Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Program Name: Diploma

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM	MST	Q/A	END SEM	Q/A				
DTMA201	BS	**APPLIED MATHEMATICS II**	60	20	20	0	0	3	1	0	4

Course Objective

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

Course Outcomes

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

1. *understand the concept of limit, continuity, and differentiability and find maxima, minima and critical points of functions.*
2. *solve the system of simultaneous linear equations using matrices and determinants*
3. *apply partial derivatives and 3D geometry to Engineering problems*
4. *understand different techniques of Integral and apply definite integral to find area and learn various methods of solving linear differential equations of first order.*
5. *construct and solve the problems by differential equations and integration.*

Course Content:

Unit 1

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

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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 2

MATRICES & DETERMINATS: 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 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 3

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.

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Unit 4

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 5

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

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, Lakhsmi Prakasan

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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Diploma in Civil Engineering
(2021-2024)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
DTCE 101	BEC	Applied 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 10 marks.

Course Educational Objectives (CEOs):

The students (A) will be Able to familiarize with different branches of mechanics (B) with emphasis on their analysis and application to practical engineering problems(C) efficiently & effectively (D)

Course Outcomes (COs):

The students will be able to

1. To apply knowledge of mathematics, science in engineering.
2. To identify, formulate, and solve engineering problems.
3. Demonstrate various types of forces and their analysis.
4. Demonstrate shear force and bending moment on structural member.
5. Demonstrate centre of gravity and moment of inertia determination of different geometrical shapes.

Syllabus:

UNIT I **05 Hrs.**

Static and Dynamic Forces: Introduction to Engineering Mechanics; Classification of Engineering Mechanics; Statistics, Dynamics, Kinematics, Kinetics etc.; Fundamental Laws of Mechanics.

UNIT II **06 Hrs.**

Law of Forces: 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 **06 Hrs.**

Analysis of Framed Structure: Analysis of Framed Structure: Frame, Types of frames; Truss, Types of trusses, Analysis of Truss; Various methods of Analyzing the truss; Numerical analysis of truss.

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Choice Based Credit System (CBCS) in the light of NEP-2020
Diploma in Civil Engineering
(2021-2024)

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DTCE 101	BEC	Applied Mechanics	60	20	20	30	20	2	1	2	4

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UNIT IV **06 Hrs.**

Centre of Gravity: Centroid; Centre of Gravity; Determination of Centroid of Simple Figures; Centroid of Composite Sections; Centre of Gravity of Solid Bodies.

Moment of Inertia: Basic Concept of Inertia, Definition of Moment of Inertia, Theorems of Moment of Inertia and Radius of Gyration.

UNIT V **07 Hrs.**

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; Different types of loading; Support reaction of a beam for point and uniformly distributed load; Shear force and bending moment for simply supported beam for point and uniformly distributed load.

Textbooks:

1. Prasad I.B., Applied Mechanics, Khanna Publication
2. R.S. Khurmi, N. Khurmi, A Textbook of Engineering Mechanics, S Chand Publishing.
3. R.K. Rajput, A Textbook of Applied Mechanics, Laxmi Publications

Reference Books:

1. S.P, Timoshenko, Engineering Mechanics, McGraw Hill Education.
2. R.C. Hibbler, Engineering Mechanics: Statics & Dynamics, Pearson Education
3. A. Boresi & Schmidt, Engineering Mechanics- statics dynamics, Thomson Books

List of Practical's:

1. To verify the law of Triangle of forces
2. To verify the Lami's theorem.
3. To verify the law of parallelogram of forces.
4. To verify law of polygon of forces
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

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Diploma in Electrical Engineering
Common to EE/Solar Engineering
(2021-2024)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING &EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
DTEE201	DCC	Electrical Circuits	60	20	20	30	20	2	1	2	4

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Course Educational Objectives (CEOs):
To introduce the students with the concept of circuit elements lumped circuits, waveforms, circuit laws and network reduction. To solve the electrical network using mesh and nodal analysis by applying network theorems, analyze the transient response of series and parallel A.C. circuits and to solve problems in time domain using Laplace Transform.

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

1. Apply the nodal and mesh methods of circuit analysis.
2. Apply linearity and superposition concepts to analyze RL, RC, and RLC circuits in time and frequency domains.
3. Express complex circuits in their simpler Thévenin and Norton equivalent forms.
4. Analyze circuits both in time and frequency domains.
5. Construct and make time and frequency domain measurements on elementary RL, RC, and RLC circuits.

Syllabus

UNIT I **9 Hrs.**
CIRCUIT ANALYSIS
Active and passive elements, ideal current source and voltage source.Unilateral and bilateral elements.Number of loops, nodes, branches of a network. Analysis of networks by"Mesh" and "Node" methods. T and Π terminal networks, input and output impedance and admittance.

UNIT II **9 Hrs.**
NETWORK THEOREMS
Maxwell's loop theorem, Nodal analysis, Superposition, Thevenin's, Nortons' and maximum power theorems with numerical problems.

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Choice Based Credit System (CBCS) in the Light of NEP-2020
Diploma in Electrical Engineering
Common to EE/Solar Engineering
(2021-2024)

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			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
DTEE201	DCC	Electrical Circuits	60	20	20	30	20	2	1	2	4

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UNIT III **9 Hrs.**

SINGLE PHASE A.C. CIRCUITS

Representation of A.C. quantity by phasor methods, rectangular and polarco-ordinates. RLC series and parallel combinations.Impedance, power in single phase circuits. Concept of power factor, conductance, admittance and susceptance. Series and parallel circuits, resonance in series circuit.

UNIT IV **9 Hrs.**

POLYPHASE CIRCUITS

Concept of poly phase A.C. circuits, advantages over single phase. Generation of three phase voltage system. Three phase circuits, phase sequence, vector and wave diagrams. Star and delta connections, phase and line values of current and voltage, power in three phase circuits. Balanced and unbalanced systems.

UNIT V **9 Hrs.**

TRANSIENTS

Concept of transient, variation of current when connected to D.C. or A.C. series circuit (R.L. combination and R.C. combination). Time constant.

Textbooks:

1. A K Chakrabarti :Circuit theory: Dhanpat Rai
2. Mittal GK; Network Analysis; Khanna Publisher.

References:

1. M.E. Van Valkenburg, Network Analysis, (PHI)
2. Sudhakar & Pillai; Circuit & Networks- Analysis and Synthesis; TMH
3. Hayt W.H. & J.E. Kemmerly; Engineering Circuit Analysis; TMH

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Choice Based Credit System (CBCS) in the Light of NEP-2020
Diploma in Electrical Engineering
Common to EE/Solar Engineering
(2021-2024)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING &EVALUATION SCHEME								
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DTEE201	DCC	Electrical Circuits	60	20	20	30	20	2	1	2	4

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List of Experiments:

1. Verification of Superposition theorem.
2. Verification of Norton's and Thevenin's theorem
3. Verification of Maximum power transfer theorem.
4. Performance of R-L-C- series circuit.
5. Performance of R-L-C- parallel circuit.
6. Study of electrical resonance in series circuit.
7. Verification of relation between line and phase voltage and current in 3-phase circuit.
8. Study of transients.

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Choice Based Credit System (CBCS) in the Light of NEP-2020
Diploma in Electrical Engineering
Common to EE/Solar Engineering/TX
(2021-2024)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING &EVALUATION SCHEME								
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DTEE202	BEC	Basic Electronics Engineering	60	20	20	30	20	2	1	2	4

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Course Educational Objectives (CEOs):
The course objective is to make students of all the branches of Engineering to understand the efficacy of electronic principles which are pervasive in engineering applications.

Course Outcomes (COs):
After studying this course, students will be able to:

1. Appreciate the significance of electronics in different applications.
2. Understand the applications of diode in rectifiers, filter circuits and wave shaping.
3. Apply the concept of diode in rectifiers, filters circuits.
4. Design simple circuits like amplifiers (inverting and non-inverting), comparators, adders, integrator, and differentiator using OPAMPS.
5. Compile the different building blocks in digital electronics using logic gates and implement simple logic function using basic universal gates,

Syllabus

UNIT I **9 Hrs.**

Semiconductor Diodes and Applications: p-n junction diode, Characteristics and Parameters, Diode approximations, DC load line analysis, Half-wave rectifier, Two-diode Full-wave rectifier, Bridge rectifier, Capacitor filter circuit (only qualitative approach), Zener diode voltage regulators: Regulator circuit with no load, Loaded Regulator. Numerical examples as applicable.

UNIT II **8 Hrs.**

Bipolar Junction Transistors: BJT operation, BJT Voltages and Currents, BJT amplification, Common Base, Common Emitter and Common Collector Characteristics, Numerical examples as applicable.

BJT Biasing : DC Load line and Bias Point, Base Bias, Voltage divider Bias, Numerical examples as applicable.

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Choice Based Credit System (CBCS) in the Light of NEP-2020
Diploma in Electrical Engineering
Common to EE/Solar Engineering/TX
(2021-2024)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING &EVALUATION SCHEME								
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DTEE202	BEC	Basic Electronics Engineering	60	20	20	30	20	2	1	2	4

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UNIT III **9 Hrs.**

Introduction to Operational Amplifiers: Ideal OPAMP, Inverting and Non Inverting OPAMP circuits, OPAMP applications: voltage follower, addition, subtraction, integration, differentiation; Numerical examples as applicable.

UNIT IV **10 Hrs.**

Digital Electronics: Number Systems: Decimal Number System, Binary Number System, Converting Decimal to Binary, Hexadecimal, Number System: Converting Binary to Hexadecimal, Hexadecimal to Binary, Converting Hexadecimal to Decimal, Converting Decimal to Hexadecimal, Octal Numbers: Binary to Octal Conversion Boolean Algebra Theorems, De Morgan's theorem. Digital Circuits: Logic gates, NOT Gate, AND Gate, OR Gate, XOR Gate, NAND Gate, NOR Gate, X-NOR Gate. Algebraic Simplification, NAND and NOR Implementation: NAND Implementation, NOR Implementation. Half adder, Full adder.

UNIT V **8 Hrs.**

Flip-Flops: Introduction to Flip-Flops, NAND Gate Latch/ NOR Gate Latch, RS Flip-Flop, Gated Flip-Flops: Clocked RS Flip-Flop.

Textbooks:

1. David A. Bell, "Electronic Devices and Circuits", Oxford University Press, 5th Edition, 2008.
2. D.P. Kothari, I. J. Nagrath, "Basic Electronics", McGraw Hill Education (India) Private Limited, 2014.

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Choice Based Credit System (CBCS) in the Light of NEP-2020
Diploma in Electrical Engineering
Common to EE/Solar Engineering/TX
(2021-2024)

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DTEE202	BEC	Basic Electronics Engineering	60	20	20	30	20	2	1	2	4

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List of Experiments:

1. Plotting of forward V-1 characteristics for a P-N junction diode (Silicon & Germanium diode).
2. To Plot the input and output characteristics and calculation of parameters of a transistor in common base configuration.
3. To Plot input and output characteristics and calculation of parameters of a transistor in common emitter configuration.
4. Verification and interpretation of truth tables for AND, OR, NOT NAND, NOR and Exclusive OR (EXOR) and Exclusive NOR (EXNOR) gates.
5. Measure voltage and current of a given circuit using analog and digital multimeters.
6. Operate all controls of CRO front panel.
7. Measure voltage and frequency of any given signal using oscilloscope.
8. Measure parameters of various signals.
9. Test performance of transistor as a switch.
10. Identify various connectors & draw their diagram.

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Diploma (Electrical Engineering)

SEMESTER II

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY		PRACTICAL		
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
DTHU 101		COMMUNICATION SKILLS	0	0	4	2	0	0	0	30	20

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Course Objectives:

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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Diploma (Electrical Engineering)

SEMESTER II

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.
Telephonic 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

Reference Books:-

1. TTTI-Chandigarh. **A Book of English for Polytechnic, Prose Selection.** MacMillan, India
2. Krishna Mohan and MeeraBannerji. **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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Shri Vaishnav Institute of Technology and Science
Choice Based Credit System (CBCS) in the light of NEP-2020
Diploma in Mechanical Engineering
(2021-2024)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING &EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
DTME102	BEC	Basic Mechanical Engineering	60	20	20	30	20	3	0	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 (A) main & sub domains of Mechanical engineering (B) To introduce the scope latest & future trends, jobs & research opportunities in the field of Mechanical Engineering.

Course Outcomes (COs):

1. To introduce Mechanical Engineering with the help of case studies, magazine, documentaries, presentation and industrial visit.
2. To introduce the basic concepts of thermodynamics, heat engines, IC engine, production, and case studies.
3. To introduce basic Manufacturing Process.

Syllabus

Unit-I **8HRS**

Overview of Engineering: introduction to engineering, classification of engineering disciplines, overview of mechanical engineering, domain and scope for mechanical engineers, specialization in mechanical engineering and job opportunities.

Unit-II **9HRS**

Thermodynamics: Introduction & basic definition of thermodynamics, terminology related with thermodynamics, laws of thermodynamics, properties of steam. Case study on topic related to thermodynamics.

Unit-III **8HRS**

Measurement: Introduction, various measuring instruments & devices, linear & angular measurement, measurement of displacement, velocity, and acceleration (translational and rotational), force, torque and

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Vishwavidyalaya, Indore	Vishwavidyalaya, Indore		

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strain, vibration and shock, measurement of pressure, flow, temperature and liquid level, viscosity, and humidity. Case study on topic related to the any measuring devices.

Unit-IV **10HRS**

Heat Engine: Introduction to IC engine; terminology of IC engine, cycles used in IC engine, two and four stroke petrol and diesel engines, Introduction to boiler, types of steam boilers, properties of steam, terminology related to steam and boilers, mounting and accessories of steam boiler, Case study on topic related to the heat engines.

Unit-V **7HRS**

Manufacturing Processes: Material properties, definition, and classification of basic manufacturing process; introduction to casting, rolling, extrusion, welding, brazing, soldering. Case study on topic related with manufacturing engineering

Text Books:

1. Gupta, D. K., Gupta, B., & Baredar, P. (2020). A Textbook of Basic Mechanical Engineering. DHANPAT RAI & Co.
2. Raghvendra, N. V., & Krishnamurthy, L. (2013). Engineering Metrology and Measurements. Oxford University Press.
3. Rajput, R. K. (n.d.). Mechanical Engineering. Birla Publications PVT. LTD. .
4. Sawhney, A. K., & Sawhney, P. (2017). A Course in Mechanical Measurements and Instrumentation & Control. Dhanpat Rai & Co. (P) Limited.

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Vishwavidyalaya, Indore	Vishwavidyalaya, Indore		

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References:

1. Kreith, F., & Goswami, D. (2004). *The CRC Handbook of Mechanical Engineering* . CRC Press.
2. Smith, E. H. (1994). *Mechanical Engineer's Reference Book.* Society of Automotive Engineers,U.S.

List of Experiments:

1. To study Two-Stroke & Four-Stroke Diesel Engines.
2. To study Two-Stroke & Four-Stroke Petrol Engines.
3. To study the Cochran and Babcock & Wilcox boilers.
4. To study the working and function of mountings and accessories in boilers.
5. To conduct experiment on temperature measurement and check different characteristics of measurements
6. To conduct experiment on linear and angular measurements and check different characteristics of measurements.
7. To conduct experiment on Stress, strain and force measurements and check different characteristics of measurements.
8. To conduct experiment on Speed/Velocity, acceleration measurements.

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