



# Shri Vaishnav Vidyapeeth Vishwavidyalaya

## 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*
DTMA 201		APPLIED MATHEMATICS-II	3	1	0	4	60	20	20	0	0

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 Objectives:-

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)

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### SEMESTER II

#### 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 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

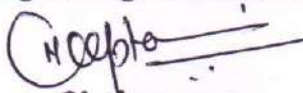
**DIFFERENTIAL EQUATION:** Differential equation, Order and degree of a differential equation, Formation of first order first degree differential equation. Solution of first order and first degree differential equation by the following methods (i) separation of variables (ii) Linear (iii) Exact

#### Text Books:

1. A. Sarkar, Mathematics (First Semester), NabaPrakashani
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, LakshmiPrakasan

#### 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



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**Shri Vaishnav Vidyapeeth Vishwavidyalaya**  
**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*
DTCE 101		APPLIED MECHANICS	2	1	2	4	60	20	20	30	20

**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 Objectives:**

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:**

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 i.e. beams
5. Demonstrate centre of gravity and moment of inertia determination of different geometrical shaped figures.

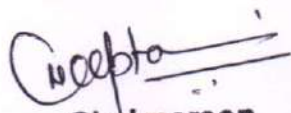
**Syllabus**

**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.



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### SEMESTER II

#### 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.

#### 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 structure, East West press Pvt.Ltd.
4. R.C. Hibbler – Engineering Mechanics: Statics & Dynamics.
5. Borese & 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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							THEORY		PRACTICAL		
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
<b>DTEE 201</b>		<b>ELECTRIC CIRCUIT</b>	2	1	2	4	60	20	20	30	20

**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 Objectives:

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:

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

##### 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  $\Pi$  terminal networks, input and output impedance and admittance.

##### UNIT II

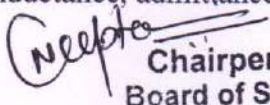
##### NETWORK THEOREMS

Maxwell's loop theorem, Nodal analysis, Superposition, Thevenin's, Nortons' and maximum power theorems with numerical problems.

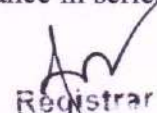
##### UNIT III

##### SINGLE PHASE A.C. CIRCUITS

Representation of A.C. quantity by phasor methods, rectangular and polar-co-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.

  
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## Diploma (Electrical Engineering)

### SEMESTER II

#### UNIT IV

#### 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

#### 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.

#### Text Books:

1. A K Chakrabarti :Circuit theory: Dhanpat Rai

#### Reference Books:

1. M.E. Van Valkenburg, Network Analysis, (PHI)
2. F.F.Kuo, Network Analysis.
3. Mittal GK; Network Analysis; Khanna Publisher
4. Mesereau and Jackson; Circuit Analysis- A system Approach; Pearson.
5. Sudhakar & Pillai; Circuit & Networks- Analysis and Synthesis; TMH
6. Hayt W.H. & J.E. Kemmerly; Engineering Circuit Analysis; TMH

#### List of Practical's

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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**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*
<b>DTHU 101</b>		<b>COMMUNICATION SKILLS</b>	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**

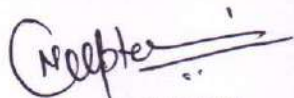
**Prose (Text book) writing in English**

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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### 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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Diploma in Mechanical Engineering

Year 1<sup>st</sup>

Sem 1<sup>st</sup>

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM UNIVERSITY EXAM	TWO TERM EXAM	TEACHER ASSESSMENT*	END SEM UNIVERSITY EXAM	TEACHER ASSESSMENT*				
DTMB102		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 20 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):

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

Syllabus

Unit - I

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

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

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

H.O.D. Mechanical Dept

Director Shri Vaishnav Institute of Technology & Engineering Indore-462 111 (M.P.)

Vice Chancellor Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore





**Diploma in Mechanical Engineering**

**Year 1<sup>st</sup>**

**Sem 1<sup>st</sup>**

**Unit - IV**

**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**

**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.

**Reference Books**

1. *Mechanical Engineering* by R. K. Rajput
2. *Basic Mechanical Engineering* by D. K. Gupta
3. *Basic Mechanical Engineering (MP)* by Domkundwar
4. *Engineering Metrology and Measurements*, Bentley, Pearson Education
5. *A course in Mechanical Measurements and Instrumentation*, A K Sawhney, Dhanpat Rai Publications
6. *Mechanical Engineering Handbook* (CRC Press)
7. *Mechanical Engineering Reference Book* by E.H. Smith
8. *An Introduction to Mechanical Engineering* by Wickert/Lewis
9. *Engineering Fundamentals: An Introduction to Engineering* by Moaveni

**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.

Date: 14/12/17

H.O.D.  
Mechanical Engg

Director  
Shri Vaishnav Institute of  
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Vice Chancellor  
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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*
DTEE 202		BASIC ELECTRONICS ENGINEERING	2	1	2	4	60	20	20	30	20

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 Objectives:

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:

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

**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

**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.

##### UNIT III

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

  
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### SEMESTER II

#### UNIT IV

**Digital Electronics:** Introduction, Switching and Logic Levels, Digital Waveform. 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. Complement of Binary Numbers. 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

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

#### Text Books:

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

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