of remote Sensing satellites, data acquisition techniques from different sources. Digital image processing, restoration, image enhancement,

Unit II

Segmentation feature extraction, Clustering edge detection, introduction to digital terrain modeling. Geographic Information System, introduction to microwave remote sensing and Global Positioning System.

Unit III

Application of GPS in remote sensing. Application of remote sensing. Applications of remote sensing in mineral resource identification and estimation, mine environment and ecology, post mining land reclamation, mine disaster management and reuse of mined out area

Unit IV

Use of relevant software's for remote sensing and GIS with particular reference to mining. Hands on exercises on image processing and GIS packages

Reference Books

1. Surveying and leveling Vol. I & II , T. P. Kanetkar
2. Surveying & Levelling , B.C. Punmia
3. Surveying & Levelling , Amarjit Aggarwal
4. Remote Sensing & GIS , Basudeb

Diploma in Mining Engineering

Semester: 6th SEM
Subject Title: 3. Mine Plan & Design
Subject Code: MIN6063

Course Objective:

1. Understanding of the role and scope of geomechanics specialists in mining.
2. A sound basis for management of the incorporation of geomechanics specialist advice for mine planning and operations is it from company or consultant sources.
3. Awareness of the circumstances in which geomechanics specialist advice ought to be sought and applied, and of how that can be engaged and applied.
4. The students will have knowledge on planning of opencast mining, underground mining and equipment utilization.

Unit I

Principle of the planning, short range and long range planning, role of planning in mining ventures, ore reserve estimation, economic block model.

Unit II

Mine Planning Input: Geological, mineralogical, structural, economical, environmental and technical inputs. Determination of optimum output, life of a mine and size of mine field based on economic consideration, Taylor's mine life rule, ultimate pit configuration.

Unit III

Optimum location of mine entries, theoretical considerations of opening and development of mine field.
Production planning and scheduling, mine equipment planning, estimation of their numbers, infrastructure planning.

Unit IV

Mine Closure-ongoing and final. Feasibility report and project report - contents and preparation.

Reference Books:

1. Coal Mining & Management Vol- I,S.P. Mathur & N.K. singh
2. Modern concept of surface mining,D. Biswas

Diploma in Mining Engineering

Semester: 6th SEM
Subject Title: Mine Plan & Design Lab
Code: MIN609

Course Objective:

Rationale:

Mining has to be planned and designed with due regards to economics, techniques, environment, safety and conservation. To make the mining production feasible with stated parameters, the skill of mining layout and design is required for mining technician.

Objectives:

1. to transfer the skill of mine layout and design.
2. brain storming session for appropriate mining planning.
3. dissemination of attitude for apt mine design.

LIST OF EXPERIMENTS (ANY 10)

1. Layout of manual bord and pillar method
2. Layout of mechanized bord and pillar method (LHD/SDL/Continuous miners etc.)
3. Layout of Longwall Advancing method.
4. Layout of long wall retreating method.
5. Layout of open cast slope failure in Indian Coal Mines.
6. Formation of benches in Opencast Mines as per coal mine regulations
7. Pit top and Pit bottom layout of coal mine
8. Pit top and bottom layout of metal mine
9. Manpower calculation and OMS in assumed mine
10. Design of caving v/s stowing coal mining
11. Design of supported v/s unsupported metal mining.
12. Design of non-cyclic v/s cyclic mining
13. Top slicing and sub level caving layout
14. Calculation of Stripping ratio and pit limit
15. Design of Haul roads
16. Design of box cut

Diploma in Mining Engineering

Semester: 6th SEM
Subject Title: Major Project Phase-II
Subject Code: MIN610

Teaching and Examination Scheme:

Teaching Scheme*			Examination Scheme					
L	T	P	Full Marks	External Exam Marks	Internal Exam Marks	External Pass Marks	Total Pass Marks	Duration of External Exams
Sessional 1 (MIN610)			100	60	40		50	

Course outcome:

After undergoing the course of study the student shall be able to

1. Prepare a report of a problem in mining area.
2. Identify the problems related to mining by visiting the project area.
3. Suggest appropriate method to resolve the problems.
4. Competent to visualize the problem in the form of report.

Content:

1. Each student has to submit a project report (other than practical training report) under the guidance of a supervisor (Lecture) from the institute.
2. The topic of project will be deicide by the supervisor.
3. The topic of project will cover the micro study or investigation or innovation concern to unsolved/unseen problems of mining.
4. Project may be also concern to fulfill the gap between curriculum and industry.
5. Project may be aim to skilling the students with research aptitude by adopting Cognitive and Psychomotor domain of learning.
6. Supervisor will examine the report of project submitted by the student. The evaluation of project will be in the light of learning domain. That is Cognitive and Psychomotor.
7. Framing the title of project, supervisor has to decide the objective or outcomes of project on the basis of element of learning domain.

Diploma in Mining Engineering

Semester: 6th SEM
Subject Title: Professional Practices
Subject Code: 602

Rationale:

Most of the diploma holders join industries. Due to globalization and competition in the industrial and service sectors the selection for the job is based on campus interviews or competitive tests.

While selecting candidates a normal practice adopted is to see general confidence, ability to communicate and their attitude, in addition to basic technological concepts.

The purpose of introducing professional practices is to provide opportunity to students to undergo activities which will enable them to develop confidence. Industrial visits, expert lectures, seminars on technical topics and group discussion are planned in a semester so that there will be increased participation of students in learning process.

Objectives:

Student will be able to:

1. Acquire information from different sources
2. Prepare notes for given topic
3. Present given topic in a seminar
4. Interact with peers to share thoughts
5. Prepare a report on industrial visit, expert lecture

Sl. No.	Activity Heads	Activities	Suggested Hrs
1.	Acquire information from different sources	Topic related to the branch and current area of interest i.e. articles in internet on which research or review is undergoing may be decided for the students group. The group may be restricted to maximum 5 students. Literature survey from Internet , print media and nearby practices may be undertaken. Minimum of 10 to 15 papers may be suggested for reading to get an overview and idea of matters.	12
2.	Prepare notes for given topic	Making review or concept to be penned down in form of a article .(the article or review may be of 8 – 10 pages length in digital form of 12 font size in Times New Roman font)	4
3.	Present given topic in a seminar	A seminar or conference or work shop on branch related topic is to be decided and all students in group of 5-6 students may be asked to present their views.	4
4.	Interact with peers to share thoughts	A power point presentation of the article prepared in stage 2 may be presented before the classmates and faculty members.	4
5.	Prepare a report on industrial visit, expert lecture	A topic on best practices and product / software development may be assigned to the student group. The group may be asked to prepare a survey, come to opinion making and list out the activities to develop the activities with SWOT analysis.	12