



**Curriculum and syllabus
2021-2024**

**University Polytechnic
Program : Automobile Engineering**

COURSE BOOK - 2020

Volume-5



School of Polytechnic

Vision:

To be a cradle for inventions and innovations that provides transformative education to create leaders and innovators, and generating new knowledge for society and industry

Mission:

- To prepare efficient technical graduates with high level of knowledge and technological innovation.
- To provide necessary support to the aspirants in their goal oriented academic pursuits through value aided curricular and co-curricular activities.
- To achieve the international standards of quality assurance in accordance with the needs in public and private sectors
- To provide the students with academic environment of excellence, leadership, ethical guidelines and lifelong learning needed for a long productive career.

Program Educational Objectives:

The Diploma in Automobile Engineering Undergraduate Program at Galgotias University has the following Program Educational Objectives (PEOs):

1. Impart knowledge of Mathematics, Applied sciences and Engineering.
2. Ability to work in teams on multi-disciplinary projects in industry.
3. Practice in a broad range of industries for Automobile engineering
4. Participate as leaders in their fields of expertise and in activities that support service and economic development nationally and throughout the world.

Program Specific Objectives:

Automobile Engineering Diploma Students will able to:

PSO1- Ability to solve contemporary issues related to Automobile, design, and Industrial automation through internship integrated program curriculum.

PSO2- Conceptualize; make/improve physical products, process and system using Automobile and industrial engineering

Program Outcomes:

The Diploma holder of Automobile Engineering will be able to:

Program Outcome	Diploma in Automobile Engineering students will be able to:
PO1	Basic knowledge: An ability to apply knowledge of basic mathematics, science and engineering to solve the engineering problems.
PO2	Discipline knowledge: An ability to apply discipline - specific knowledge to solve core and/or applied engineering problems.
PO3	Experiments and practice: An ability to plan and perform experiments and practices and to use the results to solve engineering problems.
PO4	Engineering tools: Apply appropriate technologies and tools with an understanding of the limitations.
PO5	The engineer and society: Demonstrate knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering practice.
PO6	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO7	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO8	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO9	Communication: An ability to communicate effectively.
PO10	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the context of technological changes.

Curriculum

Semester 1									
Sl. No	Course Code	Name of the Course					Assessment Pattern		
			L	T	P	C	IA	CAT	ETE
1	PHYE1001	APPLIED PHYSICS-I	3	2	0	4	20	30	100
2	MATH1002	APPLIED MATHEMATICS-I	4	0	0	4	20	30	100
3	SLPC1003	PROFESSIONAL COMMUNICATION-I	3	0	0	3	20	30	100
4	DPME1005	ENGINEERING GRAPHICS	0	6	0	3	20	30	100
5	DPCS1001	INTERNET OF THING	2	0	0	2	20	30	100
6	PHYE1006	APPLIED PHYSICS-I LAB	0	0	2	1	50	-	50
7	SLPC1007	PROFESSIONAL COMMUNICATION-I LAB	0	0	4	2	50	-	50
8	DPCS1008	COMPUTER FUNDAMENTALS LAB	0	0	2	1	50	-	50
9	SPYO1001	SPORTS AND YOGA	0	0	2	0	50	-	50
10	DPME1009	WORKSHOP PRACTICE	0	0	6	3			
11		Total Credits	10	8	20	23			
Semester II									
Sl No	Course Code	Name of the Course					Assessment Pattern		
			L	T	P	C	IA	CAT	ETE
1	PHYE-1010	APPLIED PHYSICS-II	3	2	0	4	20	30	100
2	MATD1011	APPLIED MATHEMATICS-II	3	2	0	4	20	30	100
3	SLPC1012	PROFESSIONAL COMMUNICATION-II	3	0	0	3	20	30	100
4	DPME1013	ELEMENTRY WORKSHOP TECHNOLOGY	2	0	0	2	20	30	100
5	CHEM1014	BASIC CHEMISTRY	3	2	0	4	20	30	100
6	DPME-1006	ELEMENTS OF MECHANICAL ENGINEERING	3	0	0	3	20	30	100
7	PHYE1015	APPLIED PHYSICS-II LAB	0	0	2	1	50	-	50
8	SLPC1016	PROFESSIONAL COMMUNICATION-II LAB	0	0	2	1	50	-	50
9	DPCS1009	ARTIFICIAL INTELLIGENCE	0	0	2	1	50	-	50
10	CHEM1017	BASIC CHEMISTRY LAB	0	0	2	1	50	-	50
		Total	17	6	8	24			
Semester III									
Sl No	Course Code	Name of the Course					Assessment Pattern		
			L	T	P	C	IA	CAT	ETE
1	MATD-2001	APPLIED MATHEMATICS-III	3	2	0	4	20	30	100

2	DPME-2001	APPLIED MECHANICS	3	0	0	3	20	30	100
3	DPME-2002	THERMAL ENGINEERING	3	0	0	3	20	30	100
4	DPEE-2010	BASICS OF ELECTRICAL & ELECTRONIC ENGG.	3	0	0	3	20	30	100
5	DPME-2003	MANUFACTURING PROCESS	3	0	0	3	20	30	100
6	DPME-2005	MACHINE DRAWING	0	4	0	2	20	30	100
7	DPME-2006	APPLIED MECHANICS LAB	0	0	2	1	50	-	50
8	DPME-2007	THERMAL ENGINEERING LAB	0	0	2	1	50	-	50
9	DPME-2026	MANUFACTURING PROCESS LAB	0	0	4	2	50	-	50
10	DPEE-2011	BASICS OF ELECTRICAL & ELECTRONIC ENGG. LAB	0	0	2	1	50	-	50
		Total	15	2	14	23			

Semester IV

Sl No	Course Code	Name of the Course					Assessment Pattern		
			L	T	P	C	IA	CAT	ETE
1	DPME-2008	MECHANICS OF SOLID	3	2	0	4	20	30	100
2	DPME-2009	CONCEPT OF HEAT TRANSFER	3	2	0	4	20	30	100
3	DPME-2025	HYDRAULICS AND HYDRAULIC MACHINES	3	0	0	3	20	30	100
4	DPAE-2001	AUTO ENGINE	3	0	0	3	20	30	100
5	EEDM-3002	ENVIRONMENT EDUCATION & DISASTER MANAGEMENT	2	0	0	2	50	-	50
6	DPME-2028	MECHANICS OF SOLID LAB	0	0	2	1	50	-	50
7	DPME-2014	CONCEPT OF HEAT TRANSFER LAB	0	0	2	1	50	-	50
8	DPME-2027	HYDRAULICS AND HYDRAULIC MACHINES LAB	0	0	2	1	50	-	50
9	DPAE-2002	AUTO ENGINE LAB	0	0	2	1	50	-	50
10	DPAE-2003	Overhauling lab	0	0	4	2	50	-	50
11	DPME-9001	DISRUPTIVE TECHNOLOGY	0	0	2	1	50	-	50
		Total	14	4	14	23			

Semester V

Sl No	Course Code	Name of the Course					Assessment Pattern		
			L	T	P	C	IA	CAT	ETE
1	DPME-3001	THEORY OF MACHINE	3	2	0	4	20	30	100
2	DPAE-3003	CHASSIS, BODY AND TRANSMISSION	3	0	0	3	20	30	100
3	DPME-3002	MACHINE DESIGN	3	2	0	4	20	30	100

4	IMED-3001	INDUSTRIAL MANAGEMENT AND ENTREPRENEURSHIP DEVELOPMENT	3	0	0	3	20	30	100
5	DPAE-3007/DPAE-3008	Elective –I	2	0	0	2	20	30	100
6	DPAE-3004	GARAGE EQUIPMENT	3	0	0	3	20	30	100
7	DPAE-3005	CHASSIS, BODY AND TRANSMISSION LAB	0	0	2	1	50	-	50
8	DPME-3004	THEORY OF MACHINE LAB	0	0	2	1	50	-	50
9	DPAE-3006	AUTOMOBILE WORKSHOP	0	0	4	2	50	-	50
10	PDSS-3008	PERSONALITY DEVELOPMENT & SOFT SKILLS	0	0	4	2	50	-	50
		Total	18	4	10	25			
Semester VI									
Sl No	Course Code	Name of the Course					Assessment Pattern		
			L	T	P	C	IA	CAT	ETE
1	DPME-9998	FIELD VISIT AND PRESENTATION OR MINOR PROJECT	0	0	0	2	50	-	50
2	DPME-9999	MAJOR PROJECT	0	0	0	10	50	-	50
		Total	0	0	0	12			

Diploma in Automobile Engineering

List of Electives

Elective-1

Sl No	Course Code	Name of the Electives					Assessment Pattern		
			L	T	P	C	IA	CAT	ETE
1	DPAE3007	MOTOR VEHICLE ACT AND TRANSPORT MANAGEMENT	3	0	0	3			
2	DPAE3008	AUTO ELECTRICAL AND ELECTRONIC SYSTEM	3	0	0	3			
		Total				6			

Diploma in Mechanical Engineering

Detailed Syllabus

**School of Computing Science
and Engineering**
**School of Computing Science
and Engineering**

Name of The Course	Engineering Graphics			
Course Code	DPME1005			
Prerequisite	None			
Co-requisite				
Anti-requisite				
	L	T	P	C
	0	6	0	3

Course Objectives

1. To develop the concept and applicability of engineering graphics to the industry. To develop the ideas, vision and its practical reality through engineering graphics. To follow basic drawing standards and conventions.
2. To develop skills in three-dimensional visualization of engineering component.

Course Outcomes

CO1	Use the techniques and able to interpret the drawing in Engineering field.
CO2	Interpret engineering drawings using fundamental technical mathematics.
CO3	Construct basic and intermediate geometry.
CO4	To improve their visualization skills so that they can apply these skills in developing new products
CO5	Create and modify two-dimensional orthographic drawings using AutoCAD software, complete with construction lines and dimensions.

Continuous Assessment Pattern

Internal Assessment (IA)	Continuous Assessment Test (CAT)	End Term Exam (ETE)	Total Marks
20	30	50	100

Course Content:

Unit I: Introduction	06 hours
Graphics: An Overview, its need and objectives. Introduction to Computer Aided Drafting- Introduction to AutoCAD; Initial setup commands, Utility commands, drawing aids, entity draw commands, display commands and edit commands	
Unit II: Lettering, Numerals and dimensioning	6 Hours
Drawing Instruments and its uses. Lettering. Drawing scale, various types of lines and their uses. Dimensioning; Basic types of dimensioning- linear, angular and radial dimensioning. Dimensioning technique as per SP-46. Title block. Conventional Presentation.	

Unit III: Geometrical Construction and Engineering Curves
9 Hours

To draw an ellipse by, Directrix and focus method, Arcs of circle method, Concentric circles method. To draw a parabola by: Directrix and focus method, Rectangle method, To draw a hyperbola by: Directrix and focus method, passing through given points with reference to asymptotes, Transverse Axis and focus method.

Unit IV: Principles of Projection
6 Hours

(a) Orthographic, Pictorial and perspective. Concept of horizontal and vertical planes. Difference between I and III angle projections.

(b) Projections of points, lines and planes. Orthographic Projections of Simple Geometrical Solids. Orthographic views of simple composite solids from their isometric views. Exercises on missing surfaces and views

Unit V: Isometric Projections
9 Hours

Overview of Formal Languages :
Representation of regular languages and grammars, finite state Machines

Diploma in Mechanical Engineering
Suggested Reading

1. Bhatt N. D., "Engineering Drawing", Charotar publishing House, 1998

Reference Book (s)

2. French and Vierk, "Fundamentals of Engineering Drawing", McGraw Hill, 2002.
3. John K.C., "Engineering Graphics for Degree", PHI Learning Private Limited, New Delhi, 2010.

Name of The Course	Workshop Practice			
Course Code	DPME1009			
Prerequisite	None			
Co-requisite				
Anti-requisite				
	L	T	P	C
	0	0	6	3

Course Outcomes

CO1	Operate the working principle of various machines used in manufacturing
CO2	Grasp the appropriate production process and machines

CO3	Perform ,Explain and Identify the basic welding concepts
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Continuous Assessment Pattern

Internal Assessment (IA)	Continuous Assessment Test (CAT)	End Term Exam (ETE)	Total Marks
50	-	50	100

Course Content:

Unit I: GENERAL INTRODUCTION:

- (a) Scope of subject "Workshop" in engineering.
- (b) Different shop activities and broad division of the shops on the basis of nature of work done such as
 - (i) Carpentry Shop
 - (ii) Painting, Polishing & Plumbing Shop
 - (iii) Sheet Metal & Soldering Shop
 - (iv) Fitting Shop
 - (v) Welding Shop (Elet ARC/ Brazing)
 - (vi) Machine Shop

Unit II: Carpentryshop

Fundamental of wood working operations:

Marking & Measuring.
Holding & Supporting.
Cutting & Sawing.
Drilling & Boring.
Turning/ Smoothing
Jointing.

Unit III: Painting, Polishing & Plumbing shop

Painting & Polishing

Its need, Introduction to methods of paintings (Classification only); Mannual, Machine (spray) and dip painting at room temperature, operations involved- discription of steps only eg. surface preparation method for old and new surface in timber and iron structure-sanding, derusting, deqreasing, filling of pore and dents, paint application- manual, machine (spray and dip painting drying of paint air drying and oven drying under coat and filler material (red oxide, putty, yellow clay), surface preparation materials (sand and emery papers); tools and equipments used (Name,size specification for indification). Brushes-Round and flat wire brush, scraper, trowel , spraygun, compressor. Defects likely to occur in painting and their remedies Safety of Personnel, Equipment & Tools to be observed.

Exp No-1 Introduction & demonstration of tools used in

Painting & Polishing shop

Exp No-2 (Job No- PPS1) Painting on the wooden & metal surface

Exp No-3 (Job No- PPS2) Polishing on the plastic & metal sheet

(ii) Plumbing

Introduction, Study Of Plumbing Tools, Pipe Fittings, Types Of Pipe Joints, Pipe Threading

Exp No-1 Introduction & demonstration of tools used in Plumbing shop

Exp No-2 (Job No- PS1) Threading on G.I. pipe by die

Exp No-3 (Job No- PS2) Internal tapping by tap set

Unit IV: Sheet Metal shop

Sheet Metal

Tools and Operation:

- (1) Operations involved (Names and concept only) Laying out, marking and measuring, cutting, Shearing and blanking, Straightening bending and seaming, Punching and piercing , burring and stamping,
- (2) Sheet metal joints - Lap, seam, Locked seam, cup or circular, Flange, angular and cap.
- (3) Tools and equipments used (Name, size, specification for identification only).
- (4) Marking Tools- Scriber, Divider and Trammel, Protractor, Trysquare, Dot punch, Steel Rule, Steel tape, Sheet metal gauge.
- (5) Cutting and shearing Tools-hand Shear and lever, Snips, Chisels.
- (6) Straightening tool-Straight edge.
- (7) Striking Tools-Mallet, Hammer.
- (8) Holding Tools-Vice, Plier, C or G clamps, Tongs.
- (9) Supporting Tools-Stakes and Anvil.
- (10) Bending Tools-Crimpers, Form dies, Roundnose plier, Rails.
- (11) Punching-Piercing and Drifting tools.
- (12) Burring Tools-Files.
- (13) Common defects likely to occur during and after operation-Their identification and remedy. Defects due to wrong operation or wrong tool.
- (14) Safety of Personnel, Equipment & Tools to be observed.

Exp No-1 Introduction & demonstration of tools used in Sheetmetal shop

Exp No-2 (Job No- SMS1) Making a rectangular tray

Exp No-3 (Job No- SMS2) Making a hollow cylinder

Exp No-4 (Job No- SMS3) Making a hollow square

Exp No-5 (Job No- SMS4) Making a funnel

(ii)-Soldering

Unit V: Fitting shop

1- Introduction to fitting shop tools, common materials used in fitting shop, Identification of materials

2- Description and demonstration of various types of work benches, holding devices and files. Precautions while filing.

3- Description and demonstration of simple operation of hack-sawing, demonstration and description of various types of blades and their specifications, uses and method of fitting the blade.

4- Care and maintenance of measuring tools like calipers, steel rule, try square, vernier calipers, micrometer, height gauge, combination set. Handling of measuring instruments, checking of zero error, finding of least count (all gauges including dial gauge).

Exp No-1 Introduction & demonstration of tools used in Fitting shop

Exp No-2 (Job No- FS1) Filing, Hacksawing, Drilling & Tapping on the workpiece

Exp No-3 (Job No- FS2) Making a male & female workpiece

Unit VI: Welding shop**(i) ELET ARC Welding**

1- (a) Introduction to welding and its importance in engineering practice; types of welding; common materials that can be welded, introduction to welding equipment e.g. a.c. welding set, d.c. rectifier, electrode holder, electrodes and their specifications, welding screens and other welding related equipment, accessories and gloves.

(b) Safety precautions during welding

(c) Hazards of welding and its remedies

2- Electric arc welding, (a.c. and d.c.) precautions while using electric arc welding, Practice in setting current and voltage for striking proper arc. Earthing of welding machine.

3- Various types of joints and end preparation.

Exp No-1 Introduction & demonstration of tools used in Welding shop

Exp No-2 (Job No- WS1) Making a T joint

Exp No-3 (Job No- WS2) Making a single V butt joint

Exp No-4 (Job No- WS3) Making a over lap joint

(ii) Brazing/Gas welding

Mild steel & steel sheet, brass sheet.

(1) Its concept, comparison with welding as joining method and classification, Brazing

(2) Brazing operation- edge preparation of joints, Pickling and degreasing, Fluxing, Tinning and brazing.

(3) Materials Used-Common fluxes, brazing rod, and their specifications and description (For Identification Only), brazing

(4) Common defects likely to occur during and after brazing.

(5) Safety of Personnel, Equipment & Tools to be observed.

Exp No-1 Introduction & demonstration of tools used in Brazing shop

Exp No-2 (Job No- BS1) Making a T joint

Exp No-3 (Job No- BS2) Making a single V butt joint

Exp No-4 (Job No- BS3) Making a over lap joint

Unit VII: Machine shop

Introduction to machine tools viz lathe, drilling machine, shaper and planer simple line and block diagram of components and their functions.

Safety of Personnel, Equipment, Tools & to be observed.

Exp No-1 Introduction & demonstration of tools used in machine shop

Exp No-2 (Job No- MS1) Facing

Exp No-3 (Job No- MS2) Turning, Stap Turning, Chamfering

Exp No-3 (Job No- MS3) Grooving, Knurling

Diploma in Automobile Engineering**Suggested Reading:**

1. Amitabh Ghosh and Ashok kumar Malik, 'Manufacturing science', Edition: 2nd Edition, 2010, Publisher: East West Press, ISBN: 9788176710633, 8176710636

2. Dr.P.C.Sharma, 'Production technology', (Manufacturing Processes).

Reference Book (s)

Serope Kalpakjian and Steven R.Schmid, 'Manufacturing Engineering and Technology; 4th Edition, 2001; Publisher: PEARSON, ISBN: 9788177581706

Name of The Course	ELEMENTS OF MECHANICAL ENGINEERING			
Course Code	DPME1006			
Prerequisite	None			
Co-requisite				
Anti-requisite				
	L	T	P	C

Course Objectives

1. Develop an ability to apply knowledge of mathematics, science, and engineering
2. To develop an ability to design a system, component, or process to meet desired needs within realistic constraints

Course Outcomes

CO1	Identify various Energy sources, Fuel & combustion and lubrication systems
CO2	Define the basic concepts of units and dimensions, systems and its boundaries, properties, state, process, cycle, etc.- required as foundation for development of principles and laws of thermodynamics
CO3	Discuss application and usage of various engineering mechanical components.
CO4	Describe different lubrication system for lubricating the components of machine
CO5	Recognize Basic idea of Transmission of Motion by various drives.

Continuous Assessment Pattern

Internal Assessment (IA)	Continuous Assessment Test (CAT)	End Term Exam (ETE)	Total Marks
20	30	50	100

Course Content:

Unit-1 Thermal Engineering: Sources of Energy 6 hour
Definition, Concept of thermodynamic system and surroundings, Closed system, Open system, Isolated system, Thermodynamics definition of work. Zeroth law of thermodynamics Basic ideas of conventional and nonconventional forms Thermal, Hydel, Tidal, wind, Solar, Biomass and Nuclear and their uses.
Unit- 2 Thermal Engineering : Fuel and Combustion 10 hour
Introduction to common fuels - solid, liquid and gases and their composition. Combustion of fuels- their higher and lower calorific values. Combustion equations for carbon, sulphur, hydrogen and their simple compounds
Unit-3 Machine Components 20 hours
(i) Pins, Cottor and Knuckle Joints. (ii) Keys, Key ways and spline on the shaft. (iii) Shafts, Collars, Cranks, (iv) Bearings-Plane, Bushed, Split-step, ball, Roller bearing, Journal bearing, Foot step bearing, thrust bearing, collar bearing and Special type bearings and their applications. (v) Gears: Different types of gears, gear trains and their use for transmission of motion. Determination of velocity ratio for spur gear trains; spur gear, single and double helical gears, Bevel gears, worms, Rack and Pinion. Simple and compound and epicyclic gear trains and their use. Definition of pitch and pitch circle & module.

(vi) Springs: Compression, Tension, Helical springs , Torsion springs, Leaf and Laminated springs. Their use and material.

(vii) Basic idea of Transmission of Motion By Belts, Ropes & Pulleys, Chain & Sprockets. Classification and uses of ropes in transmission operation, Chains and their classifications, their application in power transmission, their comparison with other drive systems

Unit-4 Lubrication**4 hours**

Different lubrication system for lubricating the components of machines. Principle of working of wet sump and dry sump system of lubrication.

Diploma in Automobile Engineering

Suggested Reading

Text Book (s)

1. Elementary of Mechanical Engineering by Katsons Publications.

Reference Book (s)

1. Basics of Mechanical Engineering by Katsons Publications .

Name of The Course	ELEMENTARY WORKSHOP TECHNOLOGY			
Course Code	DPME1013			
Prerequisite	None			
Co-requisite				
Anti-requisite				
	L	T	P	C
	0	6	0	3

Course Objectives

1. To develop general machining skills in the students.

2. Develop a skill in dignity of labor, precision, safety at work place, team working and development of right attitude.

Course Outcomes

CO1	Recognize different shops of central workshop on the basis of nature of work done
CO2	Analyze the operations involved in casting process
CO3	Determine the use of various machine tools
CO4	Apply the various welding processes
CO5	Differentiate between soldering, brazing and welding

Continuous Assessment Pattern

Internal Assessment (IA)	Continuous Assessment Test (CAT)	End Term Exam (ETE)	Total Marks
20	30	50	100

Course Content:

Unit-1 General Introduction 5 hour Scope of subject "Workshop Technology" in engineering. Different shop activities and broad division of the shops on the basis of nature of work done - (i) Wooden Fabrication (Carpentry) (ii) Metal Fabrication (shaping and Forming, Smithy, Sheet metal and Joining-welding, Riveting, Fitting and Plumbing.(c) Organization and layout of workshop.(d) General safety precaution in workshop
Unit-2 Casting 12 hour Basic steps in making a casting, Pattern Materials, Patterns allowances, colour coding of pattern, Types of pattern, Pattern making tools. Mould materials, Types of sand, Moulding processes - Sand moulding, Pit moulding, machine moulding. Shell moulding. Cores and core classification, Testing of sand. Types of furnaces - Cupola furnace, Crucible furnace, Electric arc furnace, Cleaning of casting — Fettling, Shot blasting, Cutting & trimming, Casting defects Shrinkage, Hot tear, blow holes, misrun and cold shut, scabs, fins, rat tail. Special casting processes - die casting, centrifugal casting, Investment casting. Elements of gating system.
Unit-3 Basic Machining Processes 10 hours

Lathe Introduction, Types of lathes — light duty, Medium duty and heavy duty geared lathe, CNC lathe, Specifications, Basic parts and their functions. Operations and tools — Turning, parting off, Knurling, facing, boring, drilling, threading, step turning, taper turning, Drilling
Introduction, Classification, Types of operations, Specifications of drilling machine, Types of drills and reamers, Basic parts and their functions. introduction, Classification, Principle of operation, up and down milling. Types of milling cutters, Basic parts and functions of column and knee type milling machine.

Unit-4 Welding **10 hours**

Introduction, Classification, Safety precautions, Gas welding techniques, Types of welding flames, Arc welding – principle, equipments, applications. Shielded metal arc welding, Submerged arc welding, TIG/MIG Welding, Electro slag welding, plasma arc welding, Resistance welding – spot welding, Seam welding, Projection welding, welding defects.

Unit-5 Soldering and Brazing **8 hours**

Its concept, comparison with welding as joining method and classification, electric soldering and forge soldering. Soldering operation- edge preparation of joints, Pickling and degreasing, Fluxing, Tinning and Soldering. Materials Used- Common fluxes, soft and hard solder, solder wire (Plain and Resin core) and sticks, spelters and their specifications and description (For Identification Only), forge soldering bits. Electric soldering iron. Common defects likely to occurs during and after soldering. Safety of Personnel, Equipment & Tools to be observed.

Suggested Reading

Text Book (s)

1. S.K. Hajara Chaudhary - "Workshop Technology" - Media Promoters and Publishers, New Delhi

Reference Book (s)

1. B.S. Raghuwanshi - "Workshop Technology" - Dhanpat Rai and sons, New Delhi
2. H.S.Bawa - "Workshop Technology" -Tata McGraw Hill Publishers, New Delhi.

Name of The Course

APPLIED MECHANICS

Course Code	DPME2001			
Prerequisite	PHYE1001			
Co-requisite				
Anti-requisite				
	L	T	P	C
	3	0	0	3

Course Objectives:

1. To prepare students about to solve the mechanics problems.
2. Student able to analysis the performace of a mechanical machine.

Course Outcomes

CO1	Describe basic knowledge of Engineering Mechanics where in Laws of Physics are applied to Solve Engineering problems.
CO2	Analyse force system and apply them to practical engineering system design and development.
CO3	Examine a mechanical system and derive all forces, couples and moment about it.
CO4	Calculate different parameters for a machine like mechanical advantage, velocity ratio and Machine law.
CO5	Recognize Concept of moment of inertia and its applications.

Continuous Assessment Pattern

Internal Assessment (IA)	Continuous Assessment Test (CAT)	End Term Exam (ETE)	Total Marks
20	30	50	100

Course Content:

Unit-1 Introduction 2 hour
Mechanics and its utility. Concept of scalar and vector quantities. Effect of a force. Tension & compression. Rigid body. Principle of physical independence of force. Principle of transmissibility of a force.

Unit-2 System of Forces, General Condition of Equilibrium 06 hour
Concept of coplanar and non-coplanar forces including parallel forces. Concurrent and non-concurrent forces. Resultant force. Equilibrium of forces. Law of parallelogram of forces. Law of triangle of forces and its converse. Law of polygon of forces. Solution of simple engineering problems by analytical and graphical methods such as simple wall crane, jib crane and other structures. Determination of resultant of any number of forces in one plane acting upon a particle, conditions of equilibrium of coplanar concurrent force system. General condition of equilibrium of a rigid body under the action of coplanar forces, statement of force law of equilibrium, moment law of equilibrium, application of above on body.
Unit-3 Moment & couple 06 hours
Concept of Varignon's theorem. Generalized theorem of moments. Application to simple problems on levers-Bell crank lever, compound lever, steel yard, beams and wheels, lever safety valve, wireless mast, moment of a couple; Properties of a couple ; Simple applied problems such as pulley and shaft.
Unit-4 Friction 06 hours
Definition of a machine. Mechanical advantage, velocity ratio, input, output, mechanical efficiency and relation between them for ideal and actual machines. Law of a machine Lifting machines such as levers, single pulley, three system of pulleys. Weston differential pulley, simple wheel and axle, differential wheel and axle. Simple screw jack, differential screw jack, simple worm and worm wheel..
Unit-5 Machines 06 hours
Its concept, comparison with welding as joining method and classification, electric soldering and forge soldering. Soldering operation- edge preparation of joints, Pickling and degreasing, Fluxing, Tinning and Soldering. Materials Used- Common fluxes, soft and hard solder, solder wire (Plain and Resin core) and sticks, spelters and their specifications and description (For Identification Only), forge soldering bits. Electric soldering iron. Common defects likely to occurs during and after soldering. Safety of Personnel, Equipment & Tools to be observed.
Unit-6 Centre of Gravity 06 hours

Concept, definition of centroid of plain figures and center of gravity of symmetrical solid bodies. Determination of centroid of plain and composite lamina using moment method only, Centroid of bodies with removed portion. Determination of center of 'gravity' of solid bodies - cone, cylinder, hemisphere and sphere, composite bodies and bodies with portion removed.

Unit-7 Moment of Inertia

06 hours

Concept of moment of inertia and second moment of area and radius of gyration, theorems of parallel and perpendicular axis, second moment of area of common geometrical section : rectangle, triangle, circle (without derivations). Second moment of area for L, T, I and channel section, section of modulus

Suggested Reading:

Text Book (s)

1. A Textbook of Engineering Mechanics by D.S. Kumar
2. A Textbook of Engineering Mechanics, written by Dr. R. K. Bansal.
3. Engineering Mechanics, written by R. K. Rajput.

Reference Book (s)

1. Beer – Johnson Engineering Mechanics Tata McGraw Hill, Delhi
2. Basu Engineering Mechanics Tata McGraw Hill, Delhi

Name of The Course	THERMAL ENGINEERING			
Course Code	DPME2002			
Prerequisite				
Co-requisite				
Anti-requisite				
	L	T	P	C
	3	0	0	3

Course Objectives:

1. To This course aims to provide a good platform to mechanical engineering students to understand,

model and appreciate concept of dynamics involved in thermal energy transformation.

2. To prepare them to carry out experimental investigation and analysis at later stages of graduation

Course Outcomes

CO1	Define the fundamentals of laws of thermodynamics and its applications.
CO2	Calculate heat and work interactions for various system.
CO3	Use & Practice two property rule and hence thermodynamic tables, thermodynamic diagrams and concept of equation of state, also their simple application.
CO4	Evaluate change in entropy to determine reversibility and irreversibility.
CO5	Calculate efficiencies of Heat engine, Heat pump, Refrigerator and Vapour power cycle.

Continuous Assessment Pattern

Internal Assessment (IA)	Continuous Assessment Test (CAT)	End Term Exam (ETE)	Total Marks
20	30	50	100

Course Content:

Unit-1 FUNDAMENTAL OF THERMODYNAMICS 12 hour

Definition, concept of thermodynamic system and surroundings. Closed system, open system, isolated system, and thermodynamics definition of work. Zeroth law of thermodynamics. First law of thermodynamics for cyclic and non-cyclic processes. Idea of internal energy and enthalpy. Thermodynamic processes - constant volume, constant pressure, constant temperature (Isothermal) processes, adiabatic process, polytropic process, their representation on P-V diagram and calculation of work done.

Unit-2 SECOND LAW OF THERMODYNAMICS 08 hour

Definition, concept of thermodynamic system and surroundings. Closed system, open system, isolated system, and thermodynamics definition of work. Zeroth law of thermodynamics. First law of thermodynamics for cyclic and non-cyclic processes. Idea of internal energy and enthalpy.

Thermodynamic processes - constant volume, constant pressure, constant temperature (Isothermal) processes, adiabatic process, polytrophic process, their representation on P-V diagram and calculation of work done.

Unit-3 ENTROPY

06 hours

Physical concept and significance, reversibility and efficiency, Irreversibility and entropy. Expression for change of entropy in various thermodynamic processes. Simple numerical problems concerning the above.

Unit-4 GAS POWER CYCLES

08 hours

Air Standard cycles: Carnot, Otto, Diesel, Dual and Stirling cycles, P-V and T-S diagrams, description, efficiencies and mean effective pressures, Comparison of Otto, Diesel and dual cycles.

Unit-5 PROPERTIES OF STEAM

10 hours

Idea of steam generation beginning from heating of water at 0°C to its complete formation into saturated steam. Pressure temperature curve for steam. Idea of dry saturated steam, wet steam and its dryness fraction, super-heated steam and its degree of super heat. Enthalpy, entropy, specific volume and saturation pressure and temperature of steam. Use of steam table and mollier chart. Simple numerical problems.

Prerequisite	DPME1013			
Co-requisite				
Anti-requisite				
	L	T	P	C
	3	0	0	3

Course Objectives:

1. An ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities
2. An ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes

Course Outcomes

CO1	Identify and know basic press operations and tools.
CO2	Identify basic manufacturing processes like forging, rolling and extrusion, for required component
CO3	Discuss process parameters for different operations
CO4	Classify the products simply in terms of their basic shape
CO5	Describe the difference between the hot and cold working of metals and give the advantages of each process

Continuous Assessment Pattern

Internal Assessment (IA)	Continuous Assessment Test (CAT)	End Term Exam (ETE)	Total Marks
20	30	50	100

Course Content:

Unit-1 METAL FORMING PROCESSES

18 hour

Press Working - Types of presses, type of dies, selection of press die, die material. Press Operations-Shearing, piercing, trimming, punching, notching, shaving, gearing, embossing, stamping
Forging - Open die forging, closed die forging, Press forging,

Suggested Reading:

Text Book (s)

1. "Thermal Engineering: Engineering Thermodynamics and Energy Conversion Techniques" by P L Ballaney
2. "Thermodynamics and Thermal Engineering" by J Selwin Rajadurai
3. "Thermal Engineering" by R K Rajput

Reference Book (s)

1. Nag, P.K., Engineering Thermodynamics, 3rd ed., Tata McGraw-Hill, 2005
2. Cengel, Y.A and Boles, M.A, Thermodynamics: An Engineering Approach, 5th ed., McGraw-Hill, 2006.

Name of The Course	MANUFACTURING PROCESS
Course Code	DPME2003

upset forging, swaging, up setters, roll forging, Cold and hot forging. **Rolling** - Elementary theory of rolling, Types of rolling mills, Thread rolling, roll passes, Rolling defects and remedies. **Extrusion and Drawing** - Type of extrusion- Hot and Cold, Direct and indirect. Pipe drawing, tube drawing, wire drawing.

Unit-2 POWDER METALLURGY

12 hour

Introduction, principle, scope and names of processes. Production of metal powders, compaction, sintering and sizing. Self lubricated bearings. Advantages of the process and its limitations. (Elementary concept only).

Unit-3 MODERN MACHINING PROCESS

10 hours

Ultrasonic Machining (USM), Electro Chemical Machining (ECM), Electro Chemical Grinding (ECG), Electrical Discharging Machining (EDM), Laser Beam Machining (LBM), Electron Beam Machining (EBM), Plasma Arc Machining (PAM)

1. Provide the fundamental concepts of machine drawing elaborating on how to concretize the idea of new structure such as a machine element.
2. Help the student in the visualization of assembly and sub assembly of various machine elements.

Course Outcomes

CO1	Draw the isometric view of a given three dimensional object/part
CO2	Draw the orthogonal projection of a solid body
CO3	Practice different kinds of materials and Mechanical components conventionally.
CO4	Identify the elements of a detailed drawing.
CO5	Produce the assembly drawing using part drawings.

Suggested Reading:

Text Book (s)

1. Amitabh Ghosh and Ashok kumar Malik, 'Manufacturing science', Edition: 2nd Edition, 2010, Publisher: East West Press, ISBN: 9788176710633, 8176710636
2. Dr.P.C.Sharma, 'Production technology', (Manufacturing Processes).

Reference Book (s)

1. Serope Kalpakjian and Steven R.Schmid,' Manufacturing Engineering and Technology;4th Edition, 2001;Publisher: PEARSON,'ISBN: 9788177581706, 8177581708

Continuous Assessment Pattern

Internal Assessment (IA)	Continuous Assessment Test (CAT)	End Term Exam (ETE)	Total Marks
20	30	50	100

Course Content:

Unit-1 GENERAL CONCEPT OF MACHINE DRAWING	06 hour
(a) Views and sections (Full and half), dimensioning Technique - Unidirectional and aligned practice conventions as per latest code of practice for general engineering drawing.	
(b) General concept of IS working drawing symbols for	
(i) Welding & Rivetting	
(ii) Screws & Screw threads	
(iii) Surface Finish Marks	
(iv) Limits, Fits & Tolerances	
Unit-2 FAMILIARIZATION WITH AUTO CAD COMMOANDS	09 hour

Name of The Course	MACHINE DRAWING			
Course Code	DPME2005			
Prerequisite	DPME1005			
Co-requisite				
Anti-requisite				
	L	T	P	C
	0	4	0	2

Course Objectives:

CAD, Different type of CAD software available, Advantages of using CAD, AUTOCAD graphical user interface? Setting up drawing environment: Setting units, drawing limits, Snap, Opening and Saving a drawing, Setting drafting properties, Different co-ordinate system used. Commands and their aliases, Different methods to start a command
 Selecting object, removing object from selection set, Editing with grips, Editing object properties. Use of draw commands - Line, Arc, Circle, Polygon, Polyline, rectangle, Ellipse, construction line, Spline Use of modify commands - erase offset, Move, Copy, Mirror, Fillet, Chamfer, Array, Scale, Stretch, rotate, Explode, Lengthen Creating 2D objects using Draw and Modify commands, Use of Hatch commands. Controlling the drawings display; Zoom, PAN, view ports, Aerial view. Drawing with precision: Adjusting snap and Grid alignment. Use of Tools Menu bar for calculating distance, angle, area, ID points, Mass using inquiry command, Quick select. Adding text to drawing, creating dimension Use of UCS, Alignment of UCS, Move UCS, Orthographic UCS Creating 3 D objects using region, boundary, 3D Polyline, Extrude, revolve feature. Use of solid 3D edit features, Shell, Imprint, Separate, Section, Boolean functions like Union, Subtract and Intersect, Extrude faces, Move faces, Delete face, Offset faces, Copy faces and colour faces commands. To show the section - Use of slice, Section commands Rendering and imaging, Produce hard copies.

Unit-3 Assembly Drawing 21 hours

Sectioned View of (i) Knuckle joint- Part drawing, Solid Modelling, Assembly and Sectioning.
 (ii) Protective type flange coupling- Part drawing, Solid Modelling, Assembly and Sectioning.
 (iii) Bench vice - Part drawing, Solid Modelling, Assembly and Sectioning.
 Assembly Drawing of (i) Knuckle joint- Part drawing, Solid Modeling, Assembly and Sectioning.
 (ii) Protective type flange coupling- Part drawing, Solid Modeling, Assembly and Sectioning.
 (iii) Bench vice - Part drawing, Solid Modeling, Assembly and Sectioning.
 Assembly Drawing from detail and vice versa

Unit-4 Assembly Drawing from detail and vice versa 09 hours

(i) Tail stock of Lathe machine

(ii) Screw jack

(iii) Drilling Jig

B). Assembly and Disassembly Drawings

Plummer block, Footstep bearings, Couplings etc., Rivetted & Welded Joints, Screw and form of screw thread

Spur gear profile drawing and free hand sketching

Spur gear profile drawing from given data.

Unit-5 Free hand sketching

6 hours

(i) Pipe fittings-Such as-Elbows-Reducers, T-Cross and Bibcock.

(ii) I. C. engine piston, Simple bearing, Cottor and Knuckle joint, pulleys and flywheel-Sectioned views.

(iii)Cutting tools of Lathe machine, shaper and common milling cutters.

(iv) Gear puller and C-clamp

(v) Sketching of ortho graphics views from isometric views be practiced.

Suggested Reading:

Text Book (s)

1. Bhatt N. D., "Engineering Drawing", Charotar publishing House, 1998

Reference Book (s)

1. French and Vierk, "Fundamentals of Engineering Drawing", McGraw Hill, 2002.

Name of The Course	APPLIED MECHANICS LAB			
Course Code	DPME2006			
Prerequisite				
Co-requisite				
Anti-requisite				
	L	T	P	C
	0	0	2	1

Course Objectives:

1. Perform and solve problems concerning simple application of moments and forces.
2. Grasp the idea of the mechanical advantage, velocity ratio and efficiency of Simple machine.

Course Outcomes

CO1	Perform and solve problems concerning simple application of moments and forces.
CO2	Grasp the idea of the mechanical advantage, velocity ratio and efficiency of Simple machine.

Continuous Assessment Pattern

Internal Assessment (IA)	Continuous Assessment Test (CAT)	End Term Exam (ETE)	Total Marks
50	-	50	100

Course Content:

1. To verify the law of Polygon of forces.
2. To verify the law of parallelogram and triangle of forces.
3. To verify the law of principle of moments.
4. To find the coefficient of friction between wood, steel, copper and glass.
5. To find the coefficient of friction on inclined surface
6. To find the reaction at supports of a simply supported beam carrying point loads only.
7. To find the forces in the jib & tie of a jib crane.
8. To find the mechanical advantage, velocity ratio and efficiency of Simple wheel & axle.
9. To find the mechanical advantage, velocity ratio and efficiency of Simple Screw jack.
10. To find the mechanical advantage, velocity ratio and efficiency of Simple Worm & worm wheel.
11. To find out center of gravity of regular lamina.

12. To find out center of gravity of irregular lamina.

Name of The Course	THERMAL ENGINEERING LAB			
Course Code	DPME2007			
Prerequisite				
Co-requisite				
Anti-requisite				
	L	T	P	C
	0	0	2	1

Course Objectives:

1. Define the fundamentals of laws of thermodynamics and its applications.
2. Calculate heat and work interactions for various system.

Course Outcomes

CO1	Define the fundamentals of laws of thermodynamics and its applications.
CO2	Calculate heat and work interactions for various system

Continuous Assessment Pattern

Internal Assessment (IA)	Continuous Assessment Test (CAT)	End Term Exam (ETE)	Total Marks
50	-	50	100

Course Content:

1. Determination of temperature by: - I. Thermo couple ii. Pyrometer
2. Study of constructional details and specification of high pressure boiler and sketch
3. Demonstration of mounting and accessories on a boiler for study and sketch (field visit).

4. Performance testing of steam boiler.
5. Study of steam turbines through models and visits.
6. Determination of dryness fraction of wet steam sample
7. To study various types of compressors with the help of their models.

Name of The Course	MANUFACTURING PROCESS LAB				
Course Code	DPME2026				
Prerequisite					
Co-requisite					
Anti-requisite					
	L	T	P	C	
	0	0	4	2	

Course Objectives:

1. Operate the working principle of various machines used in manufacturing
2. Grasp the appropriate production process and machines

Course Outcomes:

CO1	Perform and solve problems concerning simple application of moments and forces.
CO2	Grasp the idea of the mechanical advantage, velocity ratio and efficiency of Simple machine.

Continuous Assessment Pattern

Internal Assessment (IA)	Continuous Assessment Test (CAT)	End Term Exam (ETE)	Total Marks
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50	-	50	100
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Course Content:

1. PATTERN MAKING:

(a) Making Patterns (Any two Experiments).

(i) Solid one piece pattern. (ii) Split two piece patterns. (iii) Split three piece patterns.

(iv) Gated pattern. (v) Four Piece pattern. (vi) Sweep pattern. (vii) Skeleton pattern. (viii) Segmental pattern.

(b) MAKING CORE BOXES (Any two Experiments).

(i) Straight Core Box. (ii) Bent Core Box. (iii) Unbalanced Cores.

(a) Sand Testing (Any two Experiments).

(i) Grading (Grain Size).

(ii) Determination of Moisture content (iii)

Determination of Clay content.

(iv) Determination of Permeability for gases. (b)

Preparation of : (i) Green Sand Composition.

(ii) Dry Sand Composition. (iii) Loam Sand

Composition. (iv) Oil Sand For Cores.

MOULDING: (All Experiments).

(a) Making at least 8 sands moulds of different forms with different types of pattern using.

(i) Floor Moulding. (ii) Two Box Moulding. (iii) Three Box (or more) Moulding.

(b) At least one of the following:

(i) Making and setting of cores of different types.

(ii) Making one shell mould apparatus.

CASE STUDY OF: (All Experiments).

At least 2 sand casting products from sand preparation, pattern layout to final finished casting by shell moulding, centrifugal casting, investment casting and continuous casting.

ADVANCE WELDING SHOP: (All Experiments).

Study of various Gas cutting and welding equipments:-

Welding transformer, Generator/rectifier, Gas cylinder, Gas cutting machines, Cutting torches etc., various electrodes and filler metals and fluxes.

Practice of welding and cutting of different metals by making suitable jobs by different methods:-

1. Arc Welding practice of mild steel (M.S.) and Spot welding on stainless steel jobs.

2. Tig Welding practice of Non-Ferrous metals, like Copper, Brass and Aluminum.

3. Practice of Gas cutting manually.

4. Practice of Gas cutting by cutting machine.
5. Practice of Arc cutting.

20	30	50	100
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Name of The Course	MECHANICS OF SOLIDS			
Course Code	DPME2008			
Prerequisite	DPME2001			
Co-requisite				
Anti-requisite				
	L	T	P	C
	3	2	0	4

Course Objectives:

1. To provide the basic concepts and principles of strength of materials.
2. To give an ability to calculate stresses and deformations of objects under external loading.

Course Outcomes:

CO1	Analyze and design structural members subjected to tension, compression, torsion, bending and combined stresses using the fundamental concepts of stress, strain and elastic behavior of materials.
CO2	Utilize appropriate materials in design considering engineering properties, sustainability, cost and weight.
CO3	Determine the deflections and rotation produced by the three fundamental types of load: axial, tensional and flexural.
CO4	Develop an understanding of the concepts of stress and strain and their use in the analysis and design of machine members and structures.
CO5	Develop an understanding of material behavior under a condition of pure torsion (twisting moment) on circular shafts.

Continuous Assessment Pattern

Internal Assessment (IA)	Continuous Assessment Test (CAT)	End Term Exam (ETE)	Total Marks
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Course Content:

Unit-1 INTRODUCTION TO STRESS AND STRAIN 10 hour

Introduction of Mechanical properties of materials, Definition of stress and strain, axial loading, different types of stresses and strains, tensile and compressive stress and strain, elastic limit, Hooke's law, stress-strain curve for ductile and brittle material, salient features of stress-strain curve. Young's modulus of elasticity, Factor of safety, Stress and strain in straight, stepped bars and taper bar of circular cross section, determination of stress and elongation of a bolt in a bolted joint when subjected to direct external load only. Temperature stresses, Stress and strain on composite section under axial loading, stress and strain due to temperature variations in homogeneous and composite bars and metallic tires, Shear load, shear stress and strain, modulus of rigidity, lateral strain, Poisson's ratio, volumetric strain, bulk modulus relation between modulus of elasticity, modulus of rigidity and bulk modulus.

Unit-2 PRINCIPAL STRESSES AND STRAIN, STRAIN ENERGY 08 hour

Compound stress and strains: Introduction, normal stress and strain, shear stress and strain, stresses on inclined sections, strain energy, impact loads and stresses, state of plane stress, principal stress and strain, maximum shear stress, Mohr's stress circle, three dimensional state of stress & strain, equilibrium equations, generalized Hooke's law, theories of failure. Thermal Stresses. Meaning of strain energy and resilience, Derivation of formula for resilience of a uniform bar in tension, Proof resilience, modulus of resilience, suddenly applied load, Impact or shock load. Strain energy in a material subjected to uniaxial tension and uniform shear stress. General expression for total

strain energy of simple beam subjected to simple bending.:
Pure Bending

Unit-3 SHEAR FORCE AND BENDING MOMENT **10 hours**

Types of beam, Types of load and support, Shear force and bending moment for concentrated and uniformly distributed loads on simply supported beams, cantilever and overhanging beam. Shear force and bending moment diagrams. Relationship between shear force and bending moment, Point of contra flexure, calculations for finding the position of contra flexure, Condition for maximum bending Moment

Unit-4 THIN AND THICK CYLINDRICAL AND SPHERICAL SHELLS **08 hours**

Thin cylinders & spheres: Introduction, difference between thin walled and thick walled pressure vessels, Thin walled spheres and cylinders, hoop and axial stresses and strain, volumetric strain. Thick cylinders: Radial, axial and circumferential stresses in thick cylinders subjected to internal or external pressures, compound cylinders, stresses in rotating shaft and cylinders, stresses due to interference fits.

Unit-5 SLOPES AND DEFLECTIONS OF BEAMS, TORSION **10 hours**

Definition of slope and deflection, sign convention, Circular bending, Calculation of maximum slope and deflection for the following standard cases by double integration or moment area method: (1) Cantilever having point load at the free end. Cantilever having point load at any point of the span, Cantilever with uniformly distributed load over the entire span Cantilever having U.D.L. over part of the span from free end Cantilever having U.D.L. over a part of span from fixed end (2) Simply supported beam with point load at centre of the span. Simply supported beam with U.D. load over entire span. NOTE: All examples will be for constant moment of inertia without derivation of formula. Strength of solid and hollow circular shafts, Derivation of torsion equation, Polar modulus of section, Advantages of hollow shafts over solid shaft, Comparison of weights of solid and

hollow shafts for same strength, Horse power transmitted. Calculation of shaft diameter for a given horse power.

Suggested Reading:

Text Book (s)

1. Rajput R. K., Strength of Materials, S.Chand & Co. Ltd., Delhi.
2. Kapoor J.K., Strength of Materials, Asian Publication, Muzaffarnagar.

Reference Book (s)

1. Ramamarutham S., Strength of Materials, Dhanpat Rai & Sons, Delhi..
2. Strength of Materials by Timoshenko and Youngs, East West Press.

Name of The Course	CONCEPT OF HEAT TRANSFER				
Course Code	DPME2009				
Prerequisite	DPME2002				
Co-requisite					
Anti-requisite					
	L	T	P	C	
	3	2	0	4	

Course Objectives:

1. To prepare students to know the basic knowledge of different types of heat exchanger.
2. Apply the concept of heat transfer to find heat flow in different metals.

Course Outcomes:

CO1	Draw the isometric view of a given three dimensional object/part
CO2	Draw the orthogonal projection of a solid body
CO3	Practice different kinds of materials and Mechanical components conventionally.
CO4	Identify the elements of a detailed drawing.
CO5	Produce the assembly drawing using part drawings.

Continuous Assessment Pattern

Internal Assessment (IA)	Continuous Assessment Test (CAT)	End Term Exam (ETE)	Total Marks
20	30	50	100

Course Content:

Unit-1 Introduction: 06 hour
Modes and mechanisms of heat transfer - Basic laws of heat transfer -General discussion about applications of heat transfer. Conduction Heat Transfer: Fourier rate equation - General heat conduction equation in Cartesian coordinates.
Unit-2 One Dimensional Steady State Conduction Heat Transfer 10 hour
Homogeneous slabs, overall heat transfer coefficient electrical analogy - Critical radius of insulation One Dimensional Steady State Conduction Heat Transfer , Extended surface (fins) Heat Transfer - Long Fin, Fin with insulated tip and Short Fin.
Unit-3 One Dimensional Transient Conduction Heat Transfer 10 hours
Systems with negligible internal resistance - Significance of Biot and Fourier Numbers . Heat Transfer with Phase Change: Boiling: - Pool boiling - Regimes, Critical Heat flux and Film boiling. Condensation: Film wise and drop wise condensation.
Unit-4 Heat Exchangers 07 hours
Classification of heat exchangers – parallel and counter flow and cross flow heat exchanger overall heat transfer Coefficient and fouling factor - Concepts of LMTD

and NTU methods - Problems using LMTD and NTU methods.

Unit-5 Radiation Heat Transfer
07 hours

Emission characteristics and laws of black-body radiation - Irradiation - total and monochromatic quantities- laws of Planck, Wien, Kirchhoff, Lambert, Stefan and Boltzmann- heat exchange between two black bodies - concepts of shape factor - Emissivity - heat exchange between grey bodies - radiation shields

Suggested Reading:**Text Book (s)**

1. Heat and Mass Transfer by R. K. Rajput/ S. CHAND PUBLICATION
2. A test book for Heat and mass transfer by Pk Nag
3. Heat and Mass Transfer by R.S. Khurmi

Reference Book (s)

1. Fundamentals of Heat and Mass Transfer by Frank P. Incropera.
2. Heat & Mass Transfer: A Practical Approach by Yunus Cengel , Afshin Ghajar

Name of The Course	HYDRAULICS AND HYDRAULIC MACHINES			
Course Code	DPME2025			
Prerequisite	DPME2001			
Co-requisite				
Anti-requisite				
	L	T	P	C
	3	0	0	3

Course Objectives:

1. To prepare students to know the basic knowledge of different types of hydraulic machine.
2. Apply the concept of fluid mechanics to find fluid flow in different channel.

Course Outcomes:

CO1	Identify understanding of fluid mechanics fundamentals, including concepts of mass and momentum conservation
CO2	Apply the Bernoulli equation to solve problems in fluid mechanics.
CO3	Discuss of laminar and turbulent boundary layer fundamentals
CO4	Correlate the recent developments in fluid mechanics, with application to aerospace systems.
CO5	Apply the concepts developed for fluid flow analysis to issues in aerospace design

Continuous Assessment Pattern

Internal Assessment (IA)	Continuous Assessment Test (CAT)	End Term Exam (ETE)	Total Marks
20	30	50	100

Course Content:

Unit-1 Properties of fluid 06 hour
Fluid : Real fluid, ideal fluid., Fluid Mechanics, Hydraulics, Hydrostatics, Hydro kinematics, Mass density, specific weight, specific gravity, cohesion, adhesion, viscosity, surface tension, capillarity, vapour pressure and compressibility. Hydrostatic Pressure: Pressure, intensity of pressure, pressure head, Pascal's law and its applications.
Unit- 2 Measurement of Pressure 08 hour
Atmospheric pressure, gauge pressure, vacuum pressure and absolute pressure. Use of simple manometer, differential manometer and mechanical gauges Measurement of pressure by manometers and pressure gauges. Fundamental of Fluid Flow, Types of Flow, Steady and unsteady flow, Laminar and turbulent flow Uniform and non-uniform flow. Discharge and continuity equation (flow equation)

Unit-3 Bernoulli's Theorem**07 hours**

Types of hydraulic energy, Potential energy, Kinetic energy, Pressure energy Bernoulli's theorem; statement and description (without proof of theorems) Venturimeter (horizontal and inclined)
Orifice: Definition of Orifice, and types of Orifices, Hydraulic Coefficients.

Unit-4 Flow through Pipes and Flow Measurement**10 hours**

Definition, laminar and turbulent flow explained through Reynold's Experiment. Reynolds Number, critical velocity and velocity distribution. Head Losses in pipe lines due to friction, sudden expansion and sudden contraction entrance, exit, Hydraulic gradient line and total energy line. Measurement of velocity by Pitot tube, Measurement of Discharge by a Notch Difference between notches and orifices. Dimension less numbers types (definition only)

Unit-5 Pumps and Turbines**07 hours**

Reciprocating pumps (parts, working, discharge, work done, %slip only), Centrifugal pumps (parts, working), Reciprocating v/s Centrifugal pumps, Turbine (layout, efficiency, classification), Construction & working of (Pelton turbine).

Suggested Reading:**Text Book (s)**

1. Fluid Mechanics & Hydraulic Machines, Laxmi Publication (P) Ltd., New Delhi
2. Vijay Gupta & Gupta S.K., Fluid Mechanics, New Age International Publishers, New Delhi.

Reference Book (s)

1. Garde R.J., Fluid Mechanics, New Age International Publishers, New Delhi
2. Modi P.N., Fluid Mechanics, New Age International Publishers, New Delhi.

Name of The Course	Auto Engine
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Course Code	DPAE2001				
Prerequisite					
Co-requisite					
Anti-requisite					
	L	T	P	C	
	3	0	0	3	

Course Objectives:

1. To identify the functioning of the engine and its accessories.
2. The student will be made to learn the location and importance of each part..

Course Outcomes:

CO1	Describe basic working of 2 stroke and 4 stroke engine. (K2)
CO2	Categorize different types of engines. (K4)
CO3	Demonstrate petrol engine and its operational system. (K3)
CO4	Illustrate diesel engines and it's working.(K3)
CO5	Discuss Engine pollutants and its control. (K2)

Continuous Assessment Pattern

Internal Assessment (IA)	Continuous Assessment Test (CAT)	End Term Exam (ETE)	Total Marks
20	30	50	100

Course Content:

Unit-1 Introduction to combustion engine: 06 hour
Engine as a power source Concept of internal combustion engine. Engine dimensions: Bore, stroke, dead centres, compression ratio, swept volume, clearance volume, engine capacity, engine torque engine power at the crank shaft. Classification of engines as per stroke, cycle, fuel, ignition, cooling number and arrangement of cylinders, reciprocating

and rotary. Concept of 2 stroke and 4 stroke engines and their comparison. Working principles of petrol and diesel engines.

Unit- 2 Constructional details 10 hour

Constructional details of cylinder block, cylinder head, cylinder liner piston, piston rings, gudgeon pin, connecting rod, crankshaft, camshaft, valve mechanisms, flywheel and damper

Unit-3 Fuel System 10 hours

Fuel system in spark ignition engine: Fuel feed system, fuel pumps-its types, fuel tank, fuel lines, fuel filters, concept of carburetion. Working and construction of a simple carburetor. Advantages of using fuel injection system in spark ignition engines.

Unit-4 Diesel Engine AND Combustion 07 hours

Theory of diesel engine operation. Difference between petrol& diesel engine. Fuel injection pumps- plunger and barrel type,Advantages and disadvantages. Phenomenon of combustion in C.I engines and S.I engines, phases of combustion and after burning. Methods producing turbulence. Detonation and knocking, octane and cetane number, swirl and squish.

Unit-5 Engine Pollutants and its control 07 hours

Sources of engine pollutants of S.I and C.I engine. Effect of pollutants on human and environment. Methods of Control – Crank case ventilation, fuel tank ventilation, carburetion and recirculation. Redesigning of various engine system, V.V.R. Exhaust gas recirculation systems. Catalytic converters. Close loop feedback, electronic integrated engine management system. Emission rules and regulations. Bharat – I, II, III,IV

Suggested Reading:**Text Book (s)**

1. utomobile Engineering by Dr. Kirpal Singh; Standard Publishers Distributors

2. Automobile Engineering by R.B. Gupta; Satya Parkash, New Delhi

Reference Book (s)

1. I.C. Engines by M.L. Mathur and Sharma; Dhanpat Rai and Sons, Delhi

Name of The Course	MECHANICS OF SOLID LAB				
Course Code	DPME2013				
Prerequisite	DPME2001				
Co-requisite					
Anti-requisite					
	L	T	P	C	
	0	0	2	1	

Course Objectives:

1. Ability to conduct standard tension tests of steel and other metals.
2. Ability to conduct compression tests of concrete, cast iron and steel.

Course Outcomes:

CO1	Ability to conduct standard tension tests of steel and other metals.
CO2	Ability to conduct compression tests of concrete, cast iron and steel.
CO3	Ability to conduct tests with materials subjected to torsion.

Continuous Assessment Pattern

Internal Assessment (IA)	Continuous Assessment Test (CAT)	End Term Exam (ETE)	Total Marks
50	-	50	100

Course Content:

1. To find the shear force at a given section of simply supported beam for different loading.
2. To find the value of 'E' for a steel beam by method of deflection for different loads.

3. To determine the Max-Fibre stress in X-section of simply supported beam with concentrated loads and to find the neutral axis of the section.
4. To determine the ultimate tensile strength, its modulus of Elasticity, Stress at yield point, % Elongation and contraction in x-sectional area of a specimen by U.T.M. through necking phenomenon.
5. To determine the ultimate crushing strength of materials like steel and copper and compare their strength.
6. To determine Rock Well Hardness No. Brinell Hardness No. of a sample.
7. To estimate the Shock Resistance of different qualities of materials by Izod's test and charpy test.
8. To determine the bending moment at a given section of a simply supported beam for different loading.
9. To determine the various parameters of Helical coil spring.
10. To determine the angle of twist for a given torque by Torsion apparatus and to plot a graph between torque and angle of twist.

Suggested Reading:

Name of The Course	CONCEPT OF HEAT TRANSFER LAB				
Course Code	DPME2014				
Prerequisite	DPME2002				
Co-requisite					
Anti-requisite					
	L	T	P	C	
	0	0	2	1	

Course Objectives:

1. Analyze the heat flow in different types of materials like steel, copper, silver, etc.
2. Understanding to solve the problems related to heat transfer in conduction, convection and radiation

Course Outcomes:

CO1	Analyze the heat flow in different types of materials like steel, copper, silver, etc.
CO2	Understanding to solve the problems related to heat transfer in conduction, convection and radiation.
CO3	Compare the rate of flow of heat and thermal conductivity of materials like copper and steel.

Continuous Assessment Pattern

Internal Assessment (IA)	Continuous Assessment Test (CAT)	End Term Exam (ETE)	Total Marks
50	-	50	100

Course Content:

1. Study of Heat Transfer through Composite Wall.
2. Study of Thermal Conductivity of Insulating Powder.
3. Study of Concentric Tube Heat Exchanger (Plain Tube Type).
4. Experimental Study of Thermal Conductivity of Metal Rod
5. Experimental Study of Heat Transfer From A Pin-Fin Apparatus
6. Study of Emissivity Measurement Apparatus
7. Study of Stefan Boltzmann Apparatus

Suggested Reading:

Name of The Course	Hydraulics and Hydraulics Machine Lab			
Course Code	DPME2028			
Prerequisite				
Co-requisite				
Anti-requisite				
	L	T	P	C
	0	0	2	1

Course Objectives:

1. Perform standard measurement techniques of fluid mechanics and their applications.
2. Operate different hydraulic machines and measure different parameters.

Course Outcomes:

CO1	Grasp compare the results of analytical models introduced in lecture to the actual behavior of real fluid flows.
CO2	Perform standard measurement techniques of fluid mechanics and their applications.
CO3	Operate different hydraulic machines and measure different parameters.

Continuous Assessment Pattern

Internal Assessment (IA)	Continuous Assessment Test (CAT)	End Term Exam (ETE)	Total Marks
50	-	50	100

Course Content:

To verify Bernoulli's Theorem.
To find out venturimeter coefficient
To determine Coef. of velocity (Cv), Coef. of discharge (Cd) Coef. of contraction (Cc) and verify the relation between them
To perform Reynold's Experiment.

To determine Darcy's coefficient of friction for flow through pipes.

To verify loss of head due to: (a) Sudden enlargement (b) Sudden Contraction.

To determine velocity of flow of an open channel by using a current meter.

To determine coefficient of discharge of a rectangular notch/triangular notch.

Study of the following: (i) Reciprocating Pumps or Centrifugal Pumps. (ii) Impulse turbine or Reaction turbine (iii) Pressure Gauge/water meter/mechanical flow meter.

Overhauling of petrol engine

Overhauling of diesel engine.

Replacing of piston and piston rings – removal and refitting.

Overhauling of gear box.

Overhauling of wheels and axles.

Overhauling of brakes.

Overhauling of clutch.

Suggested Reading:

Text Book (s)

1. AUTOMOBILE ENGINEERING BY KRIPAL SINGH
2. I.C. Engines by M.L. Mathur and Sharma; Dhanpat Rai and Sons, Delhi

Name of The Course	Auto Engine LAB			
Course Code	DPME2003			
Prerequisite				
Co-requisite				
Anti-requisite				
	L	T	P	C
	0	0	4	2

Course Objectives:

1. Perform the different techniques of simple parts and assemblies apply the concept of design for quality.
2. Manipulate knowledge of subsystems of an engine.

Course Outcomes:

CO1	Grasp the knowledge of fundamentals & working of Petrol Engines. (S2)
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Name of The Course	Overhauling LAB			
Course Code	DPAE2003			
Prerequisite				
Co-requisite				
Anti-requisite				
	L	T	P	C
	0	0	2	1

1. .

Course Outcomes:

CO1	Practice on overhauling of Petrol Engine
CO2	Practice on overhauling of Diesel Engine

Continuous Assessment Pattern

Internal Assessment (IA)	Continuous Assessment Test (CAT)	End Term Exam (ETE)	Total Marks
50	-	50	100

Course Content:

Diagnosing the engine for overhauling.
Removal of engine from vehicle.
Dismantling of engine.

CO2	Differentiate components of SI & CI engines. (S1)
CO3	Grasp the knowledge of subsystems of an engine. (S2)

Continuous Assessment Pattern

Internal Assessment (IA)	Continuous Assessment Test (CAT)	End Term Exam (ETE)	Total Marks
50	-	50	100

Course Content:

Study of fuel systems in petrol engines.
Study of fuel injector systems in Diesel Engines.
Study of F.I.P (Fuel Injection Pump).
Study of Engine tune up.
Study of turbocharger.
Study of cooling system.
Study of engine block.

Suggested Reading:

Text Book (s)

3. AUTOMOBILE ENGINEERING BY KRIPAL SINGH
4. I.C. Engines by M.L. Mathur and Sharma; Dhanpat Rai and Sons, Delhi

Name of The Course	THEORY OF MACHINE				
Course Code	DPME3001				
Prerequisite					
Co-requisite					
Anti-requisite					
	L	T	P	C	
	3	2	0	4	

Course Objectives:

1. Understand the fundamentals of the theory of kinematics and dynamics of machines.
2. To Use computer software packages in simple design of machines.

Course Outcomes:

CO1	Identify with common mechanisms used in machines and everyday life.
CO2	Calculate mobility (number of degrees-of-freedom) and enumerate rigid links and types of joints within mechanisms.
CO3	Analyse ability to conduct a complete (translational and rotational) mechanism position, velocity and acceleration analysis
CO4	Compare between various cam mechanism classification and cam motion profiles, and familiarity with introductory cam design considerations.
CO5	Compare between various gear mechanism classification and gear train analysis, and familiarity with gear standardization and specification in design.

Continuous Assessment Pattern

Internal Assessment (IA)	Continuous Assessment Test (CAT)	End Term Exam (ETE)	Total Marks
20	30	50	100

Course Content:

Unit-1 Introduction 08 hour
Statics and dynamics, links, classification of links, kinematic pairs classification, degrees of freedom, constrained motion-types, kinematic chains, mechanisms, inversions of quadratic chain, single slider crank chain and double slider crank chain. Straight line motion mechanisms: classification of straight line motion mechanisms, peaucellier's, grass hopper and Pantograph mechanisms.
Unit- Velocity and Acceleration Mechanism 12 hour

Velocity and acceleration in Mechanisms: Motion of a link in machine, velocity of a point on a link – Instantaneous center – types of instantaneous centers – Kennedy theorem – velocity measurement by Instantaneous center method, Relative velocity method. Acceleration of a point on a link - acceleration in slider crank mechanism, Coriolis component of acceleration. Steering gear mechanism: Davis and Ackerman steering gear, Single and Double Hook Joint analysis.

Unit-3 Cams
10 hours

Definitions, Types of cams and followers, types of follower motion, generation of cam profiles for uniform velocity, uniform acceleration and simple harmonic motion. Maximum velocity and maximum acceleration, analysis of roller follower and circular cam with straight flanks.

Unit-4 Gears
10 hours

Friction wheels and toothed gears- types-law of gearing, condition of constant velocity ratio for transmission of motion- cycloidal and involute teeth profiles, velocity of sliding-interference - condition for minimum number of teeth to avoid interference- expressions for arc of contact and path of contact.

Unit-5 Vibrations
04 hours

Concept of vibrations and its types – longitudinal, transverse and torsional vibrations (simple numerical), Damping of vibrations.

Suggested Reading:

Text Book (s)

- 5.** Theory of Machines by D.R. Malhotra; Satya Prakashan, New Delhi.
- 6.** Theory of Machines by V.P Singh; Dhanpat Rai and Sons, New Delhi

Reference Book (s)

- 1.** Theory of Machines by Jagdish Lal; Metropolitan Publishers, New Delhi.
- 2.** Theory of Machines by R.C. Jindal; North Publications

Name of The Course	MACHINE DESIGN			
Course Code	DPME3002			
Prerequisite	DPME2004			
Co-requisite				
Anti-requisite				
	L	T	P	C
	3	2	0	4

Course Objectives:

1. To prepare students for design various machine components.
2. Analysis the various mechanical properties of materials.

Course Outcomes:

CO1	Analyze the stress and strain on mechanical components and identify and quantify failure modes for mechanical parts.
CO2	Describe variety of mechanical components available and emphasize the need to continue learning.
CO3	Express the basic machine elements used in machine design; design machine elements to withstand the loads and deformations for a given application, while considering additional specifications.
CO4	Appraise a design problem successfully, taking decisions when there is not a unique answer.
CO5	Apply mechanical engineering design theory to identify and quantify machine elements in the design of commonly used mechanical systems.

Continuous Assessment Pattern

Internal Assessment (IA)	Continuous Assessment Test (CAT)	End Term Exam (ETE)	Total Marks
20	30	50	100

Course Content:

Unit-1 Introduction to Design 08 hour
1.1 Basic requirements for machine elements design 1.2 General design process 1.3 Mechanical properties 1.4 General design considerations like fatigue, creep, fabrication methods, economic considerations, material selection, ergonomic etc. 1.5 Designing for strength
Unit- Riveted And Welded Joints 07 hour
2.1 Types of riveted joints 2.2 Possible failure of riveted joints 2.3 Design of lap and butt type riveted joints (simple cases) 2.4 Strength and efficiency of riveted joints 2.5 Common types of welded joints 2.6 Transverse fillet and parallel fillet welded joint
Unit-3 Screwed Joints 08 hours
3.1 Introduction to screw and various definitions of screw threads 3.2 Advantages and disadvantages of screwed joints over riveted and welded joints 3.3 Common types of screw fastening; through bolt, tap bolt, stud, cap screw, machine screw and set screw. 3.4 Designation of screw threads 3.5 Stresses in screw fastenings 3.6 Design of bolts for cylinder cover
Unit-4 Keys And Couplings 08 hours
Keys And Couplings : 4.1 Definition of term Key; its various types 4.2 Splines 4.3 Forces acting on sunk keys 4.4 Shaft couplings and its various types 4.5 Design of flange coupling Shafts: 5.1 Various types of shafts 5.2 Stresses in shafts

5.3 Design of shaft (solid and hollow) subjected to torque and Bending moment

Unit-5 Design Of Cotter and Knuckle Joint
08 hours

Design Of Cotter Joint :

6.1 Design of cotter

6.2 Design of socket

6.3 Design of spigot

Design Of Knuckle Joint :

7.1 Design of rod

7.2 Design of pin

Suggested Reading:

Text Book (s)

1. R.S.khurmi, Machine design, S.Chand, New Delhi
2. V. Bhandari, Machine Design, Tata Mcg Hill, New Delhi

Reference Book (s)

1. Mechanical Engineering Design” by Joseph Edward Shigley

Name of The Course	Chassis, Body and Transmission			
Course Code	DPAE3003			
Prerequisite				
Co-requisite				
Anti-requisite				
	L	T	P	C
	3	0	0	0

Course Objectives:

1. The anatomy of the chassis in general.
2. The location and importance of each part..

Course Outcomes:

CO1	Identify the different types of Chassis frame and Requirement of chassis.
CO2	Explain the working of various parts like clutch, front, steering system.
CO3	Understand the Transmission system.

CO4	Develop a strong base for understanding future developments in the automobile industry.
CO5	Understand the Steering system

Continuous Assessment Pattern

Internal Assessment (IA)	Continuous Assessment Test (CAT)	End Term Exam (ETE)	Total Marks
20	30	50	100

Course Content:

Unit-1 Chassis and Body 08 hour
Classification of vehicles, types of chassis, layout of conventional type of chassis, function and arrangement of major assemblies. Alternating arrangement used such as engine position, drive types, their merits and demerits., types of frame and body streamlining, cross members, brackets, materials of frame and body upholstery..
Unit-2 Clutch 10 hour
Necessity, function and requirements of clutch, types of clutch - single plate clutch, multi plate clutch, hydraulic power assisted and wet and dry plate clutch, clutch plate and lining material Constructional details and working of centrifugal, semi centrifugal clutch, fluid coupling.
Unit-3 Transmission 10 hours
Necessity, function and types of manual transmission-Sliding, constant mesh and synchromesh. Over drive, over running clutch, description and operation of transfer gear box. Common faults and remedies Types of automatic transmission and their main components Epicyclic gear box – construction, working and determination of speed ratio Torque converter – construction, principle of working. Continuously transmission, Automated Manual Transmission
Unit-4 Final Drive And front axle 08 hours
Propeller shaft – function, construction details. Universal joints - functions and types. Types of final drive – hotchkiss drive, torque tube drive. Differential – principle, functions and its working. Rear axles – semi

floating, , three quarter floating. Fully floating . Common faults and remedies Types – Stub double drop, fully dropped, load distribution, effect of braking on axle shape, steering head, Elliot and reverse Elliot, steering knuckle. Common abrasive grinding wheel materials, Bonds, Grain or grits of abrasive, Grain structure and shapes of common wheels, various speeds and feeds, Use of coolants, Methods of grinding. Types of grinding machines, precision finishing operations like honing.

Unit-5 Steering 10 hours

Steering mechanism, function, Davis and Ackerman's Principle of steering. Working and constructional details of steering gear, steering linkages, sector arm, center arm, drag link and tie rod steering stops. Front wheel geometry-caster, camber, steering axis inclination, toe in and toe out. Cornering force, cornering power and self-righting torque. Over steering and under steering. Power steering – necessity, types, Construction features and working of hydraulic and electronic power steering systems, Common steering systems troubles and remedies

Suggested Reading:

Text Book (s)

1. Chassis, Body and Transmission-I by G.S.Aulakh, Eagle Prakashan, Jalandhar

Reference Book (s)

1. Chassis, Body and Transmission by Ishan Publications, Jalandhar

Name of The Course	CHASSIS, BODY AND TRANSMISSION LAB			
Course Code	DPAE3005			
Prerequisite				
Co-requisite				
Anti-requisite				
	L	T	P	C
	0	0	2	1

Course Objectives:

1. The anatomy of the chassis in general.
2. The location and importance of each part..

Course Outcomes:

CO1	Differentiate various types of chassis.
CO2	Handle working of different components like clutch, gearbox.
CO3	Grasp the knowledge of Servicing and overhauling of gear box and propeller shaft

Continuous Assessment Pattern

Internal Assessment (IA)	Continuous Assessment Test (CAT)	End Term Exam (ETE)	Total Marks
50	0	50	100

Course Content

Study and sketches of Heavy and Light vehicle chassis.
Identify and servicing of single plate and multi plate clutch.
Study and sketch of centrifugal clutch.
Servicing and overhauling of constant mesh and synchromesh gear box
Servicing of universal joints, slip joint and propeller shaft
Servicing of differential, adjustment of crown and pinion backlash.
Checking and adjustment of steering geometry, camber, caster, Toe-in, Toe-out, kingpin inclination.
Study of live axles.

Suggested Reading:

Text Book (s)

1. Chassis, Body and Transmission-I by G.S.Aulakh, Eagle Prakashan, Jalandhar

Reference Book (s)

1. Chassis, Body and Transmission by Ishan Publications, Jalandhar

Name of The Course	Project				
Course Code	DPME9999				
Prerequisite					
Co-requisite					
Anti-requisite					
	L	T	P	C	
	0	0	0	10	

Course Objectives:

1. Perform the different techniques of graphical representation for simple parts and assemblies apply the concept for different project.
2. Manipulate drawings through editing and plotting techniques

Course Outcomes:

CO1	Create a own data or implementation on previous data project.
CO2	Create model to exhibit project
CO3	Develop understanding of subject based knowledge given in the classroom in the context of its application at work places.
CO4	Develop firsthand experience and confidence amongst the students to enable them to use and apply polytechnic/institute based knowledge and skills to solve practical problems related to the world of work.
CO5	Develop abilities like interpersonal skills, communication skills, positive attitudes and values etc.

Continuous Assessment Pattern

Internal Assessment (IA)	Continuous Assessment Test (CAT)	End Term Exam (ETE)	Total Marks
50	-	50	100

Course Content:

Projects connected with repair and maintenance of machines.
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Estimating and costing projects.

Design of jigs / fixtures.

Projects related to quality control.

Projects relating to installation, calibration and testing of machines.
--

Projects related to wastage reduction.

Project, related to fabrication.

Project work related to increasing productivity.

ELECTIVE COURSE

Name of The Course	MOTOR VEHICLE ACT AND TRANSPORT MANAGEMENT			
Course Code	DPME3007			
Prerequisite				
Co-requisite				
Anti-requisite				
	L	T	P	C
	3	0	0	3

Course Objectives:

1. To prepare students about to find the vehicle operating cost.
2. To prepare students about to find the vehicle operating cost.
3. To prepare students to motor vehicle act in India.

Course Outcomes:

CO1	Analyze to reduce Vehicle Operating Costs.
CO2	Analysis of vehicle accident.
CO3	Discuss vehicle claim procedure from insurance company and about Motor Vehicle Act.
CO4	Analyze Motor Vehicle Act features and appropriate practices covering Motor Vehicle Act.
CO5	Understand about transport management systems and techniques would also be an asset to him.

Continuous Assessment Pattern

Internal Assessment (IA)	Continuous Assessment Test (CAT)	End Term Exam (ETE)	Total Marks
20	30	50	100

Course Content:

Unit-1 Garage location, layout and types, and change work procedure 06 hour	
Location of garage/selection of site of garage <ul style="list-style-type: none"> • Layout of garage • Types of garage • Estimation of repair • Job control system • Work – order or job card • Testing and test reports • Costing and billing 	
Unit- 2 Garage stores	08 hour

•Definition

- Purpose of store keeping
- Function of store keeping
- Location of store
- Layout of store
- Advantage of good store – keeping and recording
- Procurement of store.

Unit-3 Insurance of vehicle
08 hours**Meaning and necessity of vehicle insurance**

- Types of vehicle insurance
- Duties of driver in case of accident and injury to a person
- Procedure to get accidental claim and compensation

Unit-4 Driving And Highway Code **08 hours**

- Principle of driving
- Driving procedure
- Driving precautions
- Driving in abnormal conditions, like hilly area, night, fog, heavy traffic and rain
- Emergency Driving situations
- Driving License - purpose, importance and requirements
- Different types of driving license
- Procedure to get driving license
- Highway code – types with sketches with colour code

Unit-5 Motor Vehicle Act
10 hours

- Definitions
- Salient features of motor vehicle act
- Licensing of drivers and conductors of motor vehicles
- Registration of old and new vehicles
- Transfer of vehicle – local and state to state
- Traffic offences, penalties procedure
- Fitness of vehicle – meaning and purpose, provision in the act
- Vehicle permit – different types
- Imposition of penalties of violation of rules
- Different documents required for registration of vehicle, for driving license, and for transfer of vehicle.

Suggested Reading:**Text Book (s)**

1. Transport in Modern India by KP Bhatnagar, SatishBahadur, DN Aggarwal and SC Gupta.

Reference Book (s)

1. Motor Vehicle Act of India

Name of The Course	Auto Electrical and Electronic System
Course Code	DPME3008
Prerequisite	
Co-requisite	
Anti-requisite	
	L T P C
	3 0 0 3

Course Objectives:

1. To identify the functioning of the battery and its accessories.
2. The student will be made to learn the location and importance of each part for electrical.

Course Outcomes:

CO1	Describe and apply knowledge of electrical system in two wheeler. (K2)
CO2	Describe and apply knowledge of electrical system in Four wheeler. (K2)
CO3	Demonstrate petrol engine and its wiring system. (K3)
CO4	Illustrate diesel engines and electrical system.(K3)
CO5	Illustrate electrical system in engine.(K3)

Continuous Assessment Pattern

Internal Assessment (IA)	Continuous Assessment Test (CAT)	End Term Exam (ETE)	Total Marks
20	30	50	100

Course Content:**Unit- Introduction****4 hour**

Various Electrical and Electronics components/systems in Automobile, Functions and uses, earth return system, types of earthing, 6V, 12V system.

Unit-2 Batteries**10 hour**

Lead Acid Batteries - Construction, working, elements, types, materials used, electrolyte and its strength, effect of added plate area and temperature, rating, capacity, efficiency, temperature characteristics, terminal voltages, charging and discharging

Battery Testing - Electrolyte testing by hydrometer, voltage test, high discharge and cadmium test (voltage)

Alkaline Batteries: Construction, working, merits and demerits of Ni-Fe, Ni- Cd, Ag-Zn cells, maintenance free batteries

Lithium ion battery - Construction and working

Fuel cells - Principles of working and uses of fuel cell

Unit-3 Fuel System**10 hours**

Fuel system in spark ignition engine: Fuel feed system, fuel pumps-its types, fuel tank, fuel lines, fuel filters, concept of carburetion. Working and construction of a simple carburetor. Advantages of using fuel injection system in spark ignition engines.

Unit-4 Charging System**10 hours**

Circuits, function and various components, dynamo and alternator, types, construction, working, advantages and disadvantages of dynamo and alternators, drives, cut out relay

Unit-5 System**06 hours**

Starting requirements of I.C engines, principle, types and construction of starter motor, starter switches, starter drives their types and working. Various lighting circuits, head lamp, type and constructional details, sealed beam, double filaments, asymmetric and dual units, vertical and side control of lamps, fog light, side light, brake light, instrument light,

indicator lights, reversing light, lamp mounting, working indicators LED lighting Wiring - HT and LT, their specifications, cable colour codes, wiring Harness, Cable connections, Wiring diagrams of cars and two wheeler, Fuses, faults and rectification

Suggested Reading:

Text Book (s)

1. Young. A. P & Griffiths. L, Automobile Electrical and Electronic Equipments, English Languages Book Society & New Press, 1990.

Reference Book (s)

1. Vinal. G.W., Storage Batteries, John Wiley & Sons Inc., New York, 1985