Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
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Diploma in Automobile Engineering (2023-2026)

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*				
DTAU401	DC	Automobile Industrial Management	60	20	20	00	00	2	1	0	3

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** – Credit.
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):
The subject aims to provide the student with:

1. Technicians of Automobile engineering disciplines are expected to work during most of their career at middle level. They are also expected to deal with workforce and management problems.
2. In the present era of competition, optimum utilization of the resources with achieving higher productivity is essential for any industry to survive.
3. Quality and cost controls are also other important factors which contribute to the day-to-day supervision issues.

Course Outcomes (COs):
Students will:

1. Interpret given organization structure, and acquire major management skills, familiarize with different leadership styles.
2. List stages in product design, and explain different types of plant layout, Production modes and PPC functions.
3. Explain material requirement planning and store keeping procedure and analyze importance of inventory control.
4. Explain the need of Total Quality management and appreciate the usage of TQM tools in quality control.
5. Explain the different types of Plant maintenance and measures and procedure observed in industry towards safety.

Syllabus: -

UNIT I **8 Hrs.**

Basics of Management: Definition – Administration- Definition – Henry-Fayol's principles of management- Business Organization-Types- Proprietorship-Partnership- Joint stock- Co-operative Society-Advantages and disadvantages. Communication - Process of Communication – Barriers for effective communication.

UNIT II **8 Hrs.**

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DTAU401	DC	Automobile Industrial Management	60	20	20	00	00	2	1	0	3

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** – Credit.
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Production Management: Concept of project work - Project planning -Market survey. Plant layout-Types of Plant layout, Product Design-Stages in product design, Material requirement, Job, Batch & Mass production with their advantages and disadvantages. Production planning and Control (PPC)-definition, Functions of PPC, planning, routing, scheduling, dispatching and Inspection, Introduction to CPM and PERT –Comparison

UNIT III **11 Hrs.**

Material Management: Material management - definition, functions. Purchase - Objectives, different methods of purchasing -Purchase procedure. Enterprise resource planning - concept, features, and applications. - Material Requirement Planning (MRP)-concept, applications - Just in Time (JIT)-concept and benefits.

UNIT IV **9Hrs.**

Total Quality Management: Quality–Concept-Quality control- Definition - Factors affecting quality- Advantages of quality control –Inspection-Different types of inspection Total Quality Management-Meaning- Principles of total quality management, TQM Tools- Flow charts, Control charts, Histograms, Pareto charts, Cause, and effect diagram-5-S- Kaizen, and Six-sigma Quality Certification Systems- ISO 9000 series quality standards.

UNIT V **8 Hrs.**

Plant Maintenance and Industrial Safety: Plant Maintenance-Definition, Types of maintenance-Preventive maintenance- Break down maintenance-Advantages and disadvantages, Total Productive Maintenance-Meaning, benefits of TPM -Tools of TPM- planned maintenance and predictive maintenance.
Industrial safety –Meaning, Accident- causes for accident- Direct and indirect losses due to an accident. Personal protective devices for preventions of accidents.

Textbooks:

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DTAU401	DC	Automobile Industrial Management	60	20	20	00	00	2	1	0	3

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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.

1. T.R.Banga & S C Sharma, "Industrial Organization and Engineering Economics", Khanna.Publishers.
2. K. K. Ahuja, "Industrial management and organizational behavior".
3. O.P.khanna, "Industrial management and engineering economics", Khanna publishers.
4. Dr. K. Aswathappa and Dr. Sreedhar Bhatt, "Production and operations management", Himalaya publishers.
5. Krishnan.N V, "Safety Management in Industry", Jaico Publishing House, Bombay, 1997.

References:

1. S Raja Ram, Shivashankar, "Total Quality Management".
2. Dr.P.C. Punmia & K.K.Khandelwal, " Project planning and control with PERT&CPM", LP Publication, New Dhelli.

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DTAU402	DC	VEHICLE KINEMATICS AND DYNAMICS	60	20	20	30	20	2	1	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** – Credit.
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):
The subject aims to provide the student with:

1. An introduction of basic concepts of vehicle components and mechanisms.
2. To provide understanding about effects of various unbalanced forces on vehicle.
3. To build higher level cognitive skill of future technicians for analyzing vehicle performance against various resistances acting on it during operation.

Course Outcomes (COs):
Students will be able to:

1. Understand the functioning of vehicle components and their working.
2. Understand basic terminology related theory of machine and vehicle dynamics with their appropriate examples.
3. Demonstrate an understanding of principle of gears.
4. Explain effectively present written, oral, and graphical solutions to design problems & develop ability to come up with innovative ideas and design a layout of cam for specified motion.
5. Solve numerical problems of Rotating mass or Reciprocating mass balancing in the same or different planes applying graphical and/or analytical method.

Syllabus: -

UNIT I **8 Hrs.**

Introduction Mechanisms and Machines: Mechanism, machine, plane and space mechanism, Differentiate Mechanism, Structure and Machine, kinematic pairs, kinematic chains their classification, degree of freedom for plane mechanism, Grubler's criterion, kinematics inversions four bar mechanism and slider crank mechanism and double slider crank chain mechanism with neat sketch diagram

UNIT II **9 Hrs.**

Steering Mechanisms: Correct steering condition, Devis and Ackermann's steering mechanism,

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DTAU402	DC	VEHICLE KINEMATICS AND DYNAMICS	60	20	20	30	20	2	1	2	4

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Differentiate types of steering Mechanisms, Condition for true rolling, solving numerical for correct steering condition.

Power Transmission: Classification of power transmission devices, belt drive, chain drive, rope drive and gear drives; Flat and 'V' belt drives; ratio of tensions; Slip length of belt calculation for open and cross belt drive.

UNIT III **8 Hrs.**

Gears and Gear Trains: define gear, types of gears, terminology of gear with diagram, applications of gears, law of gearing with neat sketch diagram, interference and undercutting for gears with neat sketch diagram, types of gear train with diagram and gear train applications.

UNIT IV **8 Hrs.**

Cams: Define Cams and Followers, Applications of Cam and Followers, types of cams and followers, Follower Motion: uniform motion, simple harmonic motion, parabolic motion , cycloidal motion, Pressure Angle, Radius of Curvature, Cam Profile for radial and offset followers, Synthesis of Cam Profile by Graphical Approach.

UNIT V **9 Hrs.**

Balancing: Need of Balancing, Static and Dynamic Balancing, balancing of rotating mass, balancing of single rotating mass, balancing of several rotating masses, Primary and secondary unbalanced forces of reciprocating masses, Variation of tractive force, Swaying couple and Hammer blow with respect tolocomotive engine.

Textbooks:

1. Khurmi RS, "Theory of Machines", S. Chand and Company, New Delhi,2019

Reference Books:

1. Rattan SS, "Theory of Machines", Third Edition, Tata McGraw-Hill, 2019.
2. Ambekar A.G, "Mechanism and Machine Theory" Prentice Hall of India", New Delhi, 2017.
3. Rao J S and Dukkipati; "Mechanism and Machine Theory"; New Age Delhi, 2011.

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DTAU402	DC	VEHICLE KINEMATICS AND DYNAMICS	60	20	20	30	20	2	1	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** – Credit.
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List of Experiments.

1. To synthesize and demonstrate the inversion of four bar mechanism through animation and model.
2. To synthesize and demonstrate the inversion of single slider and double slider crank
3. mechanism through animation and model.
4. To draw Involutes profile of a gear by generating method.
5. To find out velocity ratio of various gear trains.
6. To study working of sun and planet epicycle gear train mechanism using models
7. To study various types of belt drives & find out the velocity ratio of the drive.

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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*				
DTME403N	DC	Design of Machine Elements	60	20	20	30	20	2	1	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):

1. To understand the design methodology for machine elements.
2. To analyze the forces acting on a machine element,
3. Apply suitable design methodology.
4. To understand the various standards and methods of standardization.
5. To apply the concept of parametric design and validation by strength analysis

Course Outcomes (COs):

Students will:

1. Understand the design concepts of various machine elements.
2. Design for fatigue and endurance limit
3. Design the shafts and couplings.
4. Design the various types of springs.
5. Understand the concepts of bearing lubrication and design the journal bearings.

Syllabus

UNIT-I **8 Hrs.**

Introduction: Introduction to Design process, Design considerations, Design Procedure, engineering materials properties and processes of their selection, Bending and Torsional stress equations, Stress concentration, causes of stress concentration factor, reduction of stress concentration.

UNIT-II **9 Hrs.**

Design for fatigue strength and endurance limit: fatigue, cyclic loading, endurance limit, Design consideration for fatigue, stress concentration factor, loading factor, size factor, surface factor, Goodman and modified Goodman's diagram, Soderberg equation, Gerber parabola.

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			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
DTME403N	DC	Design of Machine Elements	60	20	20	30	20	2	1	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

UNIT-III **10 Hrs.**

Design of Shafts: Various types of shafts; Stresses in Shafts; Design of shafts (solid and hollow) subjected to torque and bending moment.
keys and Coupling: Definition of term key, its various types, Design of keys, Forces acting on sunk keys, Shaft coupling and its various types.

UNIT-IV **8 Hrs.**

Design of Springs: Introduction and types of springs, Material for helical spring, terms used in compression springs, stresses in helical spring, Design of helical compression & tension spring, leaf spring, fatigue loading of springs, surge in springs.

UNIT-V **9 Hrs.**

Journal Bearing: Types of lubrication, viscosity, hydrodynamic theory, design factors, temperature and viscosity considerations, Reynold's equation, stable and unstable operation, heat dissipation and thermal equilibrium, boundary lubrication, dimensionless numbers, Design of journal bearings, Rolling-element Bearings: Types of rolling contact bearing, bearing friction and power loss, bearing life.

List of Experiments.
Solve various design problems as per the syllabus.
Designing of components contained in the syllabus.

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DTME403N	DC	Design of Machine Elements	60	20	20	30	20	2	1	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Text and Reference Books:

1. Design of Machine Elements by V.B. Bhandari, TMH, 3rd Ed. 2010.
2. Machine Design by R.S. Khurmi nad J.K. Gupta, Eurasia Pub. House, 2013.
3. Machine Design by LE. Shingley, TMH, 2011.
4. Design of Machine Elements by Sharma and Purohit, PHI, 2014.
5. Machine Design by Wentzell Timothy H., Cengage learning, 2008.
6. Machine Design by Mubeen, Khanna Pub. 2013.
7. Machine Design by Sharma and Agrawal, Kataria & Sons, 2016.

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			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
DTAU404	DC	Manufacturing Process	60	20	20	30	20	2	1	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; C - Credit.
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 20 marks.

Course Educational Objectives (CEOs):

(A) Thecourseisdesignedtogivefundamentalknowledge basicmanufacturingprocesses for manufacturing different components. (B) To understand the basic, Operate & control different machines and equipment's. (C) To understand the basic concept, inspect the job for specified dimensions. (D) To understand the basic concept of selection of the specific manufacturing process for getting the desired type ofoutput.

Course Outcomes (COs):

After completion of this course the students are expected to be able to demonstrate following knowledge, skills, and attitudes

1. Student will Know and identify basic manufacturing processes for manufacturing different components.
2. Student will be Know About Operate & control different machines andequipment's.
3. Student will be able inspect the job for specifieddimensions.
4. Student will know about basic concept of produce jobs as per specifieddimensions.
5. Student will be known selection of the specific manufacturing process for getting the desired type ofoutput.

Syllabus: -

UNIT- I **9 Hrs.**

Lathes: Introduction of lathes; Basic parts and functions; Types of Lathes; specifications of lathe machine; operations on lathe machine; chip types and chip breaker; cutting tool geometry and too life.

UNIT- II **7 Hrs.**

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DTAU404	DC	Manufacturing Process	60	20	20	30	20	2	1	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Drilling, Reaming & Boring Machine: Classification; Basic parts and their functions; Radial drilling machine; Types of operations; Specifications of drilling machine; Types of drills and reamers;Twistdrillnomenclature;cuttingparameters;machiningtimecalculation;WorkandTool Holding Devices; Horizontal Boring Machines; Vertical Boring Machines; JigBoring Machine; Size of BoringMachines.

UNIT-III **8 Hrs.**

Milling Machine: Classification; Basic parts and their functions-column and knee Type; Types of milling operations, Types of milling cutters; cutting parameters; machining time calculation; milling operations-plain milling, side and face milling, form milling, gang milling, end milling, face milling and T- slot milling; Work and Tool Holding Devices; Dividing Heads.

UNIT-IV **10 Hrs.**

Grindingmachine, BroachingMachine& GearManufacturing: Grinding wheel composition, types, and shapes; Designation; Types of grinding operations;Types of Broaching machine; Advantages, Limitation, and applications of broaching; Broach Size and Materials; Methods of manufacture Gear cutting by (i) milling, (ii) single point cutting tool on planer/shaper, (iii) Shear speed process (iv) Gear planning, (v) Gear Shapers & Gear hobbling.

UNIT -V **8Hrs.**

Nontraditional machining processes: Electrical discharge Machining, Laser Beam Machining, Application of Laser Beam for Welding (LBW); Abrasive jet machining, Introduction to NC, CNC, DNC.

Reference Books:

1. *Production Technology- P.C. Sharma, S. Chand, 2005.*
2. *Manufacturing Technology R.K. Rajput LaxmiPublication, 2006.*
3. *Basic Manufacturing Processes & workshop Technology- S.K.Garg, 2010.*

List of Practical's:

1. Grinding of single point (H.S.S.)tools.
2. Practice of taper turning and screw cutting on a centerlathe.
3. Practice of making the pins or rivets of any size on a capstanlathe.
4. Practice of drilling, boring and reaming on alathe.
5. Practice of mounting cutters on the milling m/c and setting ofm/s.
6. Practice of up milling and down millingoperation.

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7. Practice of cutting the spur gear on millingmachine.
8. Practice on a shaper square block on a shaper and milling machine (Comparison of surface produced).
9. Other practical (as suggested by course coordinator).

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DTAU405	DC	VEHICLE MAINTENANCE LAB	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 20 marks.

Course Educational Objectives (CEOs):

(A) This subject aims at practical learning of vehicles maintenance (B) It covers thediagnosis of all the parts of the vehicle (C) It also includesmanagerial skills of vehicle maintenance shop.

Course Outcomes (COs):

After completion of this course the students are expected to be able to demonstrate following knowledge, skills, and attitudes

1. To understand the principle and construction of machine tools.
2. To understand the cutting tools used.
3. To understand the theory of metal cutting.

List of Practical's:

1. Study and layout of an automobile repair, service, and maintenance shop.
2. Study and preparation of different statements/records required for the repair and maintenance works.
3. Study and preparation of the list of different types of tools and instruments required.
4. Minor and major tune up of gasoline and diesel engines.
5. Fault diagnosis in electrical ignition system gasoline fuel system, diesel fuel

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