

- (A) **COURSE TITLE AND CODE: Communication Skills - II, G - 2 01**
- (B) **LEVEL : Two**
- (C) **BRANCH/ DISCIPLINE : Electronics & Communication Engineering**
- (D) **RATIONALE :**

In Communication skills – I, the basics of the process of communication was learnt, this course deals with more applications of the concepts and principles learnt therein. The employer expects that a Diploma pass-out should be able to communicate orally as well as in writing. Moreover he is expected to write notes, circulars, minutes of meetings etc. He/she should also be able to write a technical report, draft a proposal etc. This subject will deal with Technical Communication and provide sufficient practice for this purpose.

(E) **TEACHING AND EXAMINATION SCHEME:**

Sl. No.	Course Code	Name of Course	Teaching Scheme					Examination Scheme				Total Marks
			Pre-requisite	L	T	P	C	Theory		Practical		
								ET	PA	ET	PA	
1.	G- 201	Communication Skills –II	G-101	3	1	-	4	75	25	-	-	100

(F) **DETAILED COURSE CONTENTS**

**CHAPTER-1.0 ESSENTIALS OF EFFECTIVE BUSINESS CORRESPONDENCE**

- Introduction
- Simplicity
- Clarity of goal
- Courtesy
- Persuasion
- Sincerity
- Tactful approach

**CHAPTER-2.0 BUSINESS LETTER**

- Introduction
- Different types

### **CHAPTER-3.0 ENQUIRIES & REPLIES**

- Enquiries
- Replies
- Quotations
- Sample letters

### **CHAPTER-4.0 CIRCULAR LETTERS**

- Introduction
- Salient features

### **CHAPTER-5.0 APPLICATIONS FOR EMPLOYMENT**

- Introduction
- Application formats
- Covering letter
- The Curriculum Vitae/ Resume

### **CHAPTER-6.0 AGENDA & MINUTES**

- Introduction
- Technique
- Key language

### **CHAPTER-7.0 NOTICES, CIRCULARS & ORDERS**

- Introduction
- Notices
- Circulars
- Orders

### **CHAPTER-8.0 REPORT WRITING**

- Introduction
- Techniques of writing a Report

### **CHAPTER-9.0 PROPOSAL WRITING**

- Introduction
- Types of Proposal

**(G) SPECIFICATION TABLE SHOWING DISTRIBUTION OF MARKS AND HOURS**

Chapter No.	Chapter Title	Hours	Marks			
			K	C	A	Total Mark
1.	Essentials of Effective Business Correspondence Communication	4	6	2	-	8
2.	Business Letter	6	-	4	8	12
3.	Enquiries & Replies	6	-	4	8	12
4.	Circular Letters	6	-	2	6	8
5.	Applications For Employment	8	-	4	8	12
6.	Agenda & Minutes	8	-	4	8	12
7.	Notices, Circulars & Orders	8	-	4	8	12
8.	Report Writing	9	-	4	8	12
9.	Proposal Writing	9	-	4	8	12
	<b>Total</b>	<b>64</b>	<b>6</b>	<b>32</b>	<b>62</b>	<b>100</b>

**Abbreviations:** K=Knowledge level, C= Comprehension Level, A=Application level

**(H) SUGGESTED IMPLEMENTATION STRATEGIES:**

The student will be able to develop the communication skills if this course is treated in such a way that there is enough of practice and feedback.

Enough practice in writing of notes, circulars

Moreover, the communication skills could also be developed through the technical courses, through report writing, problem solving discussions, role-plays etc., are undertaken.

**(I) SUGGESTED LEARNING RESOURCES:**

**(a) Reference Books:**

S. No	Title	Author/Publisher/Edition / year
1.	Effective Technical Communication	Rizvi, Ashraf, Tata McGraw Hill, India, 2005
2.	Effective Business Communication	Asha Kaul, Prentice Hall, India, 2007
3.	Communication Skills for Technical Students – Book I	Tiwari, N.P. et al, Somaiya Publications, 172, Mumbai Marathi Granth Sangrahalaya, Marg, Dadar, Mumbai –400 014, 4 <sup>th</sup> Ed. 1995
4.	A Course in Technical English– Book II	Tiwari, N.P. et al, Somaiya Publications, 172, Mumbai Marathi Granth Sangrahalaya, Marg, Dadar, Mumbai –400 014, 1989

**(b) Others:**

- Textbooks mentioned in the references.
  - TV programmes.
  - Newspaper clippings.
  - Periodicals like, news magazines, journals etc.
  - OHP transparencies
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**SUGGESTED LIST OF EXERCISES DURING TUTORIAL CLASS:**

- Using a dictionary.
- Use of newspaper/news magazines articles.
- Writing of reports.
- Writing of proposals.
- Writing of applications.
- Group discussions.

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- (A) **COURSE TITLE AND CODE** : **ENGINEERING DRAWING, G - 203**  
 (B) **LEVEL** : **TWO**  
 (C) **BRANCH/DISCIPLINE** : **ELECTRONICS & COMMUNICATION  
ENGINEERING**  
 (D) **RATIONALE** :

Drawing as a communicating and representing medium, which has a significant role in the design profession of technician, developing competencies related to work more closely with Design Engineer. This includes visualization of an object in space as well as proficiency in reading and interpretation of working drawing. It is the skill, which translates an engineering idea into lines and dimensions on a piece of paper. This subject for diploma programme is aimed at developing a foundation of knowledge of drawing and use of computer in the field of Engineering Drawing.

(E) **TEACHING AND EXAMINATION SCHEME:**

Sl. No.	Course Code	Name of Course	Teaching Scheme					Examination Scheme				Total Marks
			Pre-requisite	L	T	P	C	Theory		Practical		
								ET	PA	ET	PA	
2.	G- 203	Engineering Drawing		2	-	6	8	75	25	25	25	150

(F) **DETAILED COURSE CONTENTS**

*CHAPTER 1.0 INTRODUCTION TO DRAWING*

- Use of different drawing instruments
- Conventions of Lines
- Principle of dimensioning system
- Types and construction of scales – Plain and Diagonal scale
- Computer hardware and software requirements for CAD

**CHAPTER – 2.0 CURVES AND TANGENTIAL**

- Construction of Ellipse by
- Arc and Circle method
- Concentric Circle method
- Rectangle/ Oblong method
- Construction of Parabola by
- Directrix focus method

- Rectangle method
- Draw Hyperbola by
- Transverse axis and focus method
- Passing through a given point
- Draw involutes of
  - A polygon
  - A circle
- Use of CAD commands for generating above curves

### **CHAPTER – 3.0 PROJECTION OF POINTS AND LINES**

- Projection of Points in different planes
- Projection of lines in different plane
- Lines inclined to one reference plane
- Use of filter command in CAD for above

### **CHAPTER - 4.0 PROJECTION OF PLANES**

- Projection of planes of following shapes
- Circular
- Rectangular
- Pentagonal
- Hexagonal
- Projections for above planes for inclined to one plane
- For a Cube, Prism Pyramid, Cone etc.

### **CHAPTER – 5.0 PROJECTION OF SOLIDS**

- Projection of following solids, inclined to one reference plane
- Prism
- Cube
- Pyramid
- Cylinder
- Projection of above solids when section resting on base and ground.

### **CHAPTER – 6.0 ORTHOGRAPHIC PROJECTIONS**

- Introduction
- First angle and Third angle projections
- Conversion of simple pictorial view to orthographic view
- Draw plan side view and top view in third angle
- Use CAD for Orthographic projections

### **CHAPTER – 7.0 SECTIONAL VIEWS**

- Conversion of given pictorial view to sectional view
- Draw sectional view at given sections for both X and Y-axis

## CHAPTER – 8.0 DEVELOPMENT OF SURFACES

- Development of surfaces for the following
- Cube
- Cylinder
- Prism
- Cone and frustum cone
- Use CAD for development of surfaces

## CHAPTER – 9.0 ISOMETRIC PROJECTIONS

- Isometric Scales
- Isometric views of simple objects
- Isometric views for slots and cuts in the objects

## CHAPTER – 10.0 STANDARD CONVENTIONS AND SYMBOLS

- Conventions as per IS Codes
- Symbols as per Codes
- The above conventions and symbols are for Civil, Mechanical and Electrical Engg.

### (G) SPECIFICATION TABLE SHOWING DISTRIBUTION OF MARKS AND HOURS

Sl. No.	Chapter No.	Chapter Title	Hours	Marks			
				K	C	A	Total Mark
1.	1.0	INTRODUCTION TO DRAWING	2	2	2	-	4
2.	2.0	CURVES AND TANGENTIAL EXERCISES	4	2	2	6	10
3.	3.0	PROJECTION OF POINTS AND LINES	3	-	2	6	8
4.	4.0	PROJECTION OF PLANES	3	2	2	4	8
5.	5.0	PROJECTION OF SOLIDS	3	-	2	7	9
6.	6.0	ORTHOGRAPHIC PROJECTIONS	4	2	-	5	7
7.	7.0	SECTIONAL VIEWS	4	2	-	5	7
8.	8.0	DEVELOPMENT OF SURFACES	3	-	2	5	7
9.	9.0	ISOMETRIC PROJECTIONS	3	2	1	4	7
10.	10.0	STANDARD CONVENTIONS AND SYMBOLS	3	4	2	2	8
<b>Total</b>			<b>32</b>				<b>75</b>

**Abbreviations:** K=Knowledge level, C= Comprehension Level, A=Application level

**(H) SUGGESTED IMPLEMENTATION STRATEGIES:**

- Chalk & talk method to explain the various principles
- Demonstration and use of instrument used in drawing.
- Classroom practices for different typical exercises.
- Use of computer for developing drawing
- OHP Transparencies for complicated drawing objects

**(I) SUGGESTED LEARNING RESOURCES :**

**(a) Reference Books:**

<b>S. No.</b>	<b>Title</b>	<b>Author, Publisher, Edition &amp; Year</b>
1.	Elementary Engineering Drawing	N.D.Bhatt, Charoter Publisher, Anand
2.	Engineering Drawing	Gujral and Shende Khanna Pub. N.Delhi
3.	Engineering Drawing	R.B.Gupta, Satya Prakashan, Delhi
4.	Introduction of CAD	Voisinet McGraw Hill
5.	Understanding Auto CAD 2002	Sham tickoo, TaTa McGraw Hill
6.	Auto CAD 2002 With Applications	Sham tickoo, TaTa McGraw Hill
7.	Work book in Mechanical Drafting	TTTI, Bhopal

**(b) Others:**

- Charts
- Workbook
- Practice sheets

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**HOURS: 96**

**MARKS: 75**

**SUGGESTED LIST OF PRACTICALS:**

- Problems on Scales and Letterings (One sheet)
- Problems on Curves (One sheet)
- Simple Orthographic Projections- One for First Angle and One for Third Angle Projection (Two sheets)
- Orthographic projections with sections (One sheet)
- Isometric projection for two objects (One sheet)
- Projection of Points and Lines (One sheet)
- Projection of Solids (Two sheets)
- Projection of Planes (One sheet)

**Apart from above, Practice on CAD for following is essential.**

Practice on working and application on CAD software

Use of commands like.

LIMITS, UNITS, GRID SNAP, ZOOM, PAN, LINE, CIRCLE,  
SOLID, ARC, ELLIPS, POINT, ERASE, COPY,  
MOVE, MIRROR, BREAK, REGEN, VPOINT, DIST, ID, HATCH, TEXT, STYLE, ARRAY  
, PLINE, PEDIT, FILLET, CHAMFER, TRIM, STRECTH, POLYGONE, AREA, SCALE, R  
OTATE OFFSET, MEASURE. BLOCK, INSERT, EXPLODE, COLOR, VIEW, PLAN, SHA  
DE.  
DIMENSIONING,

Practice to take hard copy using Print command of CAD software

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- (A) **COURSE TITLE AND CODE** : **ELEMENTS OF CIVIL, ELECTRICAL & MECHANICAL ENGINEERING (G - 204)**
- (B) **LEVEL** : **TWO**
- (C) **BRANCH/DISCIPLINE** : **ELECTRONICS & COMMUNICATION ENGINEERING**
- (D) **RATIONALE** :

In this era of technology integration at various levels in the different engineering organisations, it has become unavoidable, but to possess the basic knowledge of various engineering disciplines. The intention of this course is to provide the student, the basic knowledge and core skills of civil, mechanical and electrical engineering discipline which are commonly required to perform effectively and efficiently in the work place.

(E) **TEACHING AND EXAMINATION SCHEME:**

Sl. No.	Course Code	Name of Course	Teaching Scheme					Examination Scheme				Total Marks
			Pre-requisite	L	T	P	C	Theory		Practical		
								ET	PA	ET	PA	
3.	G- 204	Elements of Civil, Mechanical & Electrical Engg.		3	-	2	5	75	25	25	25	150

(F) **DETAILED COURSE CONTENTS**

*CHAPTER 1.0 SURVEY AND LEVELING*

- Principles of surveying
- Purpose of reconnaissance survey
- Use of various survey instruments
- Ranging of Survey Lines
- Signs used in ranging
- Use of prismatic compass in surveying
- Procedure of using compass
- Procedure for conducting Chain and Compass Survey
- Definition of terms related to leveling procedure
- Purpose of leveling
- Types of levels e.g. Dumpy, Tilting, wyes

- Procedure of taking out & placing in of leveling instruments in box
- Taking Staff reading and recording them in level book correctly

#### **CHAPTER – 2.0 LAYOUT OF BUILDINGS/INDUSTRIAL SHEDS**

- Principles of planning and layout
- Factors affecting layout of building/industrial sheds
- Comments on a given layout of Building/Industrial Sheds
- Factors in designing industrial sheds like internal roads, light & ventilation, margins, set backs, water and sanitary rooms, recreation and retiring rooms, tool rooms, Tiffin room, store room etc.
- Rules for showing various details in layout
- Site selection for factory building using various considerations
- Factors influencing location of sites for industrial sheds
- Selection of most suitable & economical site for industrial shed/building, considering the following salient features like Cost, Material availability, Labor rates, availability of essential services, Labor skill etc.

#### **CHAPTER – 3.0 BUILDING DRAWINGS AND BUILDING BYE LAWS**

- Define: Building plan, map & distinguish them
- Abbreviations, conventions, symbols etc. used for different building components in the drawings
- Interpretation of building drawing
- Building bye laws for industrial sheds/buildings
- Provision of bye laws related to industrial building in Indian Standards

#### **CHAPTER - 4.0 POWER TRANSMISSION AND SAFETY**

- Importance of Power Transmission
- Models of Power Transmission & its Application
- Belt & Rope drive Systems
- Power Transmission by gears & chains
- Role of coupling & journal in power Transmission.

#### **CHAPTER – 5.0 I.C. ENGINES**

- Function & Classification based on fuel, no. of strokes, method of cooling, method of ignition
- Function of I.C. Engine Components such as cylinder, piston, connecting rod, crankshaft, valves etc.
- Working Principles of Petrol and Diesel Engine
- Engine related parameters like BDC, TDC, CR, Engine Capacity, Bore, Stroke and simple problems
- Advantages and Disadvantages

#### **CHAPTER – 6.0 PRIME MOVERS AND PUMPS**

- Meaning of the term “Prime movers”
- Function and classification of prime movers
- Working principles of turbines
- Function & Types of pumps
- Centrifugal. Pumps

#### **CHAPTER – 7.0 A.C. CIRCUITS AND INSTRUMENTS**

- A.C Fundamentals
- Three phase – circuit fundamentals
- Classification, Constructions and Application of Electrical Measuring Instruments
- Methods of connecting indicating instruments
- CRO and its use to measure current, voltage and frequency

#### **CHAPTER – 8.0 ELECTRICAL MACHINES**

- D.C. Motors, Construction & Working Principle
- Induction motor – Construction and Working Principle
- Application of Single phase and 3-phase induction motors
- General Troubleshooting of induction motors
- Construction of transformer
- Working Principle of transformer
- Auto Transformer
- DOL (Direct on Line), Star, Delta, and starters for A.C motors

#### **CHAPTER – 9.0 UTILIZATION AND PROTECTION OF ELECTRICAL POWER**

- Domestic wiring
- Industrial wiring
- Heating, apparatus and their applications
- Protection used for electrical machines like overload relay, earth fault relay, Single phase preventer etc.
- Electrical Safety and Earthing

#### **CHAPTER – 10.0 BASIC ELECTRONICS**

- Semiconductor Devices: Diode, Transistors and SCR
- Construction & Applications of Regulated Power Supplies
- Digital Fundamentals

**(G) SPECIFICATION TABLE SHOWING DISTRIBUTION OF MARKS AND HOURS**

Sl. No.	Chapter No.	Chapter Title	Hours	Marks			
				K	C	A	Total Mark
1.	1.0	SURVEY & LEVELING	5	3	5	-	8
2.	2.0	LAYOUT OF BUILDINGS/ INDUSTRIAL SHED	4	-	4	3	7
3.	3.0	BUILDING DRAWING AND BUILDING BYE LAWS	4	3	4	-	7
4.	4.0	POWER TRANSMISSION AND SAFETY	6	4	4	-	8
5.	5.0	I.C ENGINES	4	4	3	-	7
6.	6.0	PRIME MOVERS AND PUMPS	6	3	3	2	8
7.	7.0	A.C CIRCUITS AND INSTRUMENTS	4	4	4	-	8
8.	8.0	ELECTRICAL MACHINES	5	4	3	-	7
9.	9.0	PROTECTION AND UTILISATION OF ELECTRICAL POWER	5	4	3	-	7
10.	10.0	BASIC ELECTRONICS	5	4	2	2	8
<b>Total</b>			<b>48</b>				<b>75</b>

**Abbreviations:** K=Knowledge level, C= Comprehension Level, A=Application level

**(H) SUGGESTED IMPLEMENTATION STRATEGIES:**

Improved lecture method using appropriate audio visual aids is to be used to build the concepts in the content. Lab experiments and demonstration must be arranged to achieve learning by observation and hands-on experiences.

**(I) SUGGESTED LEARNING RESOURCES :**

**(a) Reference Books:**

<b>S. No.</b>	<b>Title</b>	<b>Author/Publisher/Edition/Year</b>
1.	Pumps operation and maintenance	Tyler & Hicks Tata McGraw Hill, New Delhi, 1995
2.	Theory of Machines	R.C. Patel Acharya Book Depot, Baroda, 1993
3.	Heat Engines	Shah & Pandya Khanna Pub. New Delhi, 1995
4.	Hydraulic Machines	Jagdishlal, Khanna Pub. New Delhi, 1997
5.	Hydraulics	R.C. Patel Acharya Book Depot, Baroda, 1993
6.	Text book on Surveying & leveling	T.P. Kanitkar
7.	Civil Engineering Drawing	Shah, Kale & Patki
8.	Planning & Designing buildings	Gurucharan Singh
9.	Fundamentals of Electrical Engineering	B.L. Theraja S.Chand & Co. New Delhi, 1999
10.	Fundamentals of Electrical Engineering	V.K. Mehta Khanna Pub. New Delhi, 1999
11.	A text book of Electrical Engineering	S.L. Uppal Khanna Pub. New Delhi, 1995
12.	Elementary Electrical Engineering	M.L. Gupta New Heights, New Delhi, 1996

**(b) Others:**

- Text book mentioned in the references
- Lab manuals available
- OHP transparencies
- Models

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**HOURS: 32**

**MARKS: 50**

**SUGGESTED LIST OF PRACTICALS:**

- Conduct Chain Survey: Ranging, chaining, offsetting, recording field book etc.
- Conduct Compass Survey: Working on prismatic Compass, Bearing of lines, recording/computing, included angles using bearing etc.
- Spot Leveling using a Dumpy Level: Selecting suitable position for the instrument, temporary adjustments, taking change points (CP), reading Level Staff, Recording level book. Calculations, Arithmetic Checks, Temporary Bench Marks, Reduced Levels etc.
- Visit to an industrial factory building and prepare a layout plan of the visited industrial buildings.

- Demonstrate an I.C Engine (Identification of parts, its functions, classifications, working etc).
- Determine the effect of variation of load on fuel consumption of an IC Engine.
- Demonstrate a Pump.
- Perform test on centrifugal pump.
- Identify and use of different modes of power transmission systems
- Discuss the effect of changing initial tension on power transmission by assuming the belt to be perfectly elastic and without mass
- Use of multimeter and megger for testing.
- Assembly of single and double fluorescent tube wiring circuit
- Wiring of panel for 3-phase induction motor using main switch starter.
- Measure voltage and frequency using CRO.
- Identify the parts of D.C. motor starter.
- Open Circuit and short circuit test on single-phase transformer.
- Load test on single-phase transformer.
- Identify and use the various A.C. Motor Starter
- Visit of high voltage substation to appreciate the working of various components of Power Transmission & distribution System.

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- (A) **COURSE TITLE AND CODE** : **ENGINEERING MATERIALS (G - 206)**  
 (B) **LEVEL** : **TWO**  
 (C) **BRANCH/DISCIPLINE** : **ELECTRONICS & COMMUNICATION  
ENGINEERING**  
 (D) **RATIONALE** :

Materials technology is advancing very fast with the expansion of technology. The sound knowledge of different types of Engineering Materials, their properties, strength, functions, and characterises are very essential for the Diploma pass-outs. This subject will provide basic insight in the students regarding engineering materials and their engineering applications. The selected topics in the curriculum of Engineering Materials are designed to impart complete overview of various materials of Civil, Mechanical, Electrical and Electronics engineering areas.

**(E) TEACHING AND EXAMINATION SCHEME:**

Sl. No.	Course Code	Name of Course	Teaching Scheme					Examination Scheme				Total Marks
			Pre-requisite	L	T	P	C	Theory		Practical		
								ET	PA	ET	PA	
4.	G- 206	Engineering Materials		4	-	-	4	75	25	-	-	100

**(F) DETAILED COURSE CONTENTS**

*CHAPTER 1.0 INTRODUCTION*

- Introduction to engineering materials
- General properties and behaviour characteristics
- Development of new materials
- Impact of new materials on design of new products

**CHAPTER – 2.0 TECHNICAL PROPERTIES OF MATERIALS**

- Physical properties of materials
- Mechanical properties of materials such as-
  - Strength
  - Tensile
  - Compressive
  - Fatigue

- Impact
- Elasticity
- Ductility
- Brittleness, hardness, Toughness
- Chemical properties of materials
  - Solidification, formation of crystal
  - Dendrites
  - Columnar crystal
  - Allotropy, Metallography
- Testing of materials
  - Destructive testing- types
  - Non- Destructive testing- types
  - Calculation and interpretation of test results
  - Macro & micro examination of metals

### **CHAPTER – 3.0 SELECTION OF MATERIALS**

- Requirements of selecting a material for an engineering use
  - Service oriented requirements
  - Fabrication/construction/manufacturing orientation required
- Necessity of alternative materials
- I.S. specifications for various uses of materials

### **CHAPTER - 4.0 FERROUS METALS AND ALLOYS**

- Types of ferrous metals
- Importance of carbon and other alloying elements
- Properties of the hot rolled ferrous products
- Factors affecting ferrous metals including electrolytic corrosion
- Effect of alloying elements like Ni, Mo, Vanadium
- Specifications and standard tests on ferrous metals

### **CHAPTER – 5.0 NON FERROUS METALS AND ALLOYS**

- Non-ferrous metals and their common alloys
- Composition and uses of different types of brasses and bronzes
- Aluminium alloys
- Factors affecting durability of metal including bimetallic corrosion
- Methods of surface protection against corrosion

### **CHAPTER – 6.0 NON-METALLIC MATERIALS**

- Ceramics-types and characteristics
- Manufacturing of ceramics
- Rubber
  - Origin
  - Engineering qualities
  - Applications

- Synthetics rubber
  - Types and uses
  - Applications
- Adhesives
  - Types and uses
  - Applications
- Insulation
  - Heat and electricity
  - Types of insulators
  - Applications
- Lubricants
  - Applications
  - Specifications
  - Commercial names and characteristics

## **CHAPTER – 7.0 BUILDING MATERIALS**

- Timber
  - Uses of timber
  - Seasoning of timber
  - Defects in timber
- Concrete
  - Uses of concrete
  - Different types of concrete
  - Common types of concrete admixtures
  - Tests of concrete
  - Ingredients and their proportion
- Cement and lime
  - Manufacturing process
  - Types of cement line
  - Properties of cement line
  - Storing of cement line
- Aggregates and sand
  - Types of Aggregates
  - Properties of Aggregates
  - Uses of Aggregates and sand
- Bricks / stones
  - Clay production
  - Uses of bricks/ stones
  - Advantage of bricks over stones

## **CHAPTER – 8.0 PLASTICS**

- Uses of plastic as an engineering material
- Properties and characteristics of plastics
- Classification
- Types of plastics
- The effect of sunlight, heat and termites on the durability of plastics

## CHAPTER – 9.0 BITUMINOUS MATERIALS

- Sources of bituminous materials
- Types of bituminous materials
- Uses of bituminous materials
- Tests on bituminous mixtures

## CHAPTER-10.0 CONDUCTIVITY, INSTALLATION & DIELECTRIC MATERIALS

- Introduction to electrical and electronics materials
  - Type of materials
  - Properties and specifications of materials
- Conducting materials
  - High conducting and high resistivity materials
  - Effect of Temperature on mechanical and electrical properties
- Dielectric materials
  - Types, basic properties and use.

### (G) SPECIFICATION TABLE SHOWING DISTRIBUTION OF MARKS AND HOURS

Sl. No.	Chapter No.	Chapter Title	Hours	Marks			
				K	C	A	Total Mark
1.	1.0	INTRODUCTION	4	2	2		4
2.	2.0	TECHNICAL PROPERTIES OF MATERIALS	10	6	4	2	12
3.	3.0	SELECTION OF MATERIALS	6	4	3		7
4.	4.0	FERROUS METALS AND ALLOYS	7	6	2		8
5.	5.0	NON FERROUS METALS AND ALLOYS	7	6	2		8
6.	6.0	NON-METALLIC MATERIALS	7	6	2		8
7.	7.0	BUILDING MATERIALS	8	6	4		10
8.	8.0	PLASTICS	5	4	2		6
9.	9.0	BITUMINOUS MATERIALS	5	4	2		6
10	10.0	CONDUCTIVITY, INSTALLATION & DIELECTRIC MATERIALS	5	4	2		6
<b>Total</b>			<b>64</b>				<b>75</b>

**Abbreviations:** K=Knowledge level, C= Comprehension Level, A=Application level

### (H) SUGGESTED IMPLEMENTATION STRATEGIES:

- Teach and explain Different types of materials and their properties, effects with examples.
- Stress should be given on the problems related to the field applications of all

Engineering Materials

- The subject shall be taught using the laboratory if available.
- Special emphasis should be given on modern materials

**(I) SUGGESTED LEARNING RESOURCES :**

**(a) Reference Books:**

<b>S. No.</b>	<b>Title</b>	<b>Author/Publisher/Edition/Year</b>
1.	Properties of concrete	Neville ELBS, Longman
2.	Engineering Materials	S.C. Rangwala, Charotar Pub. Anand (Guj.)
3.	Materials of Engineering	Moore and Moore Mc Graw Hill
4.	Materials of Construction	R.S. Deshpande United Book Cor., Pune
5.	IS Codes of practices	Bureau of Indian Standard
6.	Engineering Materials	P.D. Kulkarni

**(b) Others:**

- Direct / live demonstration of materials
- Charts of different materials
- O.H.P. Transparencies available on various Topics of Engineering Materials
- Field/ industry visits

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**HOURS: --**

**MARKS: --**

**SUGGESTED LIST OF PRACTICALS:**

**(Note:** The scope of laboratory practices is limited to Chapter No. 2.0, Therefore no practical hours have been assigned in the Teaching Scheme. Teacher may take students to the laboratory for demonstrating some tests, if it is necessary and facilities are available.)

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- (A) **COURSE TITLE AND CODE** : **ENGINEERING MATHEMATICS-II**  
(G - 207)
- (B) **LEVEL** : **TWO**
- (C) **BRANCH/DISCIPLINE** : **ELECTRONICS & COMMUNICATION**  
**ENGINEERING**
- (D) **RATIONALE** :

The purpose of teaching Engineering Mathematics-II to diploma students is to enable them to understand advance uses of mathematics and solving engineering problems. Continuity and sequence is necessary for logical Development of subject. The topic includes Coordinate Geometry, Differential Calculus, Integral Calculus, Discrete Mathematics and their application. This course will be helpful even for taking higher studies by the passouts.

- (E) **TEACHING AND EXAMINATION SCHEME:**

Sl. No.	Course Code	Name of Course	Teaching Scheme					Examination Scheme				Total Marks
			Pre-requisite	L	T	P	C	Theory		Practical		
								ET	PA	ET	PA	
5	G- 207	Engineering Mathematics – II		4	1	-	5	75	25	-	-	100

- (F) **DETAILED COURSE CONTENTS**

### CHAPTER 1.0 COORDINATE GEOMETRY

- Coordinate Systems
- Cartesian & Polar Coordination
- Distance Divisional Areas
- Distance between two points
- Division of line segment
- Area of a triangle
- Standard forms of the equations of a straight line
- General Equation
- Intersection of straight line
- Angle between them
- Bisector of the angle between them
- Change of axis
- Transformation of coordinator when origin is shifted

- When axis are rotated
- Straight lines:  $X^2 + 2hxy + by^2$
- Quadratic Equation
- Properties of Q. Equation
- Geometric figures
- Circle
- Parabola
- Ellips Hyperbola
- Definition & Properties
- Standard Equations

## CHAPTER 2.0 DIFFERENTIAL CALCULUS

- Functions
  - Independent & Dependent Variables
  - Types of functions
- Limits
  - Concept of limits
  - Evaluation of limits
- Differentiation by 1<sup>st</sup> Principle
  - Differentiation of Sum
  - Product and Quotient
  - Differentiation of function of a function
  - Differentiation of Trigonometrical, Inverse Trigonometrical & Hyperbolic functions
  - Logarithmic differentiation
  - Differentiation of Tropical & Parametric functions
- Partial Differentiation
  - Differential Equations
  - Partial Differentiation
  - Successive Differentiation
  - Higher order derivatives
  - Linear differentiation Equations
- Application of differentiation:
  - Differential coefficient.
  - Application of coefficient.
  - Equation for Tangent, Normal Tangent, Sub-tangent and Subnormal-tangent.

## CHAPTER 3.0 INTEGRAL CALCULUS

- Integration
  - Definition
  - Fundamental Properties
- Methods of Integration
  - Integration by Substitution
  - Integration by parts
  - Integration by partial fractions
  - Reduction formula for integration of  $\text{Sin}^n x \cdot \text{Cos}^n x$

- Definite Integrals
  - Definition of gamma function
  - Evaluation of gamma function
- Application of Integration
  - Definite integral as limit of a sum
  - Area of a plane curve
  - Length of areas of plane curve
  - Work done
  - Volume
  - Mean & RMS values
  - Centre of gravity
  - Simpson's Rule
- Evaluation of Integrals
  - Evaluation of double integrals
  - Evaluation of triple integrals
  - Use of constant limits

#### CHAPTER 4.0 DISCRETE MATHEMATICS

- Relational algebra
- Sets & subsets
- Operations on sets
- Product sets (Cartesian product)
- Concepts of relation, domain and Range
- Sets arising from relations

#### (G) SUGGESTED SPECIFICATION TABLE OF MARKS & HOURS DISTRIBUTION

**Legends:** K=Knowledge level, C= Comprehension Level, A=Application level

Chapter No.	Chapter Title	Hours	Marks			
			K	C	A	Total Marks
1	Coordinate Geometry	18	2	5	8	15
2	Differential Calculus	20	4	6	8	18
3	Integral Calculus	16	4	8	10	22
4	Discrete Mathematics	10	4	8	8	20
	<b>Total</b>	<b>64</b>				<b>75</b>

**NOTE:** For the entire course 16hrs of tutorial has been allotted, to be used effectively to justify the need of the students and importance of the specific topics.

#### (H) SUGGESTED IMPLEMENTATION STRATEGIES

- a) Chalk & talk method to explain the various laws, Theorems etc.
- b) Demonstration and use of Log-tables.
- c) Classroom practices for different typical exercises.
- d) Use of derivation and formulas
- e) OHP Transparencies

**(I) SUGGESTED LEARNING RESOURCES**

- a) Text book mentioned in the references
- b) Workbook
- c) Practice sheets

**(J) SUGGESTED TUTORIALS (25 Marks)**

Tutorial work of 16 hrs. to be carried out as decided by the subject teacher.

**(K) SUGGESTED REFERENCES**

<b>S. No.</b>	<b>Title</b>	<b>Author/Publisher/Edition/Year</b>
1	Mathematics for Polytechnics	Deshpande S.N., Griha Prakashan, Pune, 1996 or latest
2	Engineering, Mathematics	Grewa, I.B.S; Khanna Pub. New Delhi, 1995 or latest
3	Engineering Mathematics	Prasad, I.B.; Khanna Pub. New Delhi, 1997 or latest
4	Mathematics for Polytechnics Vol.-I & Vol-II	TTTI, Bhopal, Latest
5	Applied Mathematics	Wartiker P.N., Griha Prakashan, Pune, 1996 or latest

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