Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Think Excellence. Live Excellence.

Diploma in Mechanical Engineering

Year 1st   **Sem 2nd**

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL					
			END SEM UNIVERSITY EXAM	TWO TERM EXAM	TEACHER ASSESSTMENT*	END SEM UNIVERSITY EXAM	TEACHER ASSESSTMENT*	L	T	P	CREDITS
DTMA201		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;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 20 marks.

Course Educational Objectives (CEOs):
To introduce the students with the (A) Fundamentals of the Advanced Engineering Mathematics.

Course Outcomes (CO's):
After the successful completion of this course students will be able to
1. 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)

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Unit - II

Matrices & determinates: 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 (up to third order only). Transpose, Adjoin and Inverse of a matrix up to third order. Solution of simultaneous equations by matrix method (linear equations in two and three unknowns). Problems on above, DETERMINATS: 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

Reference 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, Lakhsmi Prakasan*
4. *H.S. Hall & S.R. Knight, Higher Algebra Book Palace, New Delhi*
5. *S.L. Loney, Trigonometry S. Chand & Co.*

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6. *H.K. Dass Engineering Mathematics S. Chand & Co.*
7. *T.M. Apostol Calculus, Volume-1, John Wiley & Sons*
8. *B.K. Pal, K. Das, Engineering Mathematics, Volume-1, U.N. Dhar & Sons*
9. *B.C. Das & B.N. Mukherjee, Differential Calculus U.N. Dhar & Sons*
10. *KAR, Engineering Mathematics, Tata McGraw- Hill*
11. *SINGH, Engineering Mathematics Tata McGraw- Hill*

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			THEORY			PRACTICAL					
			END SEM UNIVERSITY EXAM	TWO TERM EXAM	TEACHER ASSESSTMENT*	END SEM UNIVERSITY EXAM	TEACHER ASSESSTMENT*	L	T	P	CREDITS
DTCE101		ENGINEERING MECHANICS	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 20 marks.

Course Educational Objectives (CEOs):

Course Outcomes (COs):

Syllabus
Unit-I
Static Forces: Introduction to Engineering Mechanics, Classification of Engineering Mechanics, Statistics, Dynamics, Kinematics, Kinetics etc. Fundamental Laws of Mechanics

Unit-II
Force, Pressure and Stress, Free Body Diagram, Bow's Notation, Characteristics and Effects of a Force, System of Forces, Resolution of a Force, Composition of Forces, Resultant / Equilibrant Force, Law of Parallelogram of Forces, Law of Triangle of Forces, Polygon Law of Forces, Lami's Theorem, Equilibrium of a Body Under Two / Three/More Than Three Forces. Law of Superposition of Forces.

Unit-III
Analysis of Framed Structure: Frame, Types of frame, Truss, Types of truss, Analysis of Truss, Various methods of Analyzing the truss, Numerical analysis of truss.

Unit-IV
CG and MI: Centroid, Centre of Gravity, Determination of Centroid of Simple Figures, Centroid of Composite Sections. Centre of Gravity of Solid Bodies. Area Moment of Inertia: Basic Concept of Inertia, Definition of Moment of Inertia, Theorems of Moment of Inertia, Radius of Gyration.
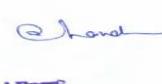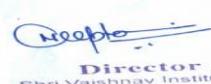
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Unit-V
Beams: Types of Beams: Simply Supported Beam, Overhanging Beam, Cantilever Beam. Types of Supports of a Beam or Frame: Roller, Hinged and Fixed Supports. Load on the Beam or Frame: Different Types of Loading. Support Reaction of a Beam, Shear force, Bending Moment.

Reference Books:
1. *Prasad I.B., Applied Mechanics, Khanna Publication.*
2. *Shesha Prakash and Mogaveer; Elements of Civil Engg & Engg. Mechanics; PHI*
3. *S.P, Timoshenko, Mechanics of stricture, East West press Pvt.Ltd.*
4. *R.C. Hibbler – Engineering Mechanics: Statics & Dynamics.*
5. *A. Boresi & Schmidt- Engineering Mechines- statics dynamics, Thomson' Books*
6. *R.K. Rajput, Engineering Mechanics S. Chand & Co.*

List of Experiments
1. To verify the law of Triangle of forces and Lami's theorem.
2. To verify the law of parallelogram of forces.
3. To verify law of polygon of forces
4. To find the support reactions of a given truss and verify analytically.
5. To determine support reaction and shear force at a given section of a simply Supported beam and verify in analytically using parallel beam apparatus.
6. To determine the moment of inertia of fly wheel by falling weight method.
7. To verify bending moment at a given section of a simply supported beam.
8. Study of Various Beams and their Loading conditions
9. Study of Newton's laws of motion
10. Study of Newton's law of Gravitation

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SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM UNIVERSITY EXAM	TWO TERM EXAM	TEACHER ASSESSTMENT*	END SEM UNIVERSITY EXAM	TEACHER ASSESSTMENT*				
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 20 marks.

Course Educational Objectives (CEOs):

To introduce the students with the (A) Component and type of components (B) Material used for the type of component (C) 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. Colour Code of Standard Resistors.
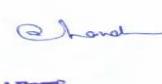
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Unit II
Capacitors: Fixed and Variable type.
Fixed: Ceramic, Mica, Polyester and Electrolytic
Variable: Air Gang and Trimmer.
Their construction, voltage rating & typical applications. Colour Coding of capacitors.

Unit III
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 Experiments
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.

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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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SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM UNIVERSITY EXAM	TWO TERM EXAM	TEACHER ASSESSTMENT*	END SEM UNIVERSITY EXAM	TEACHER ASSESSTMENT*				
DTCH101		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 20 marks.

Course Educational Objectives (CEOs):
(A)To give basic knowledge of polymer science (B) To understand and apply the knowledge of electro-chemistry and its laws(C) To give basic knowledge of corrosion and control over it. To understand the various sophisticated instrumental techniques (D) To give basic knowledge of water, lubricants and different properties of water.

Course Outcomes (COs):
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
1. Theoretical understanding of various high polymers and their properties.
2. Became aware of the importance of electro-chemistry and its laws in the field of technology and dealing with its numerical approach.
3. Understanding metal corrosion and control over it.
4. Implementing instrumental techniques as powerful tool for qualitative and quantitative analysis of compounds.
5. 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**.**

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

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 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
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 electro dialysis - domestic water treatment.

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.

Reference Books:
1. *Applied Chemistry – Theory and Practice, O.P. Viramani, A.K. Narula. Polymer Science – Ghosh.*
2. *Chemistry for Environmental Engineering – Sawyer, McCarty and Parkin.*
3. *Basic Lubrication theory – Alistair Cameron*
4. *Engineering chemistry- Dr. Jyoti Mitna*
5. *Engineering chemistry- Dr. Sunita Ratan*

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6. *Applied Chemistry – S.M. Khopkar*
7. *Polymer Science- V.R. Gowawriker*
8. *Introduction of polymer science- G.S. Mishra*

List of experiments
1. To estimate the strength of the given unknown solution of Mohr's salt (Ferrous ammonium sulphate ($FeSO_4$ $(NH_4)_2SO_4.6H_2O$) using $KMnO_4$ solution as an intermediate.
2. Estimation of hardness by EDTA method.
3. Conductometric titration - determination of strength of an acid
4. Estimation of iron by potentiometry.
5. Determination of molecular weight of polymer by viscosity average method
6. Determination of Na / K in water sample by Flame photometry (Demonstration)
7. Determination of total alkalinity and acidity of a water sample
8. Estimation of calcium ions present in tap water. (TDS)
9. To determine the viscosity of a given liquid (30% sugar   solution) at room temperature using Ostwald's viscometer.

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SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL					
			END SEM UNIVERSITY EXAM	TWO TERM EXAM	TEACHER ASSESSTMENT*	END SEM UNIVERSITY EXAM	TEACHER ASSESSTMENT*	L	T	P	CREDITS
DTME205		MECHANICAL MEASUREMENT	60	20	20	0	0	3	0	0	3

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 20 marks.

Course Outcomes (COs):

Measurement of equipment in industries is very critical issue to ensure quality and quantity of production. Industries are not able to survive and progress if proper measurement of equipment is not done. This course provides information about(A) Measurement of equipment in industries. This course also provides(B) basic knowledge and skills regarding measurement problems, their causes and remedies in industries.

Course Outcomes (COs):

1. Recognize troubles in Mechanical Measurements.
2. Assemble, dismantle and align mechanisms in sequential order.
3. Students will describe basic concepts of mechanical measurement.
4. Students will describe methods of measurement for various quantities like force, torque, power, displacement.

Syllabus

Unit - I
Introduction to measurement and measuring instruments, Units of measurement, Calibration, Concept of error.

Unit– II
Measurement of pressure. Measurement of temperature: Measurement of temperature by thermometers.

Unit - III
Measurement of temperature by thermometers, Bimetallic, Thermocouples.

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Unit - IV

Metrology: Standards of measurement, Linear and angular measurement devices and systems limit gauges, Gauge blocks.

Unit - V

Linear Measurement Instruments, Vernier caliper, Micrometer, Interval measurements: Slip gauges, checking of slip gauges for surface quality, Optical flat, Limit gauges,

Reference Books:

1. *Maintenance Engineering Hand Book Higgins*
2. *Maintenance & Spare parts Management Gopal Krishnan*
3. *Industrial Maintenance Management S.K. Shrivastava*
4. *Measurement Systems, Application and Design – E.O. Doebelin*
5. *5. Mechanical Measurements and Control – D.S. Kumar –*
6. *Beckwith Thomas G., Mechanical Measurements*
7. *Doeblein E.O., "Measurement Systems, Application Design.*
8. *Gupta, I.C., "Engineering Metrology"*

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Year 1ˢᵗ   **Sem 2ⁿᵈ**

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM UNIVERSITY EXAM	TWO TERM EXAM	TEACHER ASSESSTMENT*	END SEM UNIVERSITY EXAM	TEACHER ASSESSTMENT*				
DTCS201		COMPUTER APPLICATION II	0	0	0	30	20	0	0	2	1

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 20 marks.

Course Educational Objectives (CEOs):

Course Outcomes (COs):

Syllabus
Unit - I
Object-Oriented Programming Concepts: introduction, comparison between procedural programming paradigm and object-oriented programming paradigm, basic concepts of object-oriented programming — concepts of an object and a class, interface and implementation of a class, operations on objects, relationship among objects, abstraction, encapsulation, data hiding, inheritance, overloading, polymorphism, messaging.

Unit - II
Standard Input/Output: Concept of streams, hierarchy of console stream classes, input/output using overloaded operators >> and << and member functions of i/o stream classes, formatting output, formatting using iOS class functions and flags, formatting using manipulators.

Unit - III
Classes and Objects: Specifying a class, creating class objects, accessing class members, access specifiers, and static members, use of cost keyword, friends of a class, empty classes, nested classes, local classes, abstract classes, container classes, bit fields and classes.

Unit - IV
Pointers and Dynamic Memory Management: declaring and initializing pointers, accessing data through pointers, pointer arithmetic, memory allocation (static and dynamic), dynamic memory management using new and delete operators, pointer to an Object, this pointer, pointer
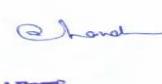
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related problems - dangling/wild pointers, null pointer assignment, memory leak and allocation failures.

Unit - V
Constructors and Destructors: need for constructors and destructors, copy constructor, dynamic constructors, explicit constructors, destructors, constructors and destructors with static members, overloading operators, rules for overloading operators, overloading of various
Operators, type conversion - basic type to class type, class type to basic type, class type to another class type.

Reference Books:
1. *Fundamentals of Computers: E Balagurusamy, TMH*
2. *Basic Computer Engineering: Silakari and Shukla, Wiley India*
3. *Fundamentals of Computers: V Rajaraman, PHI*
4. *Information Technology Principles and Application: Ajoy Kumar Ray & Tinku Acharya PHI.*

List of Experiments
1. To demonstrate use of data types, simple operators (expressions)
2. To demonstrate decision making statements (switch case) decision making statements (if and if-else, nested structures).
3. To demonstrate use of simple loops and nested loops
4. To demonstrate menu driven programs and use of standard library functions. Exercise
5. To demonstrate writing C programs in modular way (use of user defined functions
6. To demonstrate recursive functions
7. To demonstrate use of 1D array and multidimensional array (2-d arrays) and functions
8. To demonstrate use of pointers and concept of strings (strings and pointers)
9. [Classes and Objects] Write a program that uses a class where the member functions are defined inside a class.
10. [Classes and Objects] Write a program to demonstrate the use of static data members.
11. [Constructors and Destructors] Write a program to demonstrate the use of zero argument and parameterized constructors.
12. [Constructors and Destructors] Write a program to demonstrate the use of dynamic constructor.
13. [Constructors and Destructors] Write a program to demonstrate the use of explicit constructor.

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14. [Operator Overloading] Write a program to demonstrate the overloading of increment and decrement operators.
15. [Operator Overloading] Write a program to demonstrate the overloading of binary arithmetic operators.
16. [Typecasting] Write a program to demonstrate the typecasting of basic type to class type.
17. [Typecasting] Write a program to demonstrate the typecasting of class type to basic type.
18. [Inheritance] Write a program to demonstrate the multilevel inheritance.
19. [Inheritance] Write a program to demonstrate the multiple inheritance.
20. [Inheritance] Write a program to demonstrate the virtual derivation of a class.

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			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM UNIVERSITY EXAM	TWO TERM EXAM	TEACHER ASSESSTMENT*	END SEM UNIVERSITY EXAM	TEACHER ASSESSTMENT*				
DTHU101		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 20 marks.

Course Educational Objectives (CEOs):

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

Course Outcomes (COs):

Syllabus
Unit-I
Prose (Text book) writing in English:
1. Introduction to communication skills in English language.
2. Concept, principle and procedure for prose selection.
3. Study and practice in English prose as recommended in the prescribed book (5-lessons)

Unit-II
Correspondence in English: Official, Business & 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**.**

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.

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Unit – IV
Communication Techniques: All forms of written communications including drafting reports, notices, agenda note, business correspondences, preparation of summaries and precis, telegrams, circulars, Telephonic communications.

Unit – V
Precis and Comprehension:
1. Introduction and understanding of writing precis in English.
2. Concept/ principle or procedure for precis writing.
3. Organizing and summarizing the selected paragraph to develop scheme in precis writing.
4. Textbook prescribed by State Board of Technical Education to be followed.

Reference Books:

1. *TTTI- Chandigarh, A Book of English for Polytechnic, Pros Selection. MacMillan, India.*
2. *Krishna Mohan and Meera Banerjee. 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.*