



Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Technology and Science
Choice Based Credit System (CBCS) in the Light of NEP-2020
Diploma in Automobile Engineering (2021-2024)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME									
			THEORY			PRACTICAL			L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*					
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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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

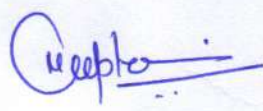
8 Hrs.

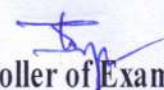
Plant Maintenance and Industrial Safety: Plant Maintenance-Definition, Types of maintenance-Preventive maintenance- Break down maintenance-Advantages and disadvantages, Total Productive Maintenance-Meaning, benefits of TPM -Tools of TPM- planned maintenance and predictive maintenance.

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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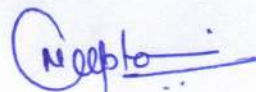
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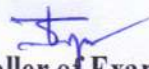
1. T.R.Banga & S C Sharma, "Industrial Organization and Engineering Economics", Khanna.Publishers.
2. K. K. Ahuja, "Industrial management and organizational behavior".
3. O.P.khanna, "Industrial management and engineering economics", Khanna publishers.
4. Dr. K. Aswathappa and Dr. Sreedhar Bhatt, "Production 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	

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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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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 to locomotive 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 Dukkupati; "Mechanism and Machine Theory"; New Age Delhi, 2011.


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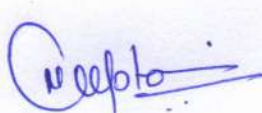
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

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 mechanism through animation and model.
3. To draw Involute profile of a gear by generating method.
4. To find out velocity ratio of various gear trains.
5. To study working of sun and planet epicycle gear train mechanism using models
6. To study various types of belt drives & find out the velocity ratio of the drive.


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COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM UNIVERSITY EXAM	TWO TERMS EXAM	TEACHER ASSESSMENT*	END SEM UNIVERSITY EXAM	TEACHER ASSESSMENT*				
DTME403	DC	MACHINE DESIGN	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):

Students will learn (A) How to apply the concepts of stress analysis (B) Theories of failure and selection of machine components (C) Familiarize the various steps involved in the Design Process (D) The principle involved in evaluating the shape and dimensions of a component (E) Functional and strength requirements, (F) Use of standard practices and standard data.

Course Outcomes (COs):

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

1. Students will be able to know about the machine elements, mechanical properties, and types of failure.
2. Students will be able to Design of shaft and flange coupling.
3. Students will be able to Design of machine elements subjected to different types of loads and moment.
4. Students will be able to Design Riveted joint, welded joints, and Threaded joints.
5. Students will be able to Design of Clutch.

Syllabus: -

UNIT- Introduction to Machine Design: Machine and machine elements; Introduction of bolt, nut, axle, shaft, bearing, coupling, clutch, belt, rope, chain, gear etc.; Basic design procedure, Basic

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requirements for machine elements; General design considerations like fatigue, creep, fabrication methods and economic considerations for strength.

UNIT-II

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

UNIT-III

Design of Machine Elements: Design of Machine Elements Subjected to Direct and Shear Loads; members subjected to direct loads – bolt, column, rod, cotter and knuckle joints; members subjected to shear loads- rivet, cotter knuckle pin, root of threaded bolt, coupling, bolt and key; Design of Machine Elements Subjected to Bending Moment, Twisting Moment and Combined Bending and Twisting Moment; Introduction to pure bending, fundamental equation of pure bending.

UNIT-IV

Design of Riveted Joint, Welded Joints, Threaded Joints: Types of Riveted joint - lap and butt joint; Modes of failure of riveted joints; Definition of welding, types of welded joints, strength of the butt weld; Types of threads and their proportions.

UNIT-V

Design of Clutch and Brakes:

Clutch: Need, Classification, Construction and Working of single and multi-plate clutches; power transmitted by single and multi-plate clutches.

Brake: Need & Classification of Brakes, Constructional detail and working of mechanical brakes; hydraulic and vacuum brake; Details of expert cylinder, wheel cylinder, Concept of brake drum, brake lining and brake equipment; Bleeding of brake.

Reference Books:

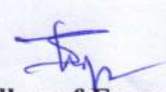
1. "Text book of Machine Design" by R.S. Khurmi & J.K. Gupta; S.Chand Publication, 2005
2. "Design of Machine Elements" by Bhandari, Tata McGraw-Hill Publishing Company Ltd, 2016.


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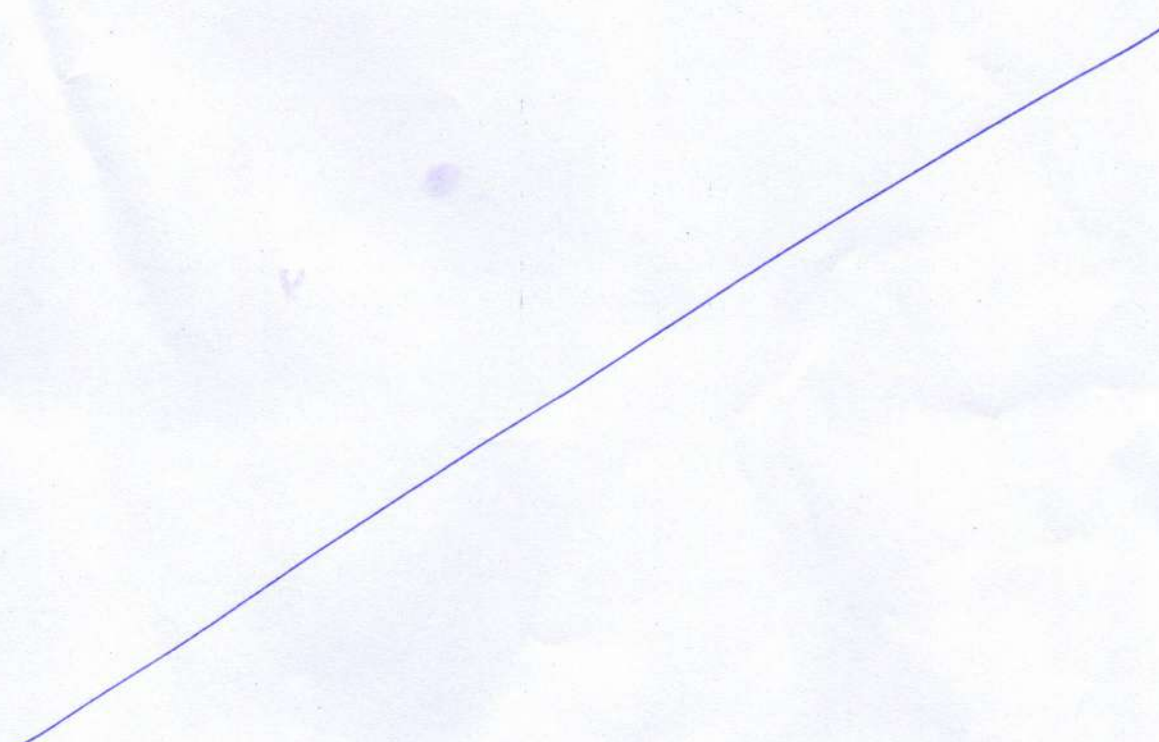
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3. "Machine Design" by Sadhu Singh, Khanna Publishers, 2014.
4. "Machine Design" by, Sharma and Agrawal, S. K. Kataria & Sons, 2012.
5. "Machine Design Vol-II & II" I by F. Haideri, NiraliPrakashan, Pune, 2011.
6. "Machine Design" by Pandya and Shah, Charotar Publishing House, 2010.

Note: PSG Design data book and/ or Mahadevan and Reddy's Mechanical design data book are to be provided/ permitted in exam hall (duly verified by authority)

List of Practical's:

Designing and sketching of components contained in the syllabus.



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DTAU404	DC	MANUFACTURING TECHNOLOGY	60	20	20	30	20	2	1	2	4

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Course Educational Objectives (CEOs):

(A) The course is designed to give fundamental knowledge basic manufacturing processes 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 of output.

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 and equipment's.
3. Student will be able inspect the job for specified dimensions.
4. Student will know about basic concept of produce jobs as per specified dimensions.
5. Student will be known selection of the specific manufacturing process for getting the desired type of output.

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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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; Twist drill nomenclature; cutting parameters; machining time calculation; Work and Tool Holding Devices; Horizontal Boring Machines; Vertical Boring Machines; Jig Boring Machine; Size of Boring Machines.

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.

Grinding machine, Broaching Machine & Gear Manufacturing: 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 Laxmi Publication, 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 of m/s.
6. Practice of up milling and down milling operation.


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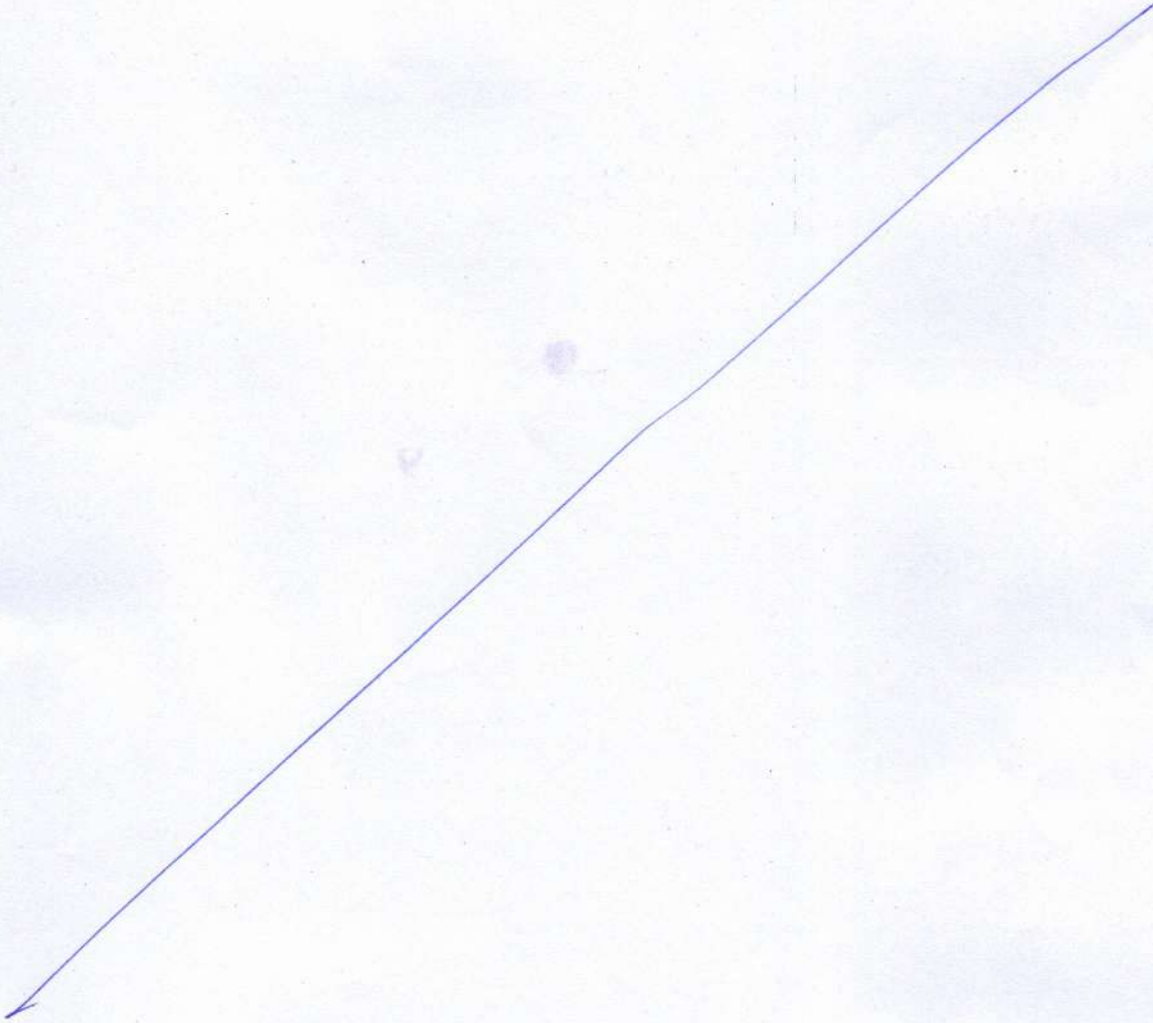

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7. Practice of cutting the spur gear on milling machine.
8. Practice on a shaper square block on a shaper and milling machine (Comparison of surface produced).
9. Other practical (as suggested by course coordinator).



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COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM UNIVERSITY EXAM	TWO TERM EXAM	TEACHER ASSESSMENT*	END SEM UNIVERSITY EXAM	TEACHER ASSESSMENT*				
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 the diagnosis of all the parts of the vehicle (C) It also includes managerial 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

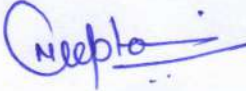
1. To understand the principle and construction of machine tools.
2. To understand the cutting tools used.
3. To understand the theory of metal cutting.

List of Practical's:

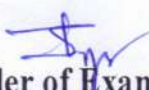
1. Study and layout of an automobile repair, service, and maintenance shop.
2. Study and preparation of different statements/records required for the repair and maintenance works.
3. Study and preparation of the list of different types of tools and instruments required.
4. Minor and major tune up of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


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Shri Vaishnav Institute of Technology and Science
Choice Based Credit System (CBCS) in the Light of NEP-2020
Diploma in Automobile Engineering (2021-2024)

system and rectification.

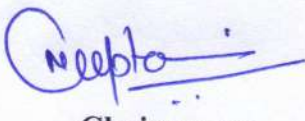
6. Study of faults in the electrical systems such as Head lights, Side of Parking lights, Trafficator lights, Electric horn system, Windscreen wiper system, Starter system and Charging system.
7. Study of fuel filters (both gasoline and diesel engines) and air cleaners (dry and wet) Simple tinkering, soldering works of body panels, study of door lock and window glass rising.

Textbooks:

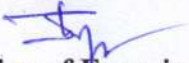
1. Automotive Trouble shooting and Maintenance by Anderson Ashburn.
2. Venk. Spicer, Automotive Maintenance and Trouble shooting.


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