

**Jharkhand University of Technology**  
**Ranchi, 834010**



**SYLLABUS**  
**1<sup>ST</sup> SEMESTER**

**For Diploma Program in**  
**Mining & Mine Surveying**

**(Effective from 2024-25)**

# **Branch- Mining & Mine Surveying**

**(1<sup>st</sup> – SEMESTER)**

# Engineering Mathematics

**Subject Code-**

**(4-0-0)**

## **RATIONALE**

Engineering Mathematics specification provides students with access to important mathematical ideas to develop the mathematical knowledge and skills that they will draw on in their personal and work lives. The course enables students to develop mathematical conceptualization, inquiry, reasoning, and communication skills and the ability to use mathematics to formulate and solve problems in everyday life, as well as in mathematical contexts. At this level, the mathematics curriculum further integrates the three content areas taught in the higher grades into three main learning areas: Algebra; Measurement of angles and Trigonometry and Calculus.

## **1. COURSE SKILL SET**

*Student will be able to:*

1. Solve system of linear equations arise in different engineering fields
2. Incorporate the knowledge of calculus to support their concurrent and subsequent engineering studies
3. Adept at solving quantitative problems
4. Ability to understand both concrete and abstract problems
5. Proficient in communicating mathematical ideas
6. Detail-oriented

## **2. COURSE OUT COMES**

*At the end of the course, student will be able to*

<b>CO1</b>	Determine the inverse of a square matrix using matrix algebra. Apply the concepts of matrices and determinants to solve system of linear equations and find eigen values associated with the square matrix.
<b>CO2</b>	Find the equation of straight line in different forms. Determine the parallelism and perpendicularity of lines.
<b>CO3</b>	Calculate trigonometric ratios of allied angles and compound angles. Transform sum or difference of trigonometric ratios into product and vice versa.
<b>CO4</b>	Differentiate various continuous functions and apply the concept in real life situations.
<b>CO5</b>	Integrate various continuous functions and apply the concept in evaluating the area and volume through definite integrals.

### 3. DETAILS OF COURSE CONTENT

The following topics/subtopics is to be taught and assessed in order to develop Unit Skill sets for achieving CO to attain identified skill sets.

UNIT NO	Unit skill set (In cognitive domain)	Topics/Subtopics
UNIT-1 MATRICES AND DETERMINANTS	➤ Use algebraic skills which are essential for the study of systems of linear equations, matrix algebra and eigen values	1.1 Matrix and types 1.2 Algebra of Matrices (addition, subtraction, scalar multiplication and multiplication) 1.3 Evaluation of determinants of a square matrix of order 2 and 3. Singular matrices 1.4 Cramer's rule for solving system of linear equations involving 2 and 3 variables 1.5 Adjoint and Inverse of the non- singular matrices of order 2 and 3 1.6 Characteristic equation and Eigen values of a square matrix of order 2

<p style="text-align: center;"><b>UNIT-2</b> <b>STRAIGHT LINES</b></p>	<ul style="list-style-type: none"> <li>➤ Able to find the equation of a straight line in different forms</li> <li>➤ Determine whether the lines are parallel or perpendicular</li> </ul>	<p>2.1 Slope of a straight line  2.2 Intercepts of a straight line  2.3 Intercept form of a straight line  2.4 Slope-intercept form of a straight line  2.5 Slope-point form of a straight line  2.6 Two-point form of a straight line  2.7 General form of a straight line  2.8 Angle between two lines and conditions for lines to be parallel and perpendicular  2.9 Equation of a straight line parallel to the given line  2.10 Equation of a straight line perpendicular to the given line</p>
<p style="text-align: center;"><b>UNIT-3</b> <b>TRIGONOMETRY</b></p>	<ul style="list-style-type: none"> <li>➤ Use basic trigonometric skills in finding the trigonometric ratios of allied and compound angles</li> <li>➤ Able to find all the measurable dimensions of a triangle</li> </ul>	<p>3.1 Concept of angles, their measurement, Radian measure and related conversions.  3.2 Signs of trigonometric ratios in different quadrants (ASTC rule)  3.3 Trigonometric ratios of allied angles (definition and the table of trigonometric ratios of standard allied angles say <math>90^\circ \pm \theta</math>, <math>180^\circ \pm \theta</math>, <math>270^\circ \pm \theta</math> and <math>360^\circ \pm \theta</math>)  3.4 Trigonometric ratios of compound angles (without proof)  3.5 Trigonometric ratios of multiple angles  3.6 Transformation formulae</p>
<p style="text-align: center;"><b>UNIT-4</b> <b>DIFFERENTIAL CALCULUS AND APPLICATIONS</b></p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Able to differentiate algebraic, exponential, trigonometric, logarithmic and composite functions</li> <li><input type="checkbox"/> Able to find higher order derivatives</li> <li><input type="checkbox"/> Understand and work with derivatives as rates of change in mathematical models</li> <li><input type="checkbox"/> Find local maxima and minima of a function</li> </ul>	<p>4.1 Derivatives of continuous functions in an interval (List of formulae)  4.2 Rules of differentiation  4.3 Successive differentiation (up to second order)  4.4 Applications of differentiation</p>
<p style="text-align: center;"><b>UNIT-5</b> <b>INTEGRAL CALCULUS AND APPLICATIONS</b></p>	<ul style="list-style-type: none"> <li>➤ Understand the basic rules of integration and Evaluate integrals with basic integrands.</li> <li>➤ Identify the methods to evaluate integrands</li> <li>➤ Apply the skills to evaluate integrals representing areas and volumes</li> </ul>	<p>5.1 List of standard integrals and Basic rules of integration  5.2 Evaluation of integrals of simple function and their combination  5.3 Methods of integration  5.4 Concept of definite integrals  5.5 Applications of definite integrals</p>

## SUGGESTED LEARNING RESOURCES:

Sl. No.	Author	Title of Books	Publication/Year
1	B.S. Grewal	Higher Engineering Mathematics	Khanna Publishers, New Delhi, 40th Edition, 2007
2	G. B. Thomas, R. L. Finney	Calculus and Analytic Geometry	Addison Wesley, 9th Edition, 1995
3	S.S. Sabharwal, Sunita Jain, Eagle Parkashan	Applied Mathematics, Vol. I & II	Jalandhar.
4	Comprehensive Mathematics	Comprehensive Mathematics Vol. I & II	Laxmi Publications, Delhi
5	Reena Garg & Chandrika Prasad	Advanced Engineering Mathematics	Khanna Publishing House, New Delhi

## DETAILED COURSE CONTENT

UNIT NO AND NAME	DETAILED COURSE CONTENT
<b>1</b> <b>MATRICES AND DETERMINANTS</b>	Definition and types of matrices
	Algebra of Matrices (addition, subtraction and scalar multiplication) problems
	Multiplication of Matrices (problems)
	Evaluation of $2 \times 2$ , $3 \times 3$ determinants and Singular matrices and problems in finding unknown variable
	Cramer's rule to solve system of linear equation with 2 and 3 variables
	Cramer's rule to solve system of linear equation with 2 and 3 variables. problems
	Minors, Cofactors of elements of square matrices of order 2 and 3
	Adjoint of a square matrix ( $2 \times 2$ and $3 \times 3$ ), Inverse of a non-singular square matrix
	Adjoint of a square matrix ( $2 \times 2$ and $3 \times 3$ ), Inverse of a non-singular square matrix and problems
	Characteristic equation and eigen values of a $2 \times 2$ matrix and problems
<b>2</b> <b>STRAIGHT LINES</b>	Slope of the straight line (provided with inclination and two points on the line as well) and problems
	Intercepts of a straight line and problems
	Intercept form of a straight line and problems
	Slope-intercept form of a straight line and problems
	Slope-point form of the straight line and problems
	Two-point form of a straight line and problems
	General form of a straight line. problems on finding slope and intercepts.

	Angle between two straight lines and conditions for the lines to be parallel and perpendicular and problems
	Equation of a line parallel to the given line and problems
	Equation of a line perpendicular to the given line. problems
<b>3</b> <b>TRIGONOMETRY</b>	Concept of angles and their measurement. Radian measures and related conversions (degree to radian and vice-versa) and problems
	Signs of trigonometric ratios in different quadrants (ASTC rule)
	Trigonometric ratios of allied angles (definition and the table of trigonometric ratios of standard allied angles say $90^\circ \pm \theta$ , $180^\circ \pm \theta$ , $270^\circ \pm \theta$ and $360^\circ \pm \theta$ )
	Problems on allied angles. (proving identities)
	Problems on allied angles. (Finding values of x in an identity)
	Trigonometric ratios of compound angles (without proof)
	Trigonometric ratios of multiple angles ( $\sin 2A$ , $\cos 2A$ , $\tan 2A$ , $\sin 3A$ , $\cos 3A$ and $\tan 3A$ )
	Problems on multiple angles $\sin 2A$ , $\cos 2A$ , $\tan 2A$ , $\sin 3A$ , $\cos 3A$ and $\tan 3A$
	Transformation formulae (without proof) as sum to product. (Simple problems)
	Transformation formulae (without proof) as product to sum. (Simple problems)
<b>4</b> <b>DIFFERENTIAL CALCULUS AND APPLICATIONS</b>	Definition of a derivative of a function. Listing the derivatives of standard functions. (Algebraic, trigonometric, exponential, logarithmic and inverse trigonometric functions)
	Addition and subtraction rule of differentiation and problems
	Product rule and quotient rule of differentiation and problems
	Product rule and quotient rule of differentiation and problems
	Composite functions and their derivatives. (CHAIN RULE)
	Composite functions and their derivatives. (CHAIN RULE). Problems
	Successive differentiation up to second order
	Slope of the tangent and normal to the given curve and their equations and problems

	Rate measure: velocity and acceleration at a point of time and problems
	Local Maxima and Minima of a function
	Local Maxima and Minima of a function. Problems
<b>5</b> <b>INTEGRAL CALCULUS AND APPLICATIONS</b>	Definition of an indefinite integral. Listing the Integrals of standard functions. (Algebraic, trigonometric, exponential, logarithmic and inverse trigonometric functions)
	Rules of Integration. Evaluation of integrals with simple integrands and their combinations
	Rules of Integration. Evaluation of integrals with simple integrands and their combinations. Problems
	Evaluation of integrals with simple integrands and their combinations. Problems
	Evaluation of integrals by Substitution method
	Evaluation of integrals by Integration by parts
	Evaluation of integrals by Integration by parts. Problems
	Definition of definite integrals and their evaluation
	Evaluation of Definite integrals. Problems
	Area enclosed by the curves by integral method
	Volume generated by the curve rotated about an axis by integral method



# Communication Skill

Subject Code-

(2-0-0)

## Preamble

Today, Communication is a very important skill for the success of every millennial student. Millennials affinity to use digital media for communication, changing career and working landscapes, and greater competition in colleges and workplaces makes enhancing student communication skills beyond language a must. Rote learning a few tips or tricks the night before an interview or performance review won't do the job if students are trying to make an impression in highly collaborative workplaces of the future. Expectations from students aspiring to be part of such future workplaces are that they have not just good verbal and non-verbal communication skills but also a good understanding of how to use modern tools for effective communication.

## Scope

To enable students to communicate clearly and effectively, by improving their verbal and non-verbal communication skills, as well as enhancing interpersonal skills and knowledge of appropriate tools for specific communication strategies.

## Course Objectives

The objectives of communication skills course are:

- Build better communication skills: oral and written expressions and body language
- Enable critical thinking
- Empower with active listening skills
- Enable team work/collaboration

## Instructional Strategy

To achieve course objectives, it is important to provide the blended mode of instruction for each of the concepts. This blended mode of instruction enables and empowers students with:

- **Understanding of Concept (Theory):**
  - Through definitions, discussions, explanation, conclusions.
  - Through demonstrations: Show films or other workplace clips that model various conversation skills. This provides greater clarity of the concept by
    - Enabling observation skills
    - Helping in expression of gesture
    - building confidence
- **Application of Concept (Learning by doing):** It is imperative that to become a good communicator, the skills have to be built by applying the concept in the hypothetically created real life situations. Students are encouraged to participate in each of these activities during lab session to help build the effective communication skills.
  - Use of technology tools like audio books, apps like voice thread or paper telephone, etc.
    - To help in workplace conversions.
    - To increase active listening, pronunciation
    - To help in voice modulation
  - Group discussion
    - Reinforce active listening
    - Enable group debate to imbibe healthy communication strategies
    - Sharpen the skills of “Asking clarifying questions”
    - Sharpen Feedback / Response skills
    - Time management skills

- Group presentations/peer reviews
  - Enable team work
  - Assess concept understanding
  - Sharpen both oral and written communication skills
- Group activities:
  - foster critical thinking
  - enable reflective learning
- Tools usage:
  - Understand the difference between a Dictionary and a Thesaurus
  - Understand “When” and “How” to use these tools for communication

## Course Outcomes

After completion of this course, the student shall be able to;

- Communicate
  - Identify audience (colleagues, management, customers/vendors) and use the right methodologies for communication using the right terminology, names, grades and other nomenclature pertaining to the trade, tools and specific equipment.
- Write
  - in at least one language correctly
  - basic level notes and observations
  - job cards, work sheets, basic report writing and responding to emails, simple presentations, job applications, resume
- Read
  - Technical manuals, task sheets/job orders, policies and regulations pertinent to the job, including OEM guidelines.
  - all instructions given in memos, manuals, documents or those put up as posters across the premises
  - safety precautions mentioned in equipment manuals and panels to understand the potential risks associated
- Question
  - Ask right questions
  - Use different ways of asking questions
    - Clarifying/Open ended (What, Why, When, Who, Where, How)
    - Close ended
- Present
  - With right Posture & Gesture
  - With greater concept/content clarity
  - With high confidence
  - With voice modulation to capture the attention of audience
- Use technology tools
  - Office productivity
    - Word : Report writing
    - PowerPoint : Creating effective presentations
    - Excel : Data handling/Charts

## Course Content

The following are the various units to be taught and assessed in order to ensure the student is able to demonstrate the Course Outcomes mentioned in the **Course Outcome** section.

### Pre-assessment:

Teachers are required to administer pre-assessment before starting the actual instruction. This helps in gathering information about students' like their attitude, beliefs, interests, and learning abilities.

**Pre assessment expectations:**

- To assess current language skill (Pronunciation, usage, sentence formation)
- To assess their ability to comprehend and respond to the instruction
- To assess their interest towards accepting ideas and learning
- To assess their current communication skills: asking questions, listening, communicating with confidence

<p><b>UNIT 1: English – Introduction</b></p> <p><b>Learning outcome:</b> Learn English pronunciation, functional grammar concepts&amp; Reading. To gain confidence in spoken English. This section also covers phonemic awareness, grammar rules to set a strong base for application mode of communication.</p>			
<b>Phonemic awareness</b>	<b>Going over 42 sounds</b>	<p><i>Examining the understanding of sounds</i> <i>Spelling patterns (Consonant and Vowel blending: CVC words)</i> <i>Pronunciation</i></p> <ul style="list-style-type: none"> <li>○ List of words given above (Commonly used words)</li> <li>○ Diction (speech)</li> </ul>	
<b>Functional Grammar Concepts</b>	<b>Revision of Grammar concepts</b>	<p><i>Parts of speech</i> <i>Sentence structure</i> <i>Examples of right sentences</i> <i>Gender, Singular, Plural</i> <i>Usage of voice (active and passive) and tenses</i></p>	
<b>Comprehension activities</b>	<b>Reading conversations (check the unit wise activity table)</b>	<i>Written test for each comprehension</i>	
<p><b>UNIT 2: Communication</b></p> <p><b>Lesson outcome:</b> At the end of the session:</p> <ul style="list-style-type: none"> <li>• Students should be able to             <ul style="list-style-type: none"> <li>○ Understand the communication process, influence of voice/tone, logical organization of thought, comprehension, listening skills.</li> <li>○ Understand the basic building blocks of communication and strategies for working with each of these blocks.</li> <li>○ Learn about carrying self, etiquettes of communication.</li> <li>○ Build positive attitude about self and towards handling communication.</li> <li>○ Learn the process for effective communication, problem solving techniques, to be confident communicator.</li> </ul> </li> </ul>			
	<b>What is communication?</b>		

<p><b>INTRODUCTI ON:</b></p>	<p><b>Why communication? How do we communicate? Communication Theory and Process</b></p>		
	<p><b>Barriers to communication</b></p>	<p><i>How communication happens?</i></p> <ul style="list-style-type: none"> <li>• Pictorial representation of communication framework</li> <li>• Elements of communication: sender, receiver, message</li> <li>• Refer to activity in Unit activity section.</li> </ul> <p><i>Language</i></p> <ul style="list-style-type: none"> <li>• Lack of linguistic ability</li> <li>• Grammar</li> </ul> <p><i>Context</i></p> <ul style="list-style-type: none"> <li>• Psychology</li> <li>• Physiology</li> </ul> <p><i>Systematic</i></p> <ul style="list-style-type: none"> <li>• inefficient or inappropriate information systems</li> <li>• Lack of communication channel</li> <li>• lack of understanding of the roles and responsibilities</li> </ul> <p><i>Attitude</i></p> <ul style="list-style-type: none"> <li>• Perceptions</li> <li>• Preconceived notions</li> </ul>	

**Building blocks  
of  
communication**

**People  
Message  
Context  
Listening**

***People:***

- Empathising with sender's or receiver's perception
- Intent & Impact on the sender/receiver
- Think – Feel – Do model

***Message:***

Message channels:

- Inperson, **email**, memo, report

Be aware of Mental Filters

- Level of understanding/knowledge
- Personal concerns
- Pre conceived notions

Organize message:

- Critical thinking: organize your thoughts?

Use following strategy:

- Who
- What
- When
- Why
- How

- Bundle Primary and Secondary information
- Mindful about non-verbal message
- Tone of voice

Examples of Types of messages:

- Inform
- Persuade
- Cyclical

Avoiding Miscommunication:

- Evaluate (Checking for) understanding of the intent of the message with the receiver – by asking clarifying questions?

***Context:***

Define context

Importance of context

Tune into context

- Timing
- Location
- Relationship

		<p><b><i>Listening:</i></b></p> <p>Importance of listening</p> <p>Barrier to listening:</p> <ul style="list-style-type: none"> <li>• Mental filters</li> <li>• Multitasking</li> <li>• Information overload</li> </ul> <p>Strategies for listening:</p> <ul style="list-style-type: none"> <li>• Recall</li> <li>• Acknowledge</li> <li>• Summarize</li> <li>• Listen with eyes for connecting to non-verbal connection</li> <li>• Empathize</li> <li>• Pay attention</li> <li>• Ask clarifying questions</li> </ul> <p>Effective Listening Behaviors:</p> <ul style="list-style-type: none"> <li>• Maintaining relaxed body posture</li> <li>• Leaning slightly forward if sitting</li> <li>• Facing person squarely at eye level</li> <li>• Maintaining an open posture</li> <li>• Maintaining appropriate distance</li> <li>• Offering simple acknowledgements</li> <li>• Reflecting meaning (paraphrase)</li> <li>• Reflecting emotions</li> <li>• Using eye contact</li> <li>• Providing non-distracting environment</li> </ul> <p>Behaviors that hinder effective listening</p> <ul style="list-style-type: none"> <li>• Acting distracted</li> <li>• Autobiographical (Telling your own story without acknowledging theirs first)</li> <li>• No response</li> <li>• Invalidating response, put downs</li> <li>• Interrupting</li> <li>• Criticizing</li> <li>• Judging</li> <li>• Giving advice/solutions</li> <li>• Changing the subject</li> <li>• Reassuring without acknowledgment</li> </ul>	

### **UNIT 3: Verbal Communication**

#### **Lesson outcome:**

At the end of this session, Students should be able to:

- Understand and define the communication framework structure for each of the verbal communication(in person/telephonic/video conference).
- Understand and apply the verbal communication techniques.
- Use technical jargons in communication.
- Use right body language during verbal communication
- Understand and practice the Active Listening techniques
- Confidently articulate or present the content

<p><b>Different types of verbal communication:</b></p>	<p><i>In person</i></p> <p><i>Telephonic</i></p> <p><i>Video conference</i></p>	<p>Use ABC's : Accuracy, Brevity, Clarity</p> <ul style="list-style-type: none"> <li>○ Introduction</li> <li>○ Main body of the content</li> <li>○ Summary</li> </ul> <ul style="list-style-type: none"> <li>● Use voice/tone effectively</li> <li>● Reinforcement of Listening skills: Active and Empathetic listening skills</li> <li>● Body language <ul style="list-style-type: none"> <li>○ Eye contact</li> <li>○ Body posture</li> <li>○ Gesture</li> <li>○ Facial expression</li> <li>○ Space</li> </ul> </li> </ul>	
<p><b>Listening Skills</b></p>	<p><i>Effective Listening behaviors</i></p>	<p>Effective Listening Behaviours:</p> <ul style="list-style-type: none"> <li>● Maintaining relaxed body posture</li> <li>● Leaning slightly forward if sitting</li> <li>● Facing person squarely at eye level</li> <li>● Maintaining an open posture</li> <li>● Maintaining appropriate distance</li> <li>● Offering simple acknowledgements</li> <li>● Reflecting meaning (paraphrase)</li> <li>● Reflecting emotions</li> <li>● Using eye contact</li> <li>● Providing non-distracting environment</li> </ul>	
	<p><i>Behaviours that hinder effective listening</i></p>	<p>Behaviours that hinder effective listening</p> <ul style="list-style-type: none"> <li>● Acting distracted</li> <li>● Autobiographical (Telling your own story without acknowledging theirs first)</li> <li>● No response</li> <li>● Invalidating response, put downs</li> <li>● Interrupting</li> <li>● Criticizing</li> <li>● Judging</li> <li>● Giving advice/solutions</li> <li>● Changing the subject</li> <li>● Reassuring without acknowledgment</li> </ul>	
<p><b>Using technical Jargons:</b></p>	<p><i>Assignment based project encouraging pupil to use the</i></p>		



	<p><i>technical terms in the written and verbal communication.</i> This requires understanding of the core concepts (from subject teacher) and integrating the concept with communication concepts to gain the real time application knowledge.</p>		
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**UNIT4: Non-Verbal Communication:**

**Lesson outcome:**

At the end of this unit, students should be able to:

- Understand the importance of Body language and its impact.
- Use the strategies for effective body language.
- Understand the relevance of different elements of emails and how to use them.
- Develop the confidence in presenting written content in logical and organized manner with a definitive email framework.
- Write different email formats confidently: Job application, Request email, apology email, email responses/feedback.
- Confidently write Resume/Curriculum-vitae, Reports, Formal letters and portfolio.

<p><b>Body Language</b></p>	<p><i>Strategies</i></p>	<p>Body language tips:</p> <ul style="list-style-type: none"> <li>• Keep appropriate distance</li> <li>• Take care of your appearance</li> <li>• Maintain eye contact</li> <li>• Smile genuinely</li> </ul> <p>Do's and Don'ts:</p> <p>dos:</p> <ul style="list-style-type: none"> <li>• smile</li> <li>• stand up confident and straight</li> <li>• use appropriate hand gestures</li> <li>• Make eye contact with audience</li> <li>• Hold neat note cards while presenting content</li> </ul> <p>Don'ts</p> <ul style="list-style-type: none"> <li>• point at anyone</li> <li>• rock backwards and forwards</li> <li>• pace across front of room</li> <li>• read off slides</li> </ul> <p>read off notes</p> <p>Different types of emails: Job application, request letter, letter writing and quick notes</p> <p>Structure of email text:</p> <ul style="list-style-type: none"> <li>• Introduction – Beginning of the letter and this plays crucial role as it provides first impression to the reader. <ul style="list-style-type: none"> <li>○ Who: author (name + position and organisation)</li> <li>○ what: purpose - controlling idea (what author does or feels)</li> </ul> </li> </ul>	
<p><b>Art of Professional writing:</b></p>	<p><i>Written communication</i></p> <p><i>Emails:</i></p> <ul style="list-style-type: none"> <li>• Structured framework for writing formal emails to emphasize on professional communication in English</li> </ul>	<ul style="list-style-type: none"> <li>• Development: Expand on the Controlling Idea/purpose of the email by answering relevant WH questions <ul style="list-style-type: none"> <li>○ what, when, where, who, whom, which, whose, why, and how</li> </ul> </li> <li>• Conclusion: Positive words <ul style="list-style-type: none"> <li>○ Verb: thank, appreciate, hope, wish</li> </ul> </li> </ul>	

		<p>o Phrases: be glad about, look forward to</p> <p>Email writing samples and practice content in the activity section.</p> <p>Additional essential writing skills – Framework will be provided and assignments will be advised:</p> <ul style="list-style-type: none"> <li>• Resume writing /Curriculum Vitae</li> <li>• Report Writing</li> <li>• Portfolio writing</li> <li>• Formal letters</li> </ul>	
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**UNIT5: English - Reading Skills, Grammar & Vocabulary**

**Lesson Outcome:**

At the end of the session, student should be able to:

- Read sentences with punctuation.
- Understand the techniques of reading complex words.
- Understand and apply the reading techniques for efficient reading.
- Understand the usage of communication tools like Thesaurus and Dictionary that aids in improving vocabulary and reading.
- Understand and apply the functional grammar aspects in day today communication.

	<p><i>Comprehension activities</i></p> <p><i>Techniques for smart reading</i></p> <p><i>List of Commonly confused words and how to use/avoid them</i></p> <p><i>Sentences:</i></p> <p>o Declarative sentence</p>	<p>Passage comprehension Conversation comprehension</p> <p>Strategies for smart reading:</p> <ul style="list-style-type: none"> <li>• Skimming and scanning through the text, inferring the meaning</li> <li>• Questioning, summarizing</li> </ul> <p>Set of words to accelerate the English language learning and usage. Strategies to use these words effectively</p> <p>Techniques of categorizing sentences, understanding how to build with punctuation and effectively use in the</p>	
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<p><b>Reading skills</b></p>	<ul style="list-style-type: none"> <li>○ Imperative sentence</li> <li>○ Interrogative sentence</li> <li>○ Exclamatory sentence</li> </ul>	<p>verbal and non-verbal communication. This involves more of hands on activities.</p>	
<p><b>Functional Grammar</b></p>	<p><i>Punctuation, Content organization and Comprehension</i></p>	<p>Comprehension remains as a main activity to accelerate the learning of spoken and written English language</p>	
<p><b>Vocabulary</b></p>	<p><i>Techniques:</i></p> <ul style="list-style-type: none"> <li>● Learning new words from comprehension by way of repetition and usage of these words in communication</li> <li>● Listing technical jargons and repeatedly using in the communication with peers and teachers</li> <li>● Chunking and reading words</li> </ul> <p><i>Tools</i></p> <ul style="list-style-type: none"> <li>● Understand the difference between a Dictionary and a Thesaurus</li> <li>● Understand “When” and “How” to use these tools for communication</li> </ul>	<p>Increases vocabulary, builds confidence and helps in becoming a good communicator.</p> <p>Activities are done, tips are provided to efficiently implement these strategies.</p>	

## Unit 6 - Communication Tools

### Lesson Outcome:

At the end of the session, student should be able to:

- Use Email technology efficiently for communication
- Present content in the PPT format efficiently
- Understand different platforms available for web conferencing and efficiently work with them.
- Create reports and data management.

<b>Introduction</b>	Evolution of communication tools	Traditional vs. modern communication tools Advantages and Disadvantages	
<b>One-to-One</b>	<i>Email using Gmail</i>	How to use the tools effectively? Formatting, layout Including attachment Working with “To, CC, BCC” and Subjectfields effectively Using signature	
<b>One-to-Many</b>	<i>Presentation using PowerPoint</i>	Creating, Editing, Saving slides Using Animation Formatting options	
	<i>Webinar / Web Presentation (zoom, Google meet, Skype)</i>	Hosting online meeting using online meeting tools Inviting people Sharing screen	
<b>Other</b>	<i>Reports using MS Word</i>	Open, close, Edit and Save usage with documents Layout and strategies for creating report Sample report creation demo with follow on assignment Core subject project report submission assignment	
	<i>Data &amp; Graphs using MS Excel</i>	Open, close, save and edit the excel document Creating data Using basic maths operation in Excel for working with data Creating simple graphs Assignment: For example, creating statistics of subject wise activities completed for 6 months in the credit course	

### Course Class Activity List (Unit-wise)

The following are the various activities that faculty could conduct for each unit are presented below;

Unit No.	Unit Title	Unit Activities
<p><b>UNIT 1: Activities:</b></p>	<p><b>English – Introduction</b></p>	<p>1. 42 sounds revision:</p> <ol style="list-style-type: none"> <li>1. s, a, t, i, p, n</li> <li>2. c k, e, h, r, m, d</li> <li>3. g, o, u, l, f, b</li> <li>4. ai, j, oa, ie, ee, or</li> <li>5. z, w, ng, v, oo, oo</li> <li>6. y, x, ch, sh, th, th</li> <li>7. qu, ou, oi, ue, er, ar</li> </ol> <ul style="list-style-type: none"> <li>• This helps in reducing the native language impact</li> <li>• Helps in understanding Short and Long vowel words</li> <li>• Helps in spelling</li> <li>• Helps in pronunciation</li> </ul> <p>2. Reading commonly used words loud from the list (list will be provided in the workbook):</p> <ul style="list-style-type: none"> <li>• This helps in getting familiarity with the word pronunciation and helps in reading.</li> </ul> <p>3. Blending words activity:</p> <ul style="list-style-type: none"> <li>• Write simple three letter words (CVC/CVCC/CVCV) pattern words: Can, Cap, Snap, cape (list will be provided in the workbook)</li> <li>• Show how to blend with the sound.</li> <li>• Starting with 3 letter words and continuing to 6 to 8 letter words. <i>Note: Remember before going through big words, it is always important to assess and ensure the student is aware of all the 42 sounds and are comfortable making small words.</i></li> </ul> <p>Parts of Speech:</p> <p>building sentence using parts of speech: Demonstration by teacher: (Will be explained in the book as an example)</p> <p>Jumbled parts of speech: Student should pick the right order to build meaningful sentence:</p> <p>(More samples will be provided in the workbook)</p> <ul style="list-style-type: none"> <li>• College go to you everyday.</li> <li>• Makes spider web the a</li> </ul>

		<p>Gender, Singular and Plurals:</p> <ul style="list-style-type: none"> <li>• Match the following activity for singular and plural</li> <li>• Fill in the blanks activity for genders</li> </ul> <p>Reading &amp; Comprehension: Conversation</p> <ul style="list-style-type: none"> <li>• Conversation at the bank (provided in the workbook along with few more conversation samples)</li> <li>• Questions based on this conversation will be provided in the workbook</li> </ul>
<p><b>Unit 2</b></p>	<p><b>Communication</b></p>	<p>Oral:</p> <ul style="list-style-type: none"> <li>• Introduce yourself?</li> </ul> <p>Visual:</p> <ul style="list-style-type: none"> <li>• Video clip on communication etiquette</li> <li>• Pictures (in addendum section): do's and don'ts of communication</li> </ul> <p>Group of students, one participant whispers in another participant's ear, and this message has to be passed on in a circle until it reaches back the sender. Making a note of process of message conveyed and how it was perceived.</p> <ul style="list-style-type: none"> <li>○ Identify the communication gap if any.</li> <li>○ Discuss and conclude the communication framework importance</li> <li>○ Discuss/reiterate how to make communication framework strong.</li> </ul> <p>1. Role play to assess the understanding of building blocks of communication: (can be tapered to the core skills of diploma courses, following are just few of the examples)</p> <ol style="list-style-type: none"> <li>a. Announcing the result of students in the class or</li> <li>b. Announcing the job placement of students (people, context, message, form of message)</li> <li>c. Discussing the guidelines of examination (listening skills)</li> <li>d. Listening to the weather forecast without seeing and making note of the listening</li> </ol>

		<p>ability (play video of weather forecast) – Assess based on how much the student is able to recall.</p> <p>2. Run National geography/Discovery Video clip/subject related technical video clip on YouTube:Check:</p> <ul style="list-style-type: none"> <li>○ if the student has not understood what a speaker expressed</li> <li>○ about work or safety related issues</li> <li>○ seeking clarification or advice appropriately from colleague, customer, management or vendor</li> </ul>
<p><b>Unit 3</b></p>	<p><b>Verbal communication</b></p>	<p>1. Voice/tone modulation: Showcase video Discussion:  What was right?  What was wrong?  How it should have been better?</p> <p>2. Picture description activity (memory test): Class split into groups A, B C,D: (two or four groups of at least 5 people each): Teacher shows different picture to each group for three minutes. Now each group has to remember what was on the picture and discuss with each other, write down the elements on a piece of sheet and share it with the teacher. Group that remembers more will be the winner.</p> <p>Teacher to observe the body language of a student in the group, listening skills of a student, presentation skill, comprehension skill, content delivery skill, confidence level, team work. And reiterate the concepts, dos and don'ts, and discuss what could have been done better. (details of pictures will be given in the workbook)</p> <p>3. Telephonic conversation: Role play by a teacher: Call Airtel/Vodafone department and asking for the phone number portability process.</p>



		<p>After teacher demonstrates, teacher divides the class in to small groups of three people.</p> <ul style="list-style-type: none"> <li>• Each group will be given a different telephone conversation assignment (samples will be provided in workbook).</li> <li>• Two people in the group pretend to converse over the phone, and the third person makes a note of right and wrong approaches during the communication.</li> </ul>
<p><b>Unit 4:</b></p>	<p><b>Non-verbal communication</b></p>	<p>Body language</p> <p>Simon Says:</p> <p>Instructions and set up :</p> <ol style="list-style-type: none"> <li>1. Series of instructions to the group that are to be copied/reproduced. Start slowly and increase the pace</li> <li>2. State the following actions as YOU do them: <ul style="list-style-type: none"> <li>○ Put your hand to your nose</li> <li>○ Clap your hands</li> <li>○ Stand up</li> <li>○ Turn around</li> <li>○ Touch your shoulder</li> <li>○ Sit down</li> <li>○ Stamp your foot</li> <li>○ Cross your arms</li> <li>○ Put your hand to your forehead – <u>BUT WHILE SAYING THIS PUT YOUR HAND TO YOUR NOSE</u></li> </ul> </li> <li>3. Observe the number of group members who copy what you did rather than what you said.</li> </ol> <p><b>Outcome of this activity:</b></p> <p>Discuss how body language can reinforce/influence verbal communication and drive the importance of body language and how to work on it</p> <ul style="list-style-type: none"> <li>• Email communication &amp; Using technical jargons:</li> </ul> <p>Sample letter writing as assignment to students. (list will be provided in the text book – Request, apology,</p>

		<p>job application and relevant email formats that are useful for students post diploma course)</p> <ul style="list-style-type: none"> <li>• There will be at least one assignment that utilizes technical jargons in email communication.</li> </ul>
<b>UNIT 5:</b>	<b>English - Reading Skills, Grammar &amp; Vocabulary</b>	<ul style="list-style-type: none"> <li>• Reading passage (Provided in workbook)</li> <li>• Reading passage from the text book</li> <li>• Comprehension: Passage &amp; Conversation (will be provided in workbook)</li> <li>• Chunking words and reading activities</li> </ul>
<b>Unit 6:</b>	<b>Communication tools</b>	<ul style="list-style-type: none"> <li>• Email writing activities: Writing emails using email provider. Theme based email writing</li> <li>• Report writing assignment</li> </ul> <p>Writing about a machinery tool/interior designing plan? Related to the diploma stream.</p> <ul style="list-style-type: none"> <li>• Resume writing assignment</li> <li>• Data handling: Collecting data about machines/number of students passed out of college for last three years and creating graph about it.</li> <li>• Presentation: <ul style="list-style-type: none"> <li>○ About learning in the communication class</li> <li>○ Concept presentation</li> </ul> </li> </ul>

### Recommended Learning Resources

<https://www.englishclub.com/grammar/parts-of-speech.htm>

Watch Amy Cuddy's TED Talk: [Your Body Language Shapes Who You Are](#)

Additional Reading: [http://money.cnn.com/2000/05/03/career/q\\_body\\_language/](http://money.cnn.com/2000/05/03/career/q_body_language/)

## Communication Skill Lab

**Subject Code-**

**(0-0-4)**

**Activity 1:**

Make a group, read random words from the list, build sentence for few words from the list.

Create a group of 3 or 5 students. Randomly pick 5 words from the word list write down on the board/show them as a chart if you have created a word chart/make chart of words and ask them to pick one chart and READ the word.

**Main idea:** Testing the pronunciation ability, language ability, confidence in speaking, ability to understand and accept the instruction

**Activity 2:**

Simple reading test – Reading passages (Simple passage from the current course book)

Show the reading passage, let each one of them read 2 lines, after first student is done with reading two lines, then the next student must pick up from there and read next two lines. This process has to be followed until the entire class is done with reading or at least ten students are done with reading.

**Main idea:** Testing listening skills, attentiveness, language ability, pronunciation ability

**Activity 3:**

Students getting to know each other. Create a group of 3 or 5 students. Each student gets chance to talk to another student, introduce him/herself to the student, ask question, make a note of the answer against the name of the student who is answering the question on a sheet of paper.

**Main idea:** To assess current communication level, body language when students talk with each other, and confidence.

### Commonly Used Word List

When	Today	For	Off	Yes	To	Girl	This		
Give	Stop	There	Often	On	Am	A	Could		
Again	Little	Than	Myself	Been	Where	You	Now		
Do	Large	At	Over	Of	Way	Be	Fun		
From	Both	Like	Along	He	Which	Were	Only		
Him	Name	Said	Why	It	Write	Or	Much		
Can	Few	They	Has	More	Goes	One	Tell		
Go	Home	Look	Bring	My	Great	All	Out		
But	Big	Know	Part	Any	Number		That	Fast	
Old	Should	Done	By	Their	First	Cat	Is		
Not	Once	High	As	We	Find	His	Small		
Her	Thought		So	She	Me	Have	Dog		
Time	Better	Them	Away	Did	In	How	See		
Long	Many	Does	No	Went	Before	Water	Here		
Had	Get	Always	Other	Full	Saw	And	People		
Word	Please	These	With	Some	Never	Use	School		
Very	Ask	Last	An	Then	Boy	Take	Two		
Your	Say	Got	What	If	Right	The	Call		
Make	Ten	Next	Come	Night	After	Will	Might		
Day	I	Those	Would	Made	About	Was	May		
Each	Show	Play	Who	Up	Far	Are	Walk		

To assess current communication skill: Activity based

### Activity 3:

Making a group of students and getting to know each other with a predefined expectation for example:

Name:

I have performed on stage:

I'm good at sports:

I can speak more than 3 languages:

I'm always cheerful:

I like my mother tongue:

# Computer Aided Engineering Drawing

Subject Code-

(2-0-0)

## 1. COURSE RATIONALE:

Engineering Drawing is an effective language of engineers. It is the foundation block which strengthens the engineering & technological structure. Moreover, it is the transmitting link between ideas and realization.

## 2. LIST OF COMPETENCIES:

*The course content should be taught and implemented with the aim to develop different types of skills leading to the achievement of the following competencies:*

1. Prepare engineering drawings both manually and using CAD with given geometrical dimensions using prevailing drawing standards and drafting instruments.
2. Visualize the shape of simple object from orthographic views and vice versa.

## 3. COURSE OUT COMES:

CO1	Adopt the standards, dimensioning and construct appropriate drawing scales, in technical drawing development.
CO2	Visualize objects in all planes and learn displaying techniques for graphical communication in design process.
CO3	Sketch orthographic projections into isometric projections and vice versa.
CO4	Use computer software and Apply computer aided drafting tools to create 2D /3 D engineering drawings

## 4. INSTRUCTIONAL STRATEGY:

1. Teacher should show model of real of the component/part whose drawing is to be made. Emphasis should be given on cleanliness, dimensioning and layout of sheet.
2. Focus should be on proper selection of drawing instruments and their proper use.
3. The institute should procure AutoCAD or other engineering graphics software for practice in engineering drawings.
4. Separate labs for practice on Engineering graphics Software should be established.

## 5-a CONTENTS:

The following topics/sub topics is to be taught and assessed in order to develop Unit Skill sets for achieving CO to attain identified skill sets

## 5-b COURSE CONTENT DETAILS:

Unit	Major Learning Topics and Sub- Topics	Outcomes (in cognitive domain)
<b>UNIT-1</b> Basic elements of Drawing	1.1 List the different drawing instruments and application 1.2 Convention of lines and its application(Thick, Thin, Axis etc.,) 1.3 Practice use of drawing instruments 1.4 Representative fraction 1.5 Scales - Full Scale, Reduced Scale and Enlarged Scale 1.6 Dimensioning a. Aligned system and Unidirectional system in the Sketches b. Chain dimensioning and Parallel dimensioning 1.7 Construct different polygons	1. Drawing equipments, instruments and materials. 2. Equipments-types, specifications, method to use them,applications. 3. Instruments-types, specifications, methods to use them andapplications. 4. Pencils-grades, applications, Different types oflines. 5. Scaling technique used indrawing. 6. Dimensioningmethods.- Alignedmethod. Unilateral with chain, paralleldimensioning. 7. Constructions of geometrical figures
<b>UNIT-2</b> Introduction to Projections	2.1 Introduction to Projections-Principle Planes of Projection and Principle Views 2.2 Introduction to First angle and Third angle method, their symbols 2.3 Projection of points in All 4 Quadrants	1. Reference planes, orthographicprojections. 2. Concept ofquadrant, 1st angle and 3rd angle projection andtheir symbols. 3. Projection ofpoints.
	2.4 Projection of Lines a) Parallel to both the planes b) Parallel to one and Perpendicular to another c) Parallel to one and Inclined to another	1. Projection of lines determination of true length and inclinations for followingcases. (a) Line parallel to one or both theplane. (b) Line perpendicular to one of theplane. (c) Line inclined to one plane and parallel to another.
	2.5 Projection of plane surfaces. a) Parallel to one plane and Perpendicular to other two b) Planes Perpendicular to one plane and inclined to the other ( Resting on Edge, Corner, Inclined to HP And VP)	1. Projection ofPlanes. (a) Types ofplanes. (b)Projection of planes parallel to one of the referenceplanes. (c) Projection of plane inclined to one reference plane and perpendicular toanother. Note : <i>Triangle, Square / rectangle, pentagon, hexagon and circle shape should be included in various plane problems.</i>

	2.6 Projection of Solids for the above conditions	1. Projections of solids in various positions with respect to the reference planes. (Parallel, perpendicular and inclined to HP and / or VP.)
<b>UNIT-3</b> <b>Orthographic projections</b>	3.1 Introduction to orthographic, Perspective, Isometric and Oblique projections 3.2 Conversion of pictorial view into Orthographic Views	1. Types of projections-orthographic, perspective, isometric and oblique: concept and applications. 2. Various terms associated with orthographic projections. (a) Theory of projection. (b) Methods of projection. (c) Orthographic projection. (d) Planes of projection. 3. Conversion of simple pictorial views into Orthographic views. Illustrative problems on orthographic projection. Note : (1) Problem should be restricted up to - Front view/Elevation, Top view/Plan and Side views only. Use First Angle Method only.
<b>UNIT-4</b> <b>Isometric projections</b>	4.1 Introduction to Isometric Projections 4.2 Isometric Scales and Natural Scale 4.3 Isometric View and Isometric Projection 4.4 Conversion of Orthographic Views into Isometric	1. Isometric axis, lines and planes. 2. Isometric scales. 3. Isometric view and isometric drawing. 4. Difference between isometric projection and isometric drawing. 5. Illustrative problems limited to Simple elements
<b>UNIT-5</b>	5.1 Introduction to CAD- Hardware requirements. 5.2 Various CAD software available 5.3 Familiarization of CAD window - Commands like New file, Saving the file, Opening an existing drawing file, Creating templates 5.4 Setting up new drawing: Units, Limits, Grid, Snap. Standard sizes of sheet. 5.5 Selecting Various plotting parameters such as Paper size, paper units, Drawing orientation, plot scale, plot offset, plot area, print preview 5.6 Draw basic entities like Line, Circle,	1. Computer graphics & its terminology. 2. CAD definition, concept & need. 3. Commands used in CAD 4. Functional areas of CAD. - Coordinate systems. 5. Familiarization of CAD commands 6. Draw simple Geometrical figures using CAD

	<p>Arc, Polygon, Ellipse, Rectangle, Multiline, Dimensioning, Inserting text</p> <p>Applying constraints - horizontal, vertical, parallel, concentric, perpendicular, symmetric equal, collinear</p> <p>5.7 Insert title block for the drawing and take the Print out</p> <p>5.8 Create objects by applying constraints and convert the objects to full scale , reduced scale and enlarged scale</p> <p>5.9 Apply copy, mirroring, array, fillet and trim on the object created</p>	
<p><b>UNIT-6</b> <b>CAD Drafting</b></p>	<p>6.1 Draw different types of 2D/3D modeling entities using viewing commands, to view them (Problems solved in chapter no 3 and 4 i.e Orthographic, isometric projection).</p> <p>6.2 2D/3D modeling for Threadprofiles,nuts,bolts,studs,setscrews,washer,Locking arrangements</p>	<p>1 Difference between 2D &amp; 3D models.</p> <p>2.2D/3D modeling – concept, Simple objects</p>



## Computer Aided Engineering Drawing Lab

Subject Code-

(0-0-4)

The exercises/practical/experiments should be properly designed and implemented with an attempt to develop different types of skills leading to the achievement of the competency. Following is the list of exercises/practical/experiments for guidance.

Sl. No	Unit No.	Practical Exercises (Outcomes in Psychomotor Domain)
1	1	1. Teacher will demonstrate a: Use of a. Drawing instruments. b. Planning and layout as per IS. c: Scaling technique.
		2. Draw following. Problem – 1 Drawing horizontal, vertical, 30 degree, 45 degree, 60 & 75 degrees lines using Tee and Set squares/ drafter.(Drawing sheet)
		Problem – 2 Indicate different convention of lines on the drawing. .(Drawing sheet)
		Problem – 3 Copy the sketch to the required scale and dimensioning adopting right system and positioning of dimensions using Tee and Set squares / drafter.(Drawing sheet)
		Problem 4. Draw regular geometric constructions Pentagon, Hexagon, Square, circle, Triangle and other shapes. .(Drawing sheet)

2	2	First angle Projection symbol Problem 5: Draw Projection of points in 1 <sup>s</sup> , 2 <sup>nd</sup> , 3 <sup>d</sup> and 4 <sup>th</sup> Quadrants.(Drawing sheet)
		Problem 6: Draw Projection of Lines a) Parallel to both the planes b) Parallel to one and Perpendicular to another c) Parallel to one and Inclined to another. .(Drawing sheet)
		Problem 7: Draw Projection of plane surfaces. a) Parallel to one plane and Perpendicular to other two( Resting on Edge, Corner, Inclined to HP And VP)
		Problem 8: Planes Perpendicular to one plane and inclined to the other ( Resting on Edge, Corner, Inclined to HP And VP) ( Drawing sheets)
2	2	Problem 9: Draw Projection of Solids for the above conditions (Resting on Edge, Corner, Inclined to HP And VP) (Drawing sheet)
3	3	Problem 10: Draw Orthographic views for the given object. (Sketch book and CAD Drawing)
4	4	Problem 11: Draw Isometric projections for the given Orthographic views (Sketch book and CAD Drawing)
5	5	Use of CAD commands , plotting the drawing
		Problem 12: Drawing basic entities : Circle, Arc, Polygon, Ellipse, Rectangle, Multiline
		Applying constraints draw basic entities Insert title Block (CAD Drawings and Printout)
6	6	Problem 13: Produce Orthographic (2D) Drawings in CAD- Chap3 Problem 14: Produce Isometric and 3D Drawings in CAD – Chap 4(CAD Drawings and Printout)
		Problem 15: create 3D models of Mechanical Elements such as Hexagonal headed bolt, Simple toy, ball bearing (CAD Drawings and Printout)

## 6. SUGGESTED LEARNING RESOURCES:

1. Bureau of Indian Standards. *Engineering Drawing Practice for Schools and Colleges IS: Sp-46*. BIS. Government of India, Third Reprint, October 1998; ISBN: 81-7061-091-2.
2. Bhatt, N. D. *Engineering Drawing*. Charotar Publishing House, Anand, Gujrat 2010; ISBN: 978-93-80358-17-8.
3. Jain &Gautam, *Engineering Graphics & Design*, Khanna Publishing House, New Delhi (ISBN: 978- 93-86173-478)
4. Jolhe, D. A. *Engineering Drawing*. Tata McGraw Hill Edu. New Delhi, 2010; ISBN: 978-0-07-064837-1
5. Dhawan, R. K. *Engineering Drawing*. S. Chand and Company, New Delhi; ISBN: 81-219-1431-0.
6. Shah, P. J. *Engineering Drawing*. S. Chand and Company, New Delhi, 2008, ISBN:81-219-2964-4.
7. Kulkarni, D. M.; Rastogi, A. P.; Sarkar, A. K. *Engineering Graphics with AutoCAD* . PHI Learning Private Limited-New Delhi (2010); ISBN: 978-8120337831.
8. Jeyapooan, T. *Essentials of Engineering Drawing and Graphics using AutoCAD*. Vikas Publishing House Pvt. Ltd, Noida, 2011; ISBN: 978-8125953005.
9. Autodesk. *AutoCAD User Guide*. Autodesk Press, USA, 2015.
10. Sham, Tickoo. *AutoCAD 2016 for Engineers and Designers* .Dreamtech Press; Galgotia Publication, New Delhi, 2015; ISBN 978-9351199113.

## 9.SOFTWARE/LEARNING WEBSITES :

1. <https://www.youtube.com/watch?v=TJ4jGyDWCw>
2. <https://www.youtube.com/watch?v=dmt6n7Sgcg>
3. <https://www.youtube.com/watch?v=MQScnLXL0M>
4. <https://www.youtube.com/watch?v=3WXPanCq9LI>
5. <https://www.youtube.com/watch?v=fvjk7PlxAuo>
6. <http://www.me.umn.edu/coursesme2011/handouts/engg%20graphics.pdf>
7. <https://www.machinedesignonline.com>

## Mining Geology-I

**Subject Code-**

**(2-0-0)**

The following topics/sub topics is to be taught and assessed in order to develop Unit Skill sets for achieving CO to attain identified skill sets

SHOP	Unit skill set (In cognitive domain)	Topics/Sub topics
UNIT-1 Introduction to Geology	<ol style="list-style-type: none"> <li>1. Know the scope of Geology.</li> <li>2. Know the zones of Earth.</li> <li>3. Understand weathering and erosion.</li> </ol>	<ol style="list-style-type: none"> <li>1. Scope of Geology-its importance and interest.</li> <li>2. Branches of geology – Physical geology, Mineralogy, Structural geology, Petrology, Economic geology, Stratigraphy, Engineering geology &amp; Hydrogeology</li> <li>3. The internal constitution of the Earth; Barysphere, Lithosphere, Hydrosphere, Atmosphere, Pyrosphere, Asthenosphere and Technosphere.</li> <li>4. Weathering and Erosion.</li> <li>5. Weathering-Mechanical and Chemical.</li> <li>6. Erosion- Wind, Fluvial, Marine, and Glacial erosion.</li> </ol>
UNIT-2 Applied Mineralogy	<ol style="list-style-type: none"> <li>1. Understand the Origin and Occurrence of Mineral</li> <li>2. Identify the different physical properties of Rock forming minerals.</li> </ol>	<ol style="list-style-type: none"> <li>1. Origin and Occurrence of Mineral.</li> <li>2. Physical properties of Minerals</li> <li>3. Physical properties of the following minerals –Quartz, Calcite, Gypsum, Fluorite, Barite, Beryl, Magnesite, Kyanite, Feldspar: Orthoclase, Microcline, Hornblende, Mica-Muscovite, Biotite, Talc, Augite, Corundum, Calcite, Magnesite,</li> </ol>
UNIT-3 Petrology a) Igneous formations	<ol style="list-style-type: none"> <li>1. Understand the concepts of Petrology-Igneous Formations.</li> <li>2. Identify the textures and structures of Igneous rocks</li> <li>3. Identify the igneous rocks.</li> </ol>	<ol style="list-style-type: none"> <li>1. Classification of rocks into Igneous, Sedimentary and Metamorphic rocks</li> <li>2. Textures of igneous rocks:</li> <li>3. Equigranular, -Panidiomorphic Hypidiomorphic and Allotriomorphic Inequigranular textures- Porphyritic, Poikilitic and intergrowth textures</li> <li>4. Structures of Igneous rocks-</li> <li>5. Forms of Igneous rocks: Concordant and Discordant Igneous Intrusions-Sill, Dyke and Batholith</li> <li>6. Classification of the Igneous rocks based on Depth of Formation-Plutonic, Hypabyssal and Volcanic rocks based on percentage of Silica-Acid, Intermediate, Basic and Ultra basic.</li> <li>7. Study of the following Rocks-Granite, Diorite, Syenite, Dunite, Dolerite, Granite porphery, Syenite porphery, Dolerite porphery, Pegmatite and Basalt.</li> </ol>

<p>UNIT-4 b)Sedimentary and Metamorphic formations</p>	<p>1. Understand the concepts of Petrology- Sedimentary and</p>	<p>1. Sedimentary Rocks and its formation: Mechanically, chemically and organically. 2. Textures of Sedimentary rocks 3. Structures of Sedimentary Rocks.</p>
	<p>Metamorphic Formations. 2. Identify the sedimentary and metamorphic rocks.</p>	<p>4. Classification of Sedimentary rocks- Rudacious, Araneceous, Calcarious and Argillaceous 5. Description of the following Sedimentary Rocks- Conglomerate, Breccia, Sand stone, Grit, Lime stone, Dolomite and Shale 6. Metamorphism and Metamorphic Rocks. 7. Agents of Metamorphism 8. Explain the different types of Metamorphism 9. Classification of the Metamorphic Rocks into- Foliated and Massive Rocks. 10. Study of important metamorphic rocks- Gneiss, Schist, Marble, Slate, Quartzite,</p>

Reference:-

1. A Text book of Geology: P.K Mukerjee
2. Rutley's elements of Mineralogy: H.H.Read
3. Principles of petrology –G.W. Tyrell.
4. Fundamentals of Engineering Geology-R.S.Khurmi
5. Engineering Geology- Vasudev Kanithi

## Mining Geology-I Lab

**Subject Code-**

**(4-0-0)**

- 1) Demonstration of branches of geology with charts.
- 2) Different zones of earth Barysphere, Lithosphere, Hydrosphere, Atmosphere, Pyrosphere, Asthenosphere and Technosphere.
- 3) Demonstration of Weathering and Erosion internet videos.
- 4) Weathering- Mechanical and chemical.
- 5) Study of Erosion- Wind, Fluvial.
- 6) Study of Marine, and Glacial erosion.
- 7) Study of different properties of Minerals using internet videos.
- 8) Habit, colour, streak, lustre, diaphinity, cleavage, fracture, specific gravity.
- 9) Identification of physical properties of the following minerals- different types of Quartz, Calcite.
- 10) Identification of physical properties of the following minerals Gypsum, Fluorite, Barite.
- 11) Identification of physical properties of the following minerals Beryl, Magnesite, Kyanite, Mica- Muscovite, Biotite, Talc.
- 12) Identification of physical properties of the following minerals Hornblende, Feldspar: Orthoclase and Microcline.
- 13) Identification of physical properties of the following minerals Talc, Augite, Corundum, Magnetite.
- 14) Study of classification of Rocks.
- 15) Demonstration of Concordant and Discordant Igneous Intrusions-Sill, Dyke and Batholith.
- 16) Study of Texture and its types-Equi-granular, -Panidiomorphic Hypidiomorphic and Allotriomorphic.
- 17) Inequigranular Textures-Porphyrific, Poikilitic and intergrowth textures. Study of Structures of Igneous Rocks-Vesicular and Amygdaloidal.
- 18) Identification of the following Rocks-Granite, Syenite, Dunite.
- 19) Identification of the following Rocks Granite porphyry, Syenite porphyry, Dolerite, Dolerite porphyry, Diorite Pegmatite and Basalt.
- 20) Study of Textures and structures of Sedimentary rocks.
- 21) Study of Textures and structures of Metamorphic rocks.
- 22) Identification of the following Sedimentary Rocks- Conglomerate, Breccia, Sand Stone, Grit, Lime Stone and Shale.
- 23) Identification of the following Metamorphic Rocks- Gneiss, Schist, Marble, Slate, Quartzite.

# Engineering Workshop

**Subject Code: -**

**(0-0-3)**

1. Identify fire extinguisher according to their specification.
2. Perform mock drill session in group of minimum 10 students for extinguishing fire.
3. Identify different tools used in workshop.
4. Prepare job using following operations: part 1 a. Marking operation as per drawing b. punching operation as per drawing c. Filing operation as per drawing d. sawing operation as per drawing e. drilling operation as per drawing f. tapping operation as per drawing.
5. Prepare T joint pipe fitting job as per given drawing (individually).
6. Prepare elbow joint pipe fitting job as per given drawing (individually).
7. Prepare bill of material for given pipeline layout (individually).
8. Practice different safety rules in welding shop as per given instruction.
9. Prepare lap joint using gas welding as per given drawing (individually).
10. Prepare butt joint using gas welding as per given drawing (individually).
11. Prepare utility job (like stool, benches, tables or similar jobs) involving arc welding and artificial wood as per given drawing (in group of 4 to 5 students) Fabrication operation involve measuring, marking, cutting, edge preparation, welding.
12. Prepare sheet metal utility job using following operations a. Cutting and Bending b. Edging c. End curling d. Lancing e. Soldering f. Riveting.
13. Draw sketches of various ancient tools.

## Suggested Learning Materials / Books

1. Gupta, J.K.; Khurmi, R.S., A Textbook of Manufacturing Process (Workshop Tech.), S.Chand and Co. New Delhi ISBN:81-219-3092-8.
2. Hajra; Choudhary, Elements of Workshop Technology, Media Promoters and Publishers Mumbai, 2009, ISBN: 10-8185099146.
3. Sarathe, A.K., Engineering Workshop Practice, Khanna Book Publishing CO(P) LTD, New Delhi, ISBN No. 978-93-91505-51-6.
4. Raghuwansi, B.S; Workshop Technology, Dhanpat Rai & Co.





