Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Diploma in Mechanical Engineering

SEMESTER I

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM	MST	Q/A	END SEM	Q/A				
DTMA101N		APPLIED MATHEMATICS-I	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 Educational Objectives (CEOs):

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

Course Outcomes (COs):

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

1. Apply the techniques of algebra.
2. Understand the quadratic equations.
3. know the fundamental concepts of Binomial theorem.
4. Study the trigonometric properties used in the engineering.

Syllabus

Unit - 1

Algebra: Logarithm, Definition of natural and common Logarithm; Laws of Logarithm; Simple Problems based on laws of logarithm.

Unit – II

Complex Numbers: Definition of Complex numbers, Cartesian and polar. Exponential forms of complex numbers; Modulus, amplitude & conjugate of a complex number; Algebra of Complex numbers (Equality, Addition, Subtraction, Multiplication);

Unit – III

Cube root of unity & Quadratic Equations: Cube root of unity and properties of cube root of unity. Definition of Quadratic Equations, Analyzing the nature of roots using discriminant, Relation between roots & coefficients, simple problems.

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Unit – IV

Binomial Theorem: Definition of factorial notation, definition of permutation and combination with formula, Binomial theorem for positive index (statement only), General term and middle term. Binomial theorem for negative index (statement only).

Unit – V

Trigonometry: Relation between degree and radian, trigonometric ratios, sign of trigonometric ratios or function, simple problems based on trigonometric functions.

Reference Books:

1. *B.K. Paul, Diploma Engineering Mathematics (Vol-1), U.N. Dhār & Sons*
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 Prakasan*
4. *H.S. Hall & S.R. Knight, Higher Algebra Book Palace, New Delhi*
5. *S.L. Loney, Trigonometry S. Chand & Co.*
6. *H.K. Dass Engineering Mathematics S. Chand & Co.*
7. *B.K. Pal, K. Das, Engineering Mathematics, Volume-1, U.N. Dhar& Sons*
8. *B.C. Das & B.N. Mukherjee, Differential Calculus U.N. Dhar& Sons*

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Choice Based Credit System (CBCS)

Diploma Program
Applied Physics

Subject Code	Category	Subject Name	Teaching and Evaluation Scheme								
			Theory			Practical		Th	T	P	CREDITS
			End Sem University Exam	Two Term Exam	Teachers Assessment	End Sem University Exam	Teachers Assessment				
DTPH101	Diploma	Applied Physics	60	20	20	30	20	3	0	2	4

Course Objectives	Students should be able to (A) identify different systems of units and convert units from one system to other as well as conversant with practical units. (B)Estimate and minimize the errors. (C) Select proper measuring instrument considering least count, range and precision required. (D)Select appropriate materials required for a specific purpose by studying properties of materials.(E) To understand and apply the concepts of charge, current, resistance, capacitance and electromagnetism to solve field problems. (F) To understand the properties of laser to apply them for various engineering applications including optical Fibre communication.
Course Outcomes	Students will be able to (A) Convert units from one system to other. (B) Estimate and minimize the errors in measurements. (C) Take precision measurement by selecting proper measuring instrument considering least count, range of precision required. (D) Select appropriate materials required for a specific purpose. (E) Apply the concepts of charge, current, resistance, capacitance and electromagnetism to solve field problems. (F) To handle instruments consists laser and optical fibers for various engineering applications.

Abbreviation		
Th	Theory	**Teacher Assessment (Theory) shall be based on following components: Quiz / Assignment / Project / Participation in class (Given that no component shall be exceed 10 Marks).**
T	Tutorial	**Teacher Assessment (Practical) shall be based on following components: Viva/ File/ Participation in Lab work (Given that no component shall be exceed 50% of Marks).**
P	Practical	

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DTPH101: Applied Physics

UNIT I Measurements

1.1 Units: Requirements of standard unit, various unit's systems (CGS, FPS, MKS, SI), conversions, fundamental and derived physical quantities and their units, dimensions and dimensional analysis.

1.2 Errors: Accuracy, precision of instruments, errors, types of errors, minimization of errors, significant figures, problems.

1.3 Measuring instruments: Venire caliper, micrometer screw gauge, spherometer, thermometer, galvanometer, voltmeter, Ammeter with least count and range, errors in them and correction to it.

UNIT II Properties of matter

2.1 Elasticity: Deformation, restoring force, stress, strain, Hooke's law, stress-strain diagram for some materials (steel, aluminum, cast iron, concrete), breaking stress.

2.2 Viscosity: Newton's law of viscosity, coefficient of viscosity, streamline and turbulent flow, critical velocity, Reynold's number, problems, stokes' law, determination of viscosity, factors affecting viscosity.

2.3 Surface tension: Cohesive and adhesive forces, angle of contact, surface tension, capillary action, problems, factors affecting surface tension.

UNIT III Optics

3.1 Wave theory of light: Huygen's theory, wavefronts, laws of reflection and refraction, total internal reflection, dispersion, angle of deviation, problems.

3.2 Interference and diffraction: Principle of superposition, constructive and destructive interference, and conditions to obtain steady interference pattern, Young's double slit experiment, diffraction, Fresnel and fraunhofer diffraction, applications and problems.

3.3 Polarization: Polarized and unpolarized light, qualitative treatment of polarizer and analyzer, half shade polarimeter, applications.

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UNIT IV Electricity and Electromagnetism

4.1 Electricity and Electromagnetism: Coulomb's Law, Electric Field, Intensity of Electric field and Electric Potential, Capacitance, capacitors in series and parallel. Ohm's law, resistance, conductance, resistivity, conductivity, series and parallel combination of resistors, problems.

4.2 Electromagnetism: Oersted experiment, magnetic field, magnetic flux, magnetic flux density, Biot-Savart law, magnetic field near straight conductor and at the centre of current carrying coil, problems.

UNIT V Laser and Fibre Optics

5.1 Laser: Stimulated and Spontaneous Emission, Population Inversion, Pumping, Optical Resonator, Properties and Applications of Laser, Ruby, He-Ne lasers.

5.2 Optical fibre: Introduction to Optical fibre, Ray theory of propagation through optical fibre, Acceptance angle and cone, Types of Optical fibre, Numerical Aperture, VNumber, Fractional refractive index change Δ, applications of optical fibre.

References

1. Engineering Physics by Gaur R. K. and Gupta S. L., Dhanpat Rai Publications, New Delhi, Eighth Edition, 2001, Physics Text Book of 11th & 12th std. (NCERT).
2. "Engineering Physics", by Dr. S. L. Gupta and Sanjeev Gupta, Dhanpat Rai Publication, New Delhi.
3. "Engineering Physics", by Navneet Gupta, Dhanpat Rai Publication, New Delhi.
4. "Engineering Physics", by H. J Sawant, Technical Publications, Pune, Maharashtra.
5. "Engineering Physics". by MN. Avdhanulu & P. G. Kshirsagar, S. Chand & Co.Edition (2012).

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DTPH101: Applied Physics

List of Experiments:

1. To determine the volume of a box by the Vernier Caliperse.
2. To determine the diameter of a wire by screw guage.
3. To determine the distance between two lines by traveling microscope.
4. To verify Hooke's law.
5. To find refractive index of material of prism using spectrometer.
6. To verify Ohm's law.
7. Measurement of Numerical aperture of fiber by LASER.
8. To determine the mass of cane sugar dissolved in water using half shade polarimeter.
9. To determine the surface tension of a liquid by Jagers's method.
10. To determine the value of coefficient of viscocity of water using Poiseuille' method.

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Diploma
(2024-2027)

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 201	BEC	Basic Civil Engineering	60	20	20	30	20	2	0	2	4

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***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 identify various civil engineering aspects (B) with emphasis on, various surveys in Civil Engineering (C) efficiently & effective (D).

Course Outcomes (COs):
The student will be able
1. To understand aspect of Civil Engineering with emphasis on surveying.
2. To acquire knowledge of various types of surveying methods.
3. To analyze and solve the problems related to survey.

Syllabus:

UNIT I **06 Hrs.**
Types of Survey: Definition and introduction of survey; Objects of surveying; Uses of survey; Classification of surveying; Primary - Plain and geodetic survey; Secondary – Surveying based on instruments, method, object, nature of field.

UNIT II **06 Hrs.**
Chain Survey: Principle of chain survey; Study and use of instruments for linear measurements; Ranging – direct and indirect; Introduction to Chain Triangulation; Survey lines, check lines, tie lines, base lines, offset; Obstacles in chaining.

UNIT III **06 Hrs.**
Compass Survey: Principle of compass survey; Meridian – True, Magnetic and Arbitrary; Bearing of lines, fore bearing, back bearing, whole circle bearing, quadrantal bearing; Prismatic compass, components, construction, and use.

UNIT IV **06 Hrs.**
Levelling: Definition and terms related to leveling; Dumpy level – components and construction; Leveling staff, backsight, foresight, intermediate sight, change point; Height of collimation; Height of instrument method; Rise and Fall method

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Diploma
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			THEORY			PRACTICAL		L	T	P	CREDITS
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UNIT V **06 Hrs.**

Mapping and Sensing: Mapping details and contouring; Measurement of areas; Volumes application of measurement in quantity computations; Introduction of remote sensing and its application.

Textbooks:

1. B.C. Punmia; Surveying – Volume – I, Laxmi Publications; seventeenth edition , 2016
2. S.K. Duggal; Surveying – Volume – I, McGraw Hill Publications, 2017.

Reference Books:

1. N.N. Basak; Surveying and Levelling, McGraw Hill Publications, 2017
2. T.P. Kanetkar; Surveying and Levelling, Pune Vidyarthi Grih Prakashan, 2017

List of Practical's:

1. Measurement of distance with chain and tape on ground with direct ranging.
2. Measurement of distance with chain and tape on ground with indirect ranging.
3. Measurement of area by chain and cross staff.
4. Back bearing and fore bearing using prismatic compass.
5. Measurement of back and fore bearing for open traverse.
6. Levelling using Dumpy level.

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