JHARKHAND Rai University

JHARKHAND RAI UNIVERSITY

RANCHI

SYLLABUS

DIPLOMA

MINING ENGINEERING

SEMESTER I

2025 - 2028

JHARKHAND Rai University

SEMESTER- I

DIPLOMA IN MINING ENGINEERING													
SEMESTER I													
				Evaluation Scheme				Subject Total	Periods			Credit	Hours
S.No	Category	Subject Code	Name of Subject	Assignment	TA	Total	ESE		L	T	P		
1	Basic Science Course	8DBSC101	Basic Mathematics I	20	10	30	70	100	3	0	0	3	3
2	Basic Science Course	8DBSC102	Basic Chemistry	20	10	30	70	100	3	0	0	3	3
3	Basic Science Course	8DBSC103	Basic Physics I	20	10	30	70	100	3	0	0	3	3
4	Engineering Science Course	8DESC101	Fundamentals of Computer	20	10	30	70	100	3	0	0	3	3
5	Humanities and Social Sciences	8DHSMC101	Life Skills I	20	10	30	70	100	2	0	0	2	2
PRACTICAL/DESIGN/DRAWING/SESSIONAL													
1	Basic Science Course	8DBSC102P	Basic Chemistry Lab		30	30	20	50	0	0	2	1	2
2	Basic Science Course	8DBSC103P	Basic Physics I Lab		30	30	20	50	0	0	2	1	2
3	Engineering Science Course	8DESC101P	Fundamentals of Computer Lab		30	30	20	50	0	0	2	1	2
4	Engineering Science Course	8DESC102P	Basic Engineering Graphics Lab		30	30	20	50	0	0	2	1	2
5	Engineering Science Course	8DESC103P	Workshop Practice I Lab		30	30	20	50	0	0	4	2	4
						TOTAL		750				20	26

Program: Diploma
Semester: One
Course: Basic Mathematics I
Course Code: 8DBSC101

L	T	P	C
3	0	0	3

Course Objective:

- To familiarize the student with functions of several variables. This is needed in many branches of engineering.
- To introduce the concepts of improper integrals, Gamma, Beta and Error functions which are needed in engineering applications.
- To acquaint the student with mathematical tools needed in evaluating multiple integrals and their usage.
- Students will simplify and evaluate algebraic expressions.
- Students will form and solve linear equations in one variable.
- Students will form and graph linear equations in two variables.
- Students will solve nonlinear equations using analytic methods.

Unit I

Trigonometry: Compound Angles, Multiple and Sub multiple Angles Inverse Trigonometric function.

Unit II

Differential Calculus: Function, Limit, Derivatives, Differentiation of implicit function, Inverse Trigonometric function and parametric function. Geometrical Meaning of dy/dx ,dy/dx as a rate Measure. Integral Calculus: Integration, Integration of product of functions, Method of Substitution, Definite Integration.

Unit III

Set Theory: Sets, Subsets Sets operations, Complement of a set, Difference of two sets, De Morgan's law, Cartesian Product of Sets. Algebra: Determinant, Permutation and Combination.

Unit IV

Vectors: Definition of Vector, Algebra of Vectors (Equality, Addition, Subtraction) Scalar and Vector Product of two and three vectors.

Suggested Reading:

1. *Basic Mathematics: Neelkant Sapna Publishing House.*
2. Basic Mathematics Semester I: Dilip Baburao S.chand & Sons.

Program: Diploma
Semester: One
Course: Basic Chemistry
Course Code: 8DBSC102

L	T	P	C
3	0	0	3

Course Objective:

- Chemistry is the base of all the scientific and technical courses.
- The knowledge gained on polymer chemistry, thermodynamics, spectroscopy, phase rule and nano materials will provide a strong platform to understand the concepts on these subjects for further learning.
- The students will be outfitted with hands-on knowledge in the quantitative chemical analysis of water quality related parameters.

Unit I

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 orbital &distinction between orbits And orbitals, Hunds Rule ,filling up the orbital's by Aufbau's principle (till Atomic no 30), Definition &types of valence (electrovalence& covalent) Octet rule, Duplet rule .formation of electrovalent &covalent compounds e.g. Nacl, $CaCl2_{,}$ $CO2$ $Cl_{2,}$ NH3C2H4,$N2_{,}$ C_2H_2Disticion between Electrovalent & covalent compounds.

Unit II

Electrochemistry : Brief study of redox reaction ,oxidation potential , Electrochemical series for Cation & anion ,Electrolysis of $CuSO_4$ solution By using carbon electrode , Faraday's first &second law of electrolysis & numerical, electrochemical cell & batteries ,definition types such As primary & secondary cell & their example .construction, working & Application of electrolysis such as electroplating &electro refining, Electrometallurgy & electrotyping

Unit III

Metal & Alloys: Metal, occurrence of Metal, Definition of Metallurgy Mineral, Ore Gangue Flux & Slag, stages of Extraction of metal from Its Ores in detail such as Fe, Al, Cr, Ni. Alloys: definition of alloy, purposes of Making alloy .preparation methods, classification of alloys such as Ferrous & Non Ferrous & their example.

Unit IV

Non Metallic Materials & Plastics : Basic concept of organic Chemistry nomenclature of different functional group & isomerism Definition of Plastic , formation of Plastic by Addition &condensation polymerization .study of Resin , Fillers ,Plasticizers Accelerates, Pigments, & their example .Engineering Application of Plastic based on their properties. Rubber natural rubber its processing, Drawbacks of Natural Rubber, vulcanization of rubber with chemical reaction .synthetic rubber , definition & distinction between natural &synthetic rubber .Thermal insulating material : definition &characteristics of thermal insulator. Preparation, properties & application of thermocol & glass wool Properties &application of Asbestos cork.

Suggested Reading:

1. *Engineering Chemistry Jain & Jain Dhanpat Rai and Sons*
2. *Engineering Chemistry S. S. Dara S. Chand Publication*
3. *Industrial Chemistry B. K. Sharma Goel Publication*

Program: Diploma
Semester: One
Course: Basic Chemistry Lab
Course Code: 8DBSC102P

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List of Experiments:

1. Study of Indicator (Methyl Orange)
2. Study of Indicator (Phenolpthalein)
3. To Determine The Strength of NaOH Solution(Standard Oxalic Acid Solution Supplied)
4. Preparation of Copper Sulphate Crystal from Its Impure Sample.
5. Salt Analysis. (Wet Test & Dry Test).

Program: Diploma
Semester: One
Course: Basic Physics I
Course Code: 8DBSC103

L	T	P	C
3	0	0	3

Course Objective:

- An ability to apply Knowledge of mathematics, science and engineering.
- An ability to design and conduct experiments, as well as to analyze and interpret data.
- An ability to function on multidisciplinary teams.
- An ability to identify, formulate and solve engineering problems.
- An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Unit I

Physical World and Measurement: Need for measurement: Units of measurement; systems of units; SI units, fundamental and derived units. Length, mass and time measurements, Dimensions of physical quantities, dimensional analysis and its applications.

Unit II

Kinematics & Laws of Motion: Frame of reference. Motion in a straight line: Position-time graph, speed and velocity. Uniform and non-uniform motion, average speed and instantaneous velocity. Uniformly accelerated motion, velocity-time, position-time graphs, and relations for uniformly accelerated motion (graphical treatment). Relative velocity. Laws of Motion: Newton's first law of motion; momentum and Newton's second law of motion; impulse; Newton's third law of motion. Law of conservation of linear momentum and its applications. Equilibrium of concurrent forces. Static and kinetic friction, laws of friction, rolling friction. Uniform circular motion, Dynamics of uniform circular motion: Centripetal force.

Unit III

Work, Energy and Power: Work done by a constant force and a variable force; kinetic energy, work-energy theorem, power. Potential energy, conservative forces, Non-conservative forces: elementary idea of elastic and inelastic collisions.

Unit IV

Motion of System of Particles, Rigid Body Dynamics, Oscillations & SHM: Centre of mass of a two-particle system, momentum conversation and centre of mass motion. Centre of mass of a rigid body; centre of mass of uniform rod. Moment of a force, torque, angular momentum, conservation of angular momentum, Rigid Body Dynamics :Equilibrium of rigid bodies, rigid body rotation and equations of rotational motion, comparison of linear and rotational motions; Oscillations & SHM :Periodic motion – period, frequency, displacement as a function of time. Periodic functions. Simple harmonic motion (S.H.M) and its equation; phase; oscillations of a spring–restoring force and force constant; energy in S.H.M.-kinetic and potential energies; simple pendulum– derivation of expression for its time period; free and forced (damped) oscillations, resonance.

Suggested Reading:

1. *Engineering Physics – R.K. Gaur & S.L.Gupta*
2. *Modern Engineering Physics- A.S.Vasudeva*
3. *Concept of Physics – H.C.Verma*
4. *Waves & Oscillations – Brij Lal & Subramaniam*

Program: Diploma
Semester: One
Course: Basic Physics I Lab
Course Code: 8DBSC103P

L	T	P	C
0	0	2	1

List of Experiments:

1. To measure the thickness of the given glass plate using Screw Gauge.
2. To measure the length and diameter of the given solid cylinder using Vernier calipers.
3. To measure the thickness of the given glass plate using Spherometer.
4. Find the resistance of a given wire using Meter Bridge.
5. To establish the current voltage relationship for a metallic conductor and find its resistance.

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Program: Diploma
Semester: One
Course: Fundamentals of Computer
Course Code: 8DESC101

L	T	P	C
3	0	0	3

Course Objective:

Student will be able to:

- Understand a computer system that has hardware and software components, which controls and makes them useful.
- Understand the operating system as the interface to the computer system & Use the basic function of an operating system.
- Set the parameter required for effective use of hardware combined with and Application software's.
- Compare major OS like Linux and MS- Windows.
- Use file managers, word processors, spreadsheets, presentation software's and Internet

Unit I

Fundamentals of Computer : Introduction ,Type of Computer, Components of PC, Inputs & Output Devices, Computer Languages, Memory of Computer.

Unit II

Introduction to MS Office : MS- Word : Introduction, Starting MS-Word Screen and its Components, Elementary Working with MS-Word, MS- Excel: Introduction, Starting MS-Excel, Basics of Spreadsheet, MS- Excel Screen and its Components, Elementary Working with MS Excel, MS –Power Point: Introduction, Starting MS-PowerPoint, Basics of PowerPoint, MS-PowerPoint Screen and Its Components, Elementary Working with MS-PowerPoint.

Unit III

Introduction to Internet: What is Internet? Computer Communication and Internet, WWW and Web Browsers, Creating own Email Account, Networking and types. **Introduction to HTML and Software:** Introduction to HTML. Working of HTML, Creating and loading HTML pages, tags, Structure of on HTML, Document, Stand Alone Tags, Formatting text, Adding Images, Creating hyper Links, Tables, Cyber security, Computer virus.

Unit IV

Information Technology: Current IT Tools, Social networking, mobile computing, cloud computing, Introduction of IOT and IOE, Computer Application in various fields like Data analysis, database management, artificial intelligence.

Suggested Reading:

1. *Computer Fundamentals by B.Ram, New Age Int.*
2. *Computer Fundamentals by P.K Sinha, Priti Sinha, Publisher Kalyani Publishers, 2nd Edition, 2003.*

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Program: Diploma
Semester: One
Course: Computer Fundamentals Lab
Course Code: 8DESC101P

L	T	P	C
0	0	2	1

List of Experiments:

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

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.

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

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

Program: Diploma
Semester: One
Course: Life Skills I
Course Code: 8DHSMC101

L	T	P	C
2	0	0	2

Course Objective:

To impart basic skills of Professional Communication in English through intensive practice to the Students, so as to enable them to function confidently & effectively in that Language in the Professional Sphere of their life

- The student must have some basic command of English so that the Student must be able to:
- Write reasonably & grammatically
- Understand (if not use) at least some 2500 general purpose words of English
- Use some 2000 (at least 1500) general-purpose words of English to express himself/herself in writing & 1500 such words to talk about day-to-day events & experiences of life.
- Understand slowly-delivered spoken material in Standard Indian English, and
- Speak reasonably clearly (if not fluently) on routine matters with his fellow Students, with proper word stress, intonation pattern, accent and perfect articulation

Unit I

Basic Grammar

- Noun, Verb, Adverb, Adjective & Preposition
- Sentence
- Tense: Present ,Past & Future
- Voice
- Narration
- Concord
- English Modals
- Connectives
- Degree of Comparison
- Nominalization

Unit II

Practice Exercise

- Re-Writing Sentences
- Gap Filling
- Common Errors
- Phrases & Idioms
- Homophones (Commonly Confused Words)
- Vocabulary Building
- Word Quiz

Unit III

Written Communication Skills

- Requisites of good sentence writing
- Effective sentence structure
- Sentence Building/ Sentence coherence
- Sentence Emphasis/theme
- Development of a paragraph

- Paragraph structure
- Principles of paragraph Writing
- Paragraph length/ coherence/ Division

Unit IV

Etiquettes & Manners

- Dinning etiquettes
- Workplace etiquettes
- Professional Manners
- Social Etiquettes
- Group Behavior
- Tour & Travel Etiquettes

Suggested Readings:

1. *Monippally, Matthukutty. M. 2001. Business Communication Strategies. 11th Reprint. Tata McGraw-Hill. New Delhi*
2. *Swets, Paul. W. 1983. The Art of Talking So That People Will Listen: Getting Through to Family, Friends and Business Associates. Prentice Hall Press. New York*
3. *Lewis, Norman. 1991. Word Power Made Easy. Pocket Books*
4. *Sen , Leena .Communication Skills ; Eastern Economy Edition*
5. *Ghanekar , Dr. Anjali . Essentials of Business Communication Skills ; Everest Publishing House*
6. *David Green . Contemporary English Grammar, Structure & Composition ; MacMillan*
7. *Dictionary; Oxford*
8. *Dictionary ; Longman*

Websites

- *www.tatamcgrawhill.com/digital_solutions/monippally*
- *www.dictionary.cambridge.org*
- *www.wordsmith.org*
- *www.edufind.com*
- *www.english_the_easy_eay.com*
- *www.englishclub.com*
- *www.english_grammar_lessons.com*
- *www.wikipedia.org/wiki/english_grammar*

Program: Diploma
Semester: One
Course: Basic Engineering Graphics Lab
Course Code: 8DESC102P

L	T	P	C
0	0	2	1

Course Objective:

- Student's ability to perform basic sketching techniques will improve.
- Students will be able to draw orthographic projections and sections.
- Student`s ability to use architectural and engineering scales will increase.
- Students will become familiar with auto cad two dimensional drawings.

Unit I

Drawing Instruments and their uses: Letters and numbers (single stroke vertical), Convention of lines and their applications, Scale (reduced, enlarged & full size) plain scale and diagonal scale, Sheet layout, Introduction to AutoCAD (Basic draw and modify Command),Geometrical constructions.

Unit II

Engineering curves & Loci of Points: To draw an ellipse by: Directrix and focus method, Arcs of circle method, concentric circles method. To draw a parabola by: Directrix and focus method, Rectangle method. To draw a hyperbola by: Directrix and focus method. Passing through given points with reference to asymptotes .Transverse Axis and focus method. To draw involutes of circle & polygon (up to hexagon).

Unit III

Orthographic projections: Introduction to Orthographic projections .Conversion of pictorial view into Orthographic Views (First Angle Projection Method Only).Dimensioning technique as per SP-46. Isometric projection. Isometric scale, Conversion of orthographic views into isometric View/projection (Simple objects), Projection of Straight Lines and Planes. (First Angle Projection Method only)

Unit IV

Lines inclined to one reference plane only and limited to both end sin one quadrant. Projection of simple planes of circular, square, rectangular, rhombus, Pentagonal, and hexagonal, inclined tone reference plane and perpendicular to the other.

Suggested Reading:

1. *Engineering Drawing N. D. Bhatt Charotar Publishing House*
2. *Engineering Drawing and Graphics+ AutoCAD K. Venugopal New Age Publication*
3. *Engineering Drawing R. K. Dhawan S. Chand Co.*
4. *Engineering Drawing ---K. R. Mohan Engineering Graphics Dhanpat Rai and Publication Co.*
5. *Engineering Drawing -P S Gill.*

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Program: Diploma
Semester: One
Course: Workshop Practice I Lab
Course Code: 8DESC103P

L	T	P	C
0	0	4	2

Course Objective:

- Students will be able to use their skills during their project work.
- Students will be able to understand the practical difficulties encountered in industries during assembly work.
- Students will be able to do simple electronic and electrical work throughout their career.
- Students will be able to rectify simple problems connected with fittings.

Suggested Reading:

1. *Workshop Technology S.K. Hajara Chaudhary Media Pro-motors and Publishers ,New Delhi*
2. *Workshop Technology B.S. Raghuwanshi Dhanpat Rai and sons, New Delhi*
3. *Production Technology R K Jain Khanna Publishers, New Delhi*
4. *Workshop Technology H.S.Bawa Tata McGraw Hill Publishers*