



Diploma in Electronics and Instrumentation Engineering

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
DTCH 101		Applied Chemistry	60	20	20	30	20	2	1	2	4

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;

*Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Education Objectives:-

- To give basic knowledge of polymer science.
- To understand and apply the knowledge of electro-chemistry and its laws.
- To give basic knowledge of corrosion and control over it.
- To understand the various sophisticated instrumental techniques.
- To give basic knowledge of water, lubricants and different properties of water.

Course Outcomes:-

- After completion of this course the students are expected to be able to demonstrate following knowledge, skills and attitudes. The student will demonstrate capability of
- CO1. Theoretical understanding of various high polymers and their properties.
 - CO2. Became aware of the importance of electro-chemistry and its laws in the field of technology and dealing with its numerical approach.
 - CO3. Understanding metal corrosion and control over it.
 - CO4. Implementing instrumental techniques as powerful tool for qualitative and quantitative analysis of compounds.
 - CO5. Analyzing boiler feed water for industrial use and drinking water for domestic use.

Syllabus

Unit-I

POLYMERS AND REINFORCED PLASTICS

Classification of polymers - types of polymerization reactions - mechanism of addition polymerization: free radical, ionic and Ziegler - Natta - effect of structure on the properties of polymers - strength, plastic deformation, elasticity and crystallinity -Preparation and properties of important resins: Polyethylene, PVC, PMMA, Polyester, Teflon, Bakelite and Epoxy resins.

Unit-II

(A) Electrochemistry:

Arrhenius theory of electrolytic dissociation, Transport number, Kohlrausch's law, Solubility product, Redox reaction, Electrochemical and concentration cells.

(B) CORROSION AND ITS CONTROL

Corrosion: Basic concepts - mechanism of chemical, electrochemical corrosion - Pilling Bedworth rule – Types of Electrochemical corrosion - galvanic corrosion - differential aeration corrosion - pitting corrosion - stress corrosion – Measurement of corrosion (wt. loss method only) - factors influencing



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corrosion. Corrosion control: Cathodic protection - sacrificial anodic method – corrosion inhibitors, Protective coating.

Unit-III

Basic Instrumental Techniques

Basic principles, instrumentation and applications of potentiometry, UV - visible spectroscopy, infrared spectroscopy, atomic absorption spectroscopy and flame photometry.

Unit-IV

(A)WATER TREATMENT

Water quality parameters: Physical, Chemical & Biological significance - Hardness of water - estimation of hardness (EDTA method) - Dissolved oxygen – determination (Winkler's method), Alkalinity - determination - disadvantages of using hard water in boilers: Scale, sludge formation - disadvantages - prevention - treatment: Internal conditioning - phosphate, carbon and carbonate conditioning methods - External: Zeolite, ion exchange, Lime Soda methods & Numericals- desalination - reverse osmosis and electrodialysis - domestic water treatment.

(B) Lubricants:

Mechanism of lubrication, Classification of lubricants, Properties & testing of lubricating oil. Definition of viscosity of a liquid; Determination of Viscosity; Shear Viscosity; Intrinsic Viscosity; Molecular weight from Viscosity measurement & Numerical problems based on viscosity index.

Unit-V

Metal in Industry

Structure of coordination compounds corresponding to coordination number up to 6, Types of ligands, Isomerism [geometrical, optical, ionization, linkage and coordination], Theories of bonding in coordination compounds- crystal field theory, Valence bond theory, Chelation.

References

1. *Applied Chemistry – Theory and Practice*, O.P. Viramani, A.K. Narula, New Age Pub.
2. *Polymer Science – Ghosh*, Tata McGraw Hill.
3. *Chemistry for Environmental Engineering – Sawyer, McCarty and Parkin – McGraw Hill, International.*
4. *Basic Lubrication theory – Alistair Cameron*
5. *Engineering chemistry- Dr. Jyoti Mitna*
6. *Engineering chemistry- Dr. Sunita Ratan*
7. *Applied Chemistry – S.M. Khopkar*
8. *Polymer Science- V.R. Gowawriker*
9. *Introduction of polymer science- G.S. Mishra*

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DTMA 201		Applied Mathematics-II	60	20	20	0	0	3	1	0	4

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit;

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Course Education Objectives(CEO's):-

To introduce the students with the Fundamentals of the Advanced Engineering Mathematics.

Course Outcomes:-

After the successful completion of this course

1. students will be able to apply the techniques of finding limit, continuity and differentiability of any function with conclusions.
2. understand the applications of the matrices and the determinants.
3. know the fundamentals of the partial derivatives and the 3D geometry.
4. study the properties of the integral calculus used in the field of the engineering.
5. understand the concepts and the solution of the differential equations.

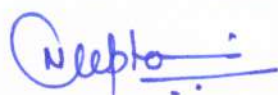
SYLLABUS

Unit-I

FUNCTION, LIMIT, CONTINUITY & DIFFERENTIABILITY: Function, Definitions of variables, constants, open & closed intervals. Definition & types of functions – Simple Examples, Limits, Concept & definition of Limit. Standard limits of algebraic, trigonometric, exponential and logarithmic functions. Evaluation of limits. Continuity, Definition and simple problems of continuity. **DERIVATIVE:** Definition of Derivatives, notations. Derivative of standard functions. Rules for differentiation in case of sum, difference, product and quotient of functions. Derivative of composite functions (Chain rule). Derivatives of inverse trigonometric functions. Derivatives of implicit functions. Logarithmic derivatives. Derivatives of parametric functions. Derivative of one function with respect to another function, Second order derivatives. Applications of Derivatives. Geometric meaning of derivative. Rate measurement, Maxima & Minima (one variable)

Unit-II

MATRICES & DETERMINANTS: Define matrix and its representation state its order. State types of matrices with examples. Perform Addition, subtraction and multiplication of a matrix with a scalar and multiplication of two matrices (upto third order only). Transpose, Adjoint and Inverse of a matrix upto



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third order. Solution of simultaneous equations by matrix method (linear equations in two and three unknowns). Problems on above, DETERMINANTS: Define determinant (second and third order). Minor, CO-factor, Study properties of determinants. Cramer's Rule: (solutions of simultaneous equations of two and three unknown).

Unit-III

PARTIAL DIFFERENTIATION & ANALYTICAL GEOMETRY IN THREE DIMENSIONS:

Functions of several variables. Partial derivatives up to three independent variables, Maxima & Minima, Euler's Theorem on homogenous function for two variables. ANALYTICAL GEOMETRY IN THREE DIMENSIONS: Co-ordinates of a point in rectangular co-ordinate system, Distance formula, Division formula, Dcs & Drs of a line, the formula for angle between two lines with given Drs, conditions of perpendicularity and parallelism. State equation of a plane, Find equation of a plane in different forms (i) General form $Ax+By+Cz+D=0$, where A,B,C are Drs of the normal to the plane, (ii) Intercept form $(X/a+Y/b+Z/c=1)$, (iii) Normal form, Angle between two planes, Perpendicular distance from a point to a plane.

Unit-IV

INTEGRAL CALCULUS: Integration as inverse process of differentiation. Indefinite and Definite Integral, Integrals of standard functions, Methods of Integration (i) Integration by Decomposition of Integrand, (ii) Integration by Substitution, (iii) Integration by parts, Methods of Integration by partial fraction. Definite Integrals, Properties of Definite Integrals. Area bounded by the curve $y=f(x)$, $x=a$, $x=b$ and x -axis and the area bounded by the curve $x=f(y)$, $y=c$, $y=d$ and y - axis.

Unit-V

DIFFERENTIAL EQUATION: Differential equation, Order and degree of a differential equation, Formation of first order first degree differential equation. Solution of first order and first degree differential equation by the following methods (i) separation of variables (ii) Linear (iii) Exact

Text Books:

1. A. Sarkar, *Mathematics (First Semester)*, Naba Prakashani
2. G.P. Samanta, *A Text Book of Diploma Engineering Mathematics, Volume-1*, Learning Press
3. Dr. S. Bose & S. Saha, *A Complete Text Book of Mathematics*, Lakshmi Prakashan

Reference Books:

1. H.S. Hall & S.R. Knight, *Higher Algebra Book Palace, New Delhi*
2. S.L. Loney, *Trigonometry S. Chand & Co.*
3. H.K. Dass *Engineering Mathematics S. Chand & Co.*
4. T.M. Apostol *Calculus, Volume-1, John Wiley & Sons*
5. B.K. Pal, K. Das, *Engineering Mathematics, Volume-1, U.N. Dhar & Sons*
6. B.C. Das & B.N. Mukherjee, *Differential Calculus U.N. Dhar & Sons*
7. KAR, *Engineering Mathematics, Tata McGraw- Hill*
8. SINGH, *Engineering Mathematics Tata McGraw- Hill*

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			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
DTEI 101		Introduction to Electronics and Instrumentation	60	20	20	30	20	2	1	2	4

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Course Education Objective:

Student should familiar with all Aspects of Electronics & Instrumentation and various measuring and sensing instruments by Identification and working point of view with good understanding as well.

Course Outcomes:

1. Student will be able to design and testing of Electronic Circuits based on sensors on Breadboard and PCB as well.
2. Student will be able to Understand various types of errors & error detecting techniques..
3. Student will be able to know the working of Electronic Bridges to measure Electronic Parameters..
4. Student will be able to explain about the working of Display Devices like LCD,LED & Seven Segment Display .

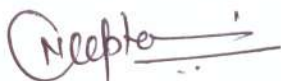
Syllabus

Unit-I

Fundamentals Concepts & Identification of Electrical & Electronics Components, their values determination and Testing with CRO, Multimeter etc. Circuit designing on Breadboard, PCB, Transistor voltmeter circuits, AC electronic voltmeter, current measurement with electronic instruments, multimeter probes Digital voltmeter systems, digital multimeters, digital frequency meter system.

Unit-II

Unit, dimensions and standards: Scientific notations and metric prefixes. SI electrical units, SI temperature scales, other unit systems, dimension and standards. Measurement Errors: Gross error, systematic error, absolute error and relative error, accuracy, precision, resolution and significant figures, Measurement error combination, basics of statistical analysis. PMMC instrument, galvanometer, DC ammeter, DC voltmeter, series ohm meter.



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Unit-III

CRO: CRT, wave form display, time base, dual trace oscilloscope, measurement of voltage, frequency and phase by CRO, Oscilloscope probes, Oscilloscope specifications and performance. Delay time based Oscilloscopes, Sampling Oscilloscope, DSO, DSO, its applications, LED, LCD & seven segment Display.

Unit-IV

Instrument calibration: Comparison method, digital Multimeter as standard instrument, calibration instrument Recorders: X-Y recorders, plotters.

Unit-V

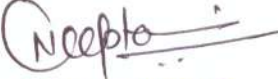
Voltmeter and ammeter methods, Wheatstone bridge, low resistance measurements, low resistance measuring instruments AC bridge theory, capacitance bridges, Inductance bridges, Q meter

References:

1. Oliver and Cage, "Electronic Measurements and Instrumentation", TMH, 2009.
2. Alan S. Morris, "Measurement and Instrumentation Principles", Elsevier (Buterworth Heinmann), 2008.
3. A.K. Sawhney; A Course in Electrical and Electronic Measurements_Dhanpat Rai Publication.
4. Robert Boylestad & Nashetsky; Electronics Devices and Circuits Theory; Pearson Ed.
5. Salivahanan, Vallabhraj; Electronics Devices and Circuits ;McGraw Hill Publication.

List of Experiments:

1. Identification of Electronics Components and determination of their values by Color, Digits & Terminals/Pins Coding.
2. Study of Function Generator, Waveforms, CRO, Multimeter and other measuring and Testing Equipments.
3. Practice of Circuits/Components Assembling on Breadboard and their Testing.
4. PCB Designing with Layouts, Soldering, Drilling process.
5. Circuit / Components Testing by Multimeter, CRO and other methods.
6. To measure Various Electrical parameters by Various Electronic Bridges..
7. To study the PMMC instruments.
8. To study the MI Instruments.
9. To study the LED, LCD and Seven Segment Display.


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Subject Code	Category	Subject Name	Teaching &Evaluation Scheme											
			Theory					Practical			L	T	P	Credits
			End Sem University	Two Term Exam	Teachers Assessment*	End Sem	University	Teachers Assessment*						
DTEI201		Signals & Systems	60	20	20	0	0	3	0	0	3			

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; Q/A Quiz/Assignment/Attendance, MST Mid Sem Test.

.Course Objectives:

The objective of this course is to have an introduction to approaches of signals & systems analysis with an increased emphasis on the frequency response and Analysis of system with continuous signal and discrete time signal. To enable the students to understand the fundamentals of Signals, their Time & Frequency characteristics.

Course Outcomes: Upon completion of this course students will be able to

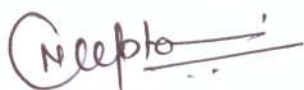
1. Classify both continuous and discrete time signals and systems.
2. Analyze continuous signals in complex plain.
3. Understand Laplace transform
4. Analyze Z transform
5. Understand the random signals and systems.

Syllabus

UNIT-I

Introduction to signal and systems: Continuous and discrete time signals: Classification of Signals Periodic aperiodic even odd energy and power signals Deterministic and random signals complex exponential and sinusoidal signals periodicity unit impulse unit step Transformation of independent variable of signals: time scaling, time shifting.

UNIT-II



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Signal Transformation: Fourier transformation of continuous and discrete time signals and their properties, Laplace transformation-analysis with examples and properties. Parseval's theorem;

UNIT-III

The Laplace Transform. The Region of Convergence for Laplace Transforms. The Inverse Laplace Transform. Geometric Evaluation of the Fourier Transform from the Pole-Zero Plot. Properties of the Laplace Transform.

UNIT-IV

Z-Transforms: Basic principles of z-transform, z-transform definition, Relationship between z-transform and Fourier transform, region of convergence properties of ROC, Properties of z-transform, Poles and Zeros, inverse z-transform using Contour integration

UNIT-V

Random Signals & Systems: Definitions, distribution & density functions, mean values & moments, function of two random variables, concepts of correlation, random processes, spectral densities, response of LTI systems to random inputs.

Text books:

1. Signals and Systems 2/E, 1996 Alan V. Oppenheim, Alan S. Willsky, with S. Hamid Prentice Hall .
2. Digital signal processing –Principles, algorithms and applications 3rd Edition, 1996 J. G. Proakis, D. G. Manolakis PHI

Reference books:

1. Outline of Signals and Systems 1st, 1995 Hwei Hsu, Schaum's McGraw-Hill
2. Signals & Systems 2nd Edition, 2002 Simon Haykin and Van Veen Wiley
3. Signals & Systems Analysis Using Transformation Methods & MATLAB 2003 Robert TMH
4. Signals, Systems and Transforms 3rd Edition, 2004. C. L. Philips, J.M.Parr and Eve A.Riskin Pearson education
5. Signals & Systems 2001. I. J. Nagrath, S.N.Sharan, R.Ranjan, S.Kumar

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			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment *	END SEM University Exam	Teachers Assessment*				
DTEE101		Basic Electrical Engineering	60	20	20	30	20	2	1	2	4

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;

***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):

To introduce the students with the

1. Component and type of components.
2. Material used for the type of component.
3. Construction and the working principle of the component.

Course Outcomes (COs):

After the successful completion of this course students will be able to

1. Identify various types of components.
2. Use multi meter for measuring various quantities like voltage(dc & ac), current, resistance.
3. Assemble and test components on breadboard.
4. Solder one simple circuit on a general purpose PCB.

Syllabus

Unit I

RESISTORS: Basic concepts. Ohm's Law. Fixed and Variable type.

Fixed: Carbon composition, carbon film, metal film, Ceramic & Vitreous Enamel wire-wound types.

Variable: Rheostat, Carbon track and wire-wound potentiometers (Linear & Non-Linear), Preset resistors.

Their construction, power rating, tolerance (accuracy) temperature coefficient, and typical applications.

E6, E12 & E24 series of resistors. Color Code of Standard Resistors.

Unit II

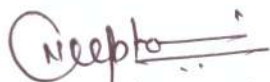
CAPACITORS: Fixed and Variable type.

Fixed: Ceramic, Mica, and Polyester and Electrolytic

Variable: Air Gang and Trimmer.

Their construction, voltage rating & typical applications. Colour Coding of capacitors.

Unit III



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INDUCTORS: Construction & application of air core, iron core, ferrite core, inductor coils(winding) used in Motors, Generators, Transformers, Tube-light chokes, D.C. power supply Filter chokes, loudspeakers and ignition system of vehicles.

Unit IV

CABLES/WIRES: Types: flexible, hook-up, coaxial and fiber optic. Multi-core Power and Control cables.

Their construction and applications.

Unit V

SWITCHES: Types: Slide, Toggle, Push to ON, Push to OFF, Rocker, Rotary & Reed switches. Their construction & applications.

RELAYS: Construction, rating & working principle of general purpose relay, Reed relay.

Text Book: - Electronic Circuits Handbook, 3rd Edition by Michael H Tooley. (BPB Publications).

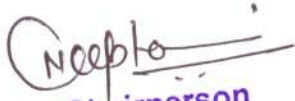
Reference Books:-

1. Basic Electronics and Linear Circuits, 4th Edition by N Bhargava, D C Kulshreshtha & S C Gupta. (Tata McGraw – Hill Publishing Company Limited)
2. Electronic Components & Materials, 2nd Edition by S M Dhir, (Tata McGraw - Hill Publishing Company Limited).
3. Electronic Components and Materials, 2nd Edition by Grover & Jamwal (Dhanpat Rai & Sons).

List of Laboratory Experiments:-

Drawing of symbols/conventions of various Electrical & Electronic components used in Engineering.

1. To identify the value, tolerance of resistors and capacitors by colour code.
2. To measure the value of resistor/s using multimeter.
3. To test rheostat, linear potentiometer, logarithmic potentiometer, preset variable resistors.
4. Testing of LDR on multimeter.
5. Testing of Germanium, Silicon PN diodes on multimeter.
6. Use of breadboard & testing of different colour LED's, 7 segments LED Display on breadboard.
7. Testing of switches by measuring their contact resistance on multimeter.
8. Wiring and soldering of one circuit on a general purpose PCB.
9. Wiring and testing of AC 230V, 50 Hz extension supply board.
10. observe motors, generators, transformers and identify the Inductor coils (windings) used therein.


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DTCS201	-	Computer Application-II	-	-	-	30	20	-	-	2	1

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Course Objectives:

1. Students should be able to explain the object oriented concepts.
2. Students should be able to Write programs using object-based programming techniques including classes, objects and inheritance
3. Able to use of various system libraries.
4. Be aware of the important topics and principles of software development.
5. Have the ability to write a computer program to solves specified problems.

Course Outcomes:

1. Explain & implement the Object Oriented Programming concepts.
2. Explain packages and interfaces using Java program.
3. implement Exception Handling in Java.
4. Design graphical user interface and Event Handling in Java.
5. Develop and deploy Applet in Java.

Syllabus

Unit-I

Basics of Java

Java - What, Where and Why? History and Features of Java , Difference between JDK,JRE and JVM ,Variable and Data Type, operators, Naming Convention.

Unit-II

OOPS Concepts

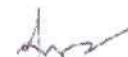
Advantage of OOPs, Object and Class, Method Overloading, Constructor, static variable, method and block , this keyword, Inheritance (IS-A), Aggregation and Composition(HAS-A), Method Overriding, super keyword, final keyword, Polymorphism, Abstract class and Interface, Package and Access Modifiers, Encapsulation.

Unit-III

String Handling

String ,Immutable String , String Comparison , String Concatenation , Substring , Methods of String class, String Buffer class , toString method.


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Unit-IV

Exception Handling

Exceptions: Need for exceptions, Exception hierarchy: Checked Unchecked exceptions, Try, catch, finally, Throw, throws, creating exceptions.

Unit-V

Multi threading

Multi threading advantages and issues, Multi threading advantages, Thread Life cycle, Simple thread program, Priorities and scheduling.

Text Books:

1. Java- Head First 2nd edition Kathy Sierra, Bert Bates.
2. Programming with Java A Primer, E. Balaguruswamy Tata McGraw Hill Companies.
3. Java Programming John P. Flynt Thomson 2nd.

References:

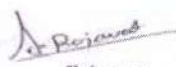
1. Java Programming Language Ken Arnold Pearson.
2. The complete reference JAVA2, Hervert schildt. TMH.
3. Big Java, Cay Horstmann 2nd edition, Wiley India Edition.
4. Java – Balaguruswamy.

List of experiments (Expandable):

Programming assignments may be given to students so that they can better understand the concepts of object oriented programming such as objects, classes, class-relationships, association, aggregation, inheritance, polymorphism etc.

Installation of J2SDK

1. Write a program to show Scope of Variables
2. Write a program to show Concept of CLASS in JAVA
3. Write a program to show Type Casting in JAVA Write a program to show
4. How Exception Handling is in JAVA
5. Write a Program to show Inheritance
6. Write a program to show Polymorphism
7. Write a program to show Access Specifiers (Public, Private, Protected) in JAVA Write a program to show use and Advantages of CONSTRUCTOR
8. Write a program to show Interfacing between two classes
9. Write a program to Add a Class to a Package
10. Write a program to show Life Cycle of a Thread
11. Write a program to demonstrate AWT.
12. Write a program to Hide a Class
13. Write a Program to show Data Base Connectivity Using JAVA
14. Write a Program to show "HELLO JAVA" in Explorer using Applet
15. Write a Program to show Connectivity using JDBC
16. Write a program to demonstrate multithreading using Java.


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DTHU 101		Communication Skills	0	0	0	30	20	0	0	4	2

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;

*Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):

A diploma holder is supposed to write official, business and personal letters. Technical report writing forms another activity of diploma holders. Keeping in view, the above and continuing education needs of diploma holders, communication skill has been considered as essential human science subject. The emphasis of teaching should be to develop necessary competencies (knowledge and skill) in written and oral communication in English.

Syllabus

Unit-I

Prose (Text book) writing in English

Introduction to communication skills in English language.

Concept, principle and procedure for prose selection.

Study and practice in English prose as recommended in the prescribed book (5-lessons)

Unit-II

Correspondence in English: OFFICIAL, BUSINESS AND PERSONAL LETTERS

1. Introduction and understanding of writing letters in English.
2. Concept, principle and procedure in writing official letters.
3. Concept, principle and procedure in writing business letters.
4. Concept, principle and procedure in writing personal letters.
5. Classification of text of letters as Title, Body and closing procedure.

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Unit-III

English Grammar

Basic Language Skills : Grammar and usage- Types of Sentences, Phrases & Clauses, Parts of Speech , Direct - Indirect, Active - Passive voice, S-V Agreement, Tenses.

Unit-IV

Communication Techniques

All forms of written communications including drafting reports, notices, agenda note, business correspondences, preparations of summaries and précis, telegrams, circulars, representations, press release and advertisements.

Telephoneic communications

Unit-V

Precis and Comprehension

1. Introduction and understanding of writing precise in English.
2. Concept/ principle or procedure for précis writing.
3. Organizing and summarizing the selected paragraph to develop scheme in précis writing.
4. Text book prescribed by State Board of Technical Education to be followed

References

1. TTTI-Chandigarh. **A Book of English for Polytechnic, Prose Selection.** MacMillan, India
2. Krishna Mohan and Meera Bannerji. **Developing Communication Skills.** MacMillan, India
3. N.K. Aggarwal. **Better English Grammar & Composition.** Arnold Publication, New Delhi
4. Thomas Huckin and Leslie Olson. **Technical Writing and Professional Communication.** McGraw Hill, New Delhi
5. R K Bansal and J B Harrison. **Spoken English for India.** Orient Longman, New Delhi

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