Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Science
Department of Physics
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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SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM	MST	Q/A	END SEM	Q/A				
DTMA 101	BS	APPLIED MATHEMATICS I	60	20	20	0	0	3	0	0	3

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. *apply the techniques of the modern algebra.*
2. *understand the Quadratic Equations & Binomial Theorem.*
3. *know the fundamental principles of the vector algebra.*
4. *study the trigonometric properties used in the engineering.*
5. *understand the concepts of the coordinate geometry.*

Course Content:

Unit 1

Algebra: Logarithm, Definition of natural and common Logarithm, Laws of Logarithm. Simple Problems. 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). Cube roots of unity & its properties. De Moivre's theorem (statement only) and simple problems.

Unit 2

Quadratic Equations & Binomial Theorem: Definition of Quadratic Equations, Analysing the nature of roots using discriminant, Relation between roots & coefficients, Conjugate roots, 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), Partial Fraction: Definition of polynomial fraction, proper & improper

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fractions and definition of partial fractions, Resolving proper fractions into partial fractions with denominator containing non repeated linear factors, repeated linear factors and irreducible non repeated quadratic factors.

Unit 3

Vector Algebra: Definition of a vector quantity. Concept of Position vector and Ratio formula. Rectangular resolution of a vector. Algebra of vectors – equality, addition, subtraction & scalar multiplication. Scalar (Dot) product of two vectors with properties. Vector (cross) product of two vectors with properties. Applications: Application of dot product in work done by a force and projection of one vector upon another. Application of cross product in finding vector area and moment of a force.

Unit 4

Trigonometry: Trigonometric Ratios of associated, compound, multiple and sub-multiple angles. Inverse trigonometric functions – Definition, formulae and simple problems. Properties of Triangle – sine, cosine and tangent formulae - Simple Problems.

Unit 5

Coordinate Geometry & Mensuration: Co-ordinate System, Cartesian & Polar co-ordinate system, Distance formula and section formula, Area of a triangle and condition for collinearity. Straight Line, Equation of straight line in slope point form, intercept form, two-point form, two-intercept form, normal form. General equation of a straight line. Angle between two straight lines – Condition for parallelism and perpendicularity. Length of perpendicular from a point on a line. Perpendicular distance between two parallel lines. **Circle:** Equation of circle in standard form, centre-radius form, diameter form, two-intercept form. General equation of circle with a given centre and radius. Simple Problems. Conic Section: Standard equations of parabola, ellipse & hyperbola. Definition of focus, vertex, directrix, axes, eccentricity. Simple problems. **Mensuration:** Regular Polygon of n sides – Formula for area and perimeter. Prism and Pyramid – Formula for volume & Surface area. Simple Problems.

Text Books:

1. B.K. Paul, Diploma Engineering Mathematics (Vol-1), U.N. Dhar & Sons
2. A. Sarkar, Mathematics (First Semester), Naba Prakashani
3. G.P. Samanta, A Text Book of Diploma Engineering Mathematics, Volume-1, Learning Press
4. Dr. S. Bose & S. Saha, A Complete Text Book of Mathematics, Lakhsmi Prakasan

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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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(2021-2024)

COURSE CODE	CATE-GORY	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*				
DTET101		Electronic Components and Applications	60	20	20	30	20	3	1	2	5

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):
Being one of the fundamental courses of electronics stream, knowledge of electronic components & devices is quite essential for the students. This course includes an exposure to basic electronic components and its applications. The knowledge of this core subject is essential for comprehending the courses and developing requisite skills for effective functioning in the industry.

Course Outcomes (COs):
After completion of this course the students are expected to be able to demonstrate following knowledge, skills, and attitudes:
1. Differentiate active & passive components by observation, specification & application.
2. Use various passive components as per requirements and applications.
3. Understand voltage and current sources as well as their interconversions.
4. Testing and verification of various electronic components.

Syllabus

UNIT I **9 Hrs.**

Introduction to Electronic components: Application of electronics in different fields, Brief introduction to active components and passive components. Definition of charge, electric potential, electric field, voltage, current. Coulombs law. Resistors, Capacitors, and Inductors: Basic concept, classification, materials used, colour code and general specifications. Voltage and Current sources: Concept of constant voltage & current sources, its symbol and graphical representation. Characteristics of ideal and practical voltage and current sources. Conversion of voltage to current & current to voltage sources. Concept of floating and grounded D.C. supplies.

UNIT II **8 Hrs.**

PCB and ICs: PCB: Need and types of PCBs. Types of laminates, steps involved in preparation of PCB. Materials used in soldering, Surface mount Technology (SMT), Materials used in soldering-soldering methods. Classification of IC's, monolithic IC, advantages, disadvantages of IC's thick & thin film IC, hybrid IC, linear IC, digital IC, IC packages-SIP, TO 5, Flat, DIP, pin Identification, temperature ranges, device identification.

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COURSE CODE	CATE-GORY	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*				
DTET101		Electronic Components and Applications	60	20	20	30	20	3	1	2	5

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UNIT III **8 Hrs.**

Cables, Connectors and Fuses: General specifications of cables, Types of cables: construction and applications of coaxial cable, 600 E telephone cable-PASP, Alpeth sheathed cable, FRC cable, twin core cable- twisted & shielded type, optical fiber cable. General specifications of connectors, Types of connectors: Constructional diagram and applications of BNC, D series, Audio, Video, printer, edge, FRC, RJ 45 connectors. Different types of fuses: Glass, ceramic fuse, resettable fuse, shunt fuse-MOV, HRC fuse.

UNIT IV **9 Hrs.**

Switches and Relays: Switch specifications – voltage rating, contact current rating, contact resistance, characteristics of switch & relay - operating time, release time, bounce time, constructional diagram, application of toggle, rotary, push to on & push to off, rocker. Construction, working and application of general-purpose relay, NO, NC contact, reed relays, solid state relays, difference between switch & relay.

UNIT V **8 Hrs.**

Transformers and Batteries: Principle of transformer, emf equation, types, specifications, losses, and applications of transformers. Auto transformer and EHT transformer. Types, specifications, and applications of batteries. Maintenance free batteries and miniature button cells.

Text Books:

1. R.S. Sedha, "Text book of Applied Electronics", S. Chand Publishing, 2008
2. Dilip Gaikkwad, "Electronic Components and Applications", S. Chand Publishing, 2010
3. Debashis De, "Basic Electronics", Pearson

References:

1. Thomas H. Jones ,"Electronic Components Handbook", Reston Publishing Co.
2. Filipovic D. Miomir, "Understanding Electronics Components", mikroElektronika, online 1st edition (2008)
3. Charles A. Harper, "Hand book of components for Electronics", McGraw-Hills
4. Walter C. Boshart, "Printed Circuit Boards Design & Technology", TMH

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			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
DTET101		**Electronic Components and Applications**	60	20	20	30	20	3	1	2	5

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.

List of Experiments:

1. To identify, test and find value of different types of resistors.
2. To identify, test and find value of different types of capacitors.
3. To identify, test and find value of different types of Inductors.
4. Make use of resister, capacitor, inductor in series and parallel connection.
5. To identify and test different types of cables.
6. To identify and test different types of connectors.
7. To identify and test different types of fuses.
8. To identify and test different types of Switches.
9. To identify and test different types of Relays.
10. Identify various IC packages.
11. Read and interpret data sheet of various ICs.

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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*				
DTME101	BEC	Engineering Drawing	60	20	20	30	20	3	0	4	5

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)Use drawing equipment, instruments & Materials (B) Follow and apply standard practice as per bureau of I.S. Develop the ability to draw various curves used in engineering practice. (C)Develop the ability to draw orthographic view of objects and draw the projections of point, line and planes.

Course Outcomes (COs):

1. Develop the ability to draw sectional view of various types of solids and construct development of surfaces.
2. Develop the concept and ability to draw the isometric projections and views.
3. Sketch the various Fasteners & tools used in mechanical engineering.

Syllabus

Unit-I **10HRS**

Uses of Drawing Aids: Drawing equipment instruments and materials, planning & layout of drawing, I.S. codes for planning & layout.

Lines, lettering & dimensioning: Different types of lines, Vertical capital & lower-case letters, inclined capital & lower-case letters, Numerals & Greek alphabets. Dimensioning methods-aligned method & unilateral with chain, parallel, progressive & combined dimensioning.

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			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
DTME101	BEC	Engineering Drawing	60	20	20	30	20	3	0	4	5

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.

Unit-II **8HRS**

Engineering Curves: Construction of Polygons, Various types of curves like Ellipse, parabola, hyperbola, cycloid, epicycloid, hypocycloid, Involute & spiral.

Unit-III **10HRS**

Projections of Points, Lines & Planes: Reference planes, Orthographic projections, 1st Angle and 3rd Angle projection, Projections of points, Projections of Lines- Determination of true lengths & inclinations, Projections of plane- circular, square, rhombus, triangular, regular Pentagonal & hexagonal plane surfaces, determination of true shape.

Unit-IV **8HRS**

Orthographic Projections: Simple Orthographic and Sectional Orthographic Projections of simple machine parts. Isometric Projections: Difference between isometric projections & isometric drawing, Isometric views & isometric projections.

Unit-V **6HRS**

Introduction to Computer Drafting: Introduction to different commands in the drawing software.

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DTME101	BEC	Engineering Drawing	60	20	20	30	20	3	0	4	5

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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.

Text Books:

1. BHATT, N. D. (53rd Edition 2019). *Engineering Drawing.* Charotar Publishing House PVT. LTD.
2. Luzadder , W. J. (7th edition 1976)). *Fundamentals of Engineering Drawing.* Prentice Hall.
3. Shah , P. J. (2008). *A Textbook of Engineering Drawing.* S. Chand Publishing.

References:

1. French, T. E., & Vierck, C. J. (1966). *Fundamentals of Engineering Drawing.* McGraw-Hill.
2. Gopalakrishna , K. R. (2017). *Engineering Drawing Vol 1 & 2 Combined.* Subhas Publications / Subhas Stores.

List of Experiments:

1. Three sheets on problems from geometrical constructions, lettering & types of lines
2. Five Sheets on the topic of Engineering Curves.
3. Four Sheets on Projections of Points & Projections of Straight Lines.
4. Three Sheets on Projections of Planes.
5. Five Sheets on the topic of Orthographic Projections.
6. Demonstration of drafting software to the students

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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*				
DTME103	BEC	Workshop Practices	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):

Know basic (A) workshop processes (B) Read and interpret job drawing.

Course Outcomes (COs):

1. Identify, select, and use various marking, measuring, holding, striking, and cutting tools & equipment's. Operate, control different machines and equipment's.
2. Inspect the job for specified dimensions.
3. Produce jobs as per specified dimensions.
4. Adopt safety practices while working on various machines.

Syllabus

Unit-I **10HRS**

Engineering materials: Introduction, Different types of ferrous and non-ferrous materials, Properties of engineering materials.

Lathe machine: Introduction. Various operations performed on Lathe machine. Main parts of Lathe machine.

Unit-II **8HRS**

Carpentry shop: Introduction, Various types of woods, Different types of tools, machines and accessories.

Unit-III **9HRS**

Fitting shop: Introduction Various marking, measuring, cutting, holding, and striking tools.

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			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
DTME103	BEC	Workshop Practices	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.

Different fitting operation like - chipping, filing, right angle, marking, drilling, tapping etc. Working Principle of Drilling machine; Tapping dies, its use, Safety precautions and safety equipment's.

Unit-IV **8HRS**

Welding shop: Introduction, Types of welding, ARC welding, Gas welding, Gas Cutting. Welding of dissimilar materials, Selection of welding rod material, Size of welding rod and work piece

Unit-V **7HRS**

Smithy shop: Introduction, Different forging processes like shaping, caulking, filleting, setting down operations etc; Safety precautions and safety equipment's.

Text Books:

1. Choudhury, H. (2004). Workshop Technology Vol 1 & 2. Mumbai: Media Promoters & Publishers Pvt. Ltd.
2. Raghuwanshi, B. S. (2014). A Course In Workshop Technology (Manufacturing Processes Vol. 1). Dhanpat Rai & Co.

References:

1. John, K. C. (2010). Mechanical Workshop Practice. New Delhi: PHI Learning Pvt. Ltd. EEE 2010.

Chairperson	Chairperson	Controller of Examination	Joint Registrar
Board of Studies	Faculty of Studies	Shri Vaishnav Vidyapeeth	Shri Vaishnav Vidyapeeth
Shri Vaishnav Vidyapeeth	Shri Vaishnav Vidyapeeth	Vishwavidyalaya, Indore	Vishwavidyalaya, Indore
Vishwavidyalaya, Indore	Vishwavidyalaya, Indore		

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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*				
DTME103	BEC	Workshop Practices	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.

List of Experiments:

1. Demonstration of different wood working tools / machines in carpentry shop.
2. One simple job involving any one joint like mortise and tenon, dovetail, bridle, half lap etc. Demonstration of different welding tools / machines.
3. Demonstration of Arc Welding, Gas Welding, Gas Cutting and rebuilding of broken parts with welding.
4. One simple job involving butt and lap joint in welding shop.
5. Demonstration of different forging tools and Power Hammer.
6. Demonstration of different forging processes like shaping, caulking, fullering, setting down operation etc.
7. One job like hook peg, flat chisel or any hardware item.
8. Demonstration of different fitting tools and drilling machines and power tools.
9. Demonstration of different operations like chipping, filing, drilling, tapping, cutting etc. in fitting shop

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Vishwavidyalaya, Indore	Vishwavidyalaya, Indore		