Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Technology and Science
Choice Based Credit System (CBCS) in light of NEP-2020
Diploma in Mechanical Engineering
SEMESTER V (2023-2026)

COURSE CODE	CATE-GORY	COURSE NAME	TEACHING &EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
DTME501C	DC	INDUSTRIAL ENGINEERING AND MANAGEMENT	60	20	20	0	0	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 20 marks.

Course Educational Objectives (CEOs):

The basic objectives of subject are (A) To understand fundamentals of industrial management practices. (B)To understand basics of work study.(C)To understand the concepts of method study.(D)To understand fundamentals of motion analysis.(E)To understand the basics of work measurements.(F)To understand latest trends in wages & incentives.

Course Outcomes (COs):

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

1. Students would be able to understand the need of fundamentals of industrial management practices.
2. Students would be able to analyses basics of work study and able to understand its aspects.
3. Students would be able to understand concepts of method study.
4. Students would be able to recognize fundamentals of motion study.
5. Students will be able to understand the basics of work measurement techniques.
6. Students would be able to understand the latest trends in wages & incentives.

Syllabus

UNIT – I

Introduction: Definition of Industrial Engineering and its various aspects. Productivity: Definitions, factors affecting productivity, difference between production and productivity.

UNIT - II

Work Study: Introduction, definition and scope of work study, factors for selection of work study of job, uses & its limitations, human aspects of work study.

UNIT - III

Method Study: Definition, objective and procedure of method study analysis, information collection and recording techniques.

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Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Technology and Science
Choice Based Credit System (CBCS) in light of NEP-2020
Diploma in Mechanical Engineering
SEMESTER V (2023-2026)

COURSE CODE	CATE-GORY	COURSE NAME	TEACHING &EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
DTME501C	DC	INDUSTRIAL ENGINEERING AND MANAGEMENT	60	20	20	0	0	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 20 marks.

UNIT - IV

Motion Study and Analysis: Principles of motion study, therbligs and SIMO charts, normal work area (principle of motion economy), design and arrangement of work place.

UNIT-V

Work Measurement/Time Study: Objectives, work measurement techniques, stopwatch time study - principle, equipment used, and procedures.

Wages & Incentives: Introduction, wage payment plans and incentives.

Reference Books:

1. *Principles of Management – P.C.Tripathi, P.N.Reddy – Tata McGraw Hill, 2012.*
2. *Learning Package on Industrial Management Publisher: TTTI, Bhopal, 2007.*
3. *Industrial Engineering and Management by O. P. Khanna, Khanna Publisher, 2010.*
4. *Management – Stephen Robbins – Pearson Education/PHI – 17th Edition, 2003.*
5. *Industrial Organization and Management by K.K.Ahuja, 2009.*

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Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Technology and Science
Choice Based Credit System (CBCS) in Light of NEP-2020
Diploma in Mechanical Engineering
SEMESTER V (2023-2026)

COURSE CODE	CATE-GORY	COURSE NAME	TEACHING &EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
DTME501D	GE	Power Plant Engineering	60	20	20	0	0	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. A comprehensive understanding of various types of power plants, including their importance, operational principles, and energy conversion processes, with a focus on addressing the energy needs of India

Course Outcomes (COs):
Students will:

1. Students will gain a clear understanding of basic fundamentals of power plant and concepts.
2. Students will grasp the fundamental principles of thermodynamics and their application in steam power generation, including the laws of thermodynamics.
3. Students will comprehend the concept and operation of hydro power plants.
4. Students will be able to analyse the pros and cons of nuclear power generation and the challenges associated with nuclear waste disposal.
5. Students will understand the functioning and components of both solar photovoltaic and solar thermal power plants.

Syllabus

UNIT I **6 Hrs.**

Introduction: Introduction to Power plants: Energy needs of India. Introduction to power plants & their importance, power plants concepts, types, and energy conversion in each type.

UNIT II **7 Hrs.**

Steam Power Plant: Overview of thermodynamic principles, Laws of thermodynamics, Boiler types, mounting and accessories, Steam turbine types, working principles, Condenser function, Steam power plant overview and working in Madhya Pradesh.

UNIT III **7 Hrs.**

Hydro power plant: Concept of hydro power plant, & its operation, general layout and components in hydro power plant, classification, advantages and disadvantages, hydro power plants status in Madhya Pradesh.

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Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Technology and Science
Choice Based Credit System (CBCS) in Light of NEP-2020
Diploma in Mechanical Engineering
SEMESTER V (2023-2026)

COURSE CODE	CATE-GORY	COURSE NAME	TEACHING &EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
DTME501D	GE	Power Plant Engineering	60	20	20	0	0	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.

UNIT IV **8 Hrs.**

Nuclear power plant: General arrangement & its operations, classification, basic nuclear physics fundamentals, criteria for selection and installation of nuclear power plant, advantages and disadvantages, safe disposal of nuclear waste.

UNIT V **7 Hrs.**

Solar power plant: Solar Photo Voltaic (SPV), Components of a solar photovoltaic system: Panels, inverters, and balance of system components, Working principle of solar thermal power plants and Components.

Text Books:

1. G.D. Rai ,"Non conventional Energy source" Sixth Edition,Khanna Publisher 1988.
2. P.K. Nag ,"Power Plant Engineering " Third Edition,Tata Mcgraw Hill Publisher 2008.
3. Arora S.C. and Domkundwar ,"Power Plant Engineering " Fifth Edition, Dhanpat rai and sons Publisher 2010.
4. "Nuclear Power Plant Systems and Equipment" by P. K. Nag
5. "Solar Energy Engineering: Processes and Systems" by Soteris Kalogirou.

References:

1. Ramalingam K.K.,"Power Plant Engineering " Third Edition, Scitech Publication 2008.
2. El Wakil M.M.,"Power Plant Engineering " Fourth Edition, Tata Mcgraw Hill Publisher 1985
3. "Nuclear Power Plant Design and Seismic Safety Considerations" by Helmut Wenzel.
4. "Solar Photovoltaic Technology and Systems: A Manual for Technicians, Engineers and Scientists" by Chetan Singh Solanki.
5. "Hydroelectric Energy: Renewable Energy and the Environment" by Bikash Pandey.

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Shri Vaishnav Institute of Technology and Science
Choice Based Credit System (CBCS) in Light of NEP-2020
Diploma in Mechanical Engineering
SEMESTER V (2023-2026)

COURSE CODE	CATE-GORY	COURSE NAME	TEACHING &EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
DTME501E	GE	Renewable Energy Technologies	60	20	20	0	0	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 primary objectives of this course are to:

1. Understand the need for renewable energy sources and their role in sustainable development.
2. Learn the basic principles and technologies behind various renewable energy systems.
3. Study the design, working, and applications of solar, wind, biomass, hydro, and other renewable energy systems.
4. Familiarize with the integration of renewable systems in mechanical applications and energy management.

Course Outcomes (COs):
After completing this course, the student will be able to:
CO1: Explain the fundamentals of different renewable energy sources.
CO2: Analyze the working and performance of solar and wind energy systems.
CO3: Describe biomass, small hydro, and other emerging renewable technologies.
CO4: Compare renewable energy systems with conventional systems in terms of environmental and economic aspects.
CO5: Apply knowledge of renewable energy systems in mechanical engineering applications and project work.

Syllabus

Unit 1: Introduction to Renewable Energy

- Global and Indian energy scenario
- Need for renewable energy
- Types of renewable energy sources
- Comparison of renewable and conventional energy
- Sustainability and environmental impact
- Government policies and incentives

Unit 2: Solar Energy Technology

- Solar radiation and its measurement

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Technology and Science
Choice Based Credit System (CBCS) in Light of NEP-2020
Diploma in Mechanical Engineering
SEMESTER V (2023-2026)

COURSE CODE	CATE-GORY	COURSE NAME	TEACHING &EVALUATION SCHEME								
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DTME501E	GE	Renewable Energy Technologies	60	20	20	0	0	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.

- Solar thermal systems: collectors (flat plate, concentrating), solar water heaters, solar cookers, dryers
- Solar photovoltaic (PV) systems: working principle, components, types of PV cells
- Applications: solar street lighting, solar pumping systems, grid-tied/off-grid systems

7 Hrs.

Unit 3: Wind Energy Systems

- Basic principles of wind energy conversion
- Types of wind turbines (horizontal and vertical axis)
- Components of wind energy system
- Site selection and wind resource assessment
- Power output and performance
- Applications and limitations

Unit 4: Biomass and Bioenergy

- Types of biomass and biofuels
- Biomass conversion technologies: thermal (combustion, gasification, pyrolysis), biological (anaerobic digestion)
- Biogas plants – types, design and operation
- Applications in rural and industrial sectors
- Biodiesel production and applications

Unit 5: Other Renewable Technologies & Energy Management

- Small hydro power: types, working principle, components
- Geothermal energy: sources, technologies, applications
- Ocean energy: tidal, wave, OTEC (overview only)
- Hybrid renewable energy systems
- Basics of energy management and conservation
- Case studies and recent developments in renewable energy

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Choice Based Credit System (CBCS) in Light of NEP-2020
Diploma in Mechanical Engineering
SEMESTER V (2023-2026)

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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*				
DTME501E	GE	Renewable Energy Technologies	60	20	20	0	0	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.

References:

1. **Non-Conventional Energy Sources Author**: G.D.Rai **Publisher**: Khanna Publishers
2. **Renewable Energy: Power for a Sustainable Future Editor**: Godfrey Boyle **Publisher**: Oxford University Press
3. **Renewable Energy Technologies Author**: C.S. Solanki **Publisher**: PHI Learning Pvt. Ltd.
4. **Solar Energy: Principles of Thermal Collection and Storage Author**: S.P. Sukhatme and J.K. Nayak **Publisher**: Tata McGraw-Hill
5. **Fundamentals of Renewable Energy Sources Author**: D.P. Kothari, K.C. Singal, and Rakesh Ranjan **Publisher**: PHI Learning
6. **Energy Technology: Non-Conventional, Renewable and Conventional Author**: S. Rao and Dr. B.B. Parulekar **Publisher**: Khanna Publishers.

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Choice Based Credit System (CBCS) in light of NEP-2020
Diploma in Mechanical Engineering
SEMESTER V (2023-2026)

COURSE CODE	CATE-GORY	COURSE NAME	TEACHING &EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
DTME502N	DC	ADVANCE MANUFACTURING PROCESSES	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):
The aim of this course is to help students to attain the following industry identified competency through various teaching learning experiences: Maintain the functioning of advanced manufacturing processes and processes.

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 functioning of abrasive jet machining and various machines of its kind
2. To understand key parameters and working of various chemical machining processes.
3. To understand the processing of EDM and other laser beam machining.
4. To understand role of Plastics and associated engineering machinery in the industry.
5. To understand various components produced by powder metallurgy and additive manufacturing.

Syllabus

UNIT – I **8 Hrs.**

Modern Machining Process: Introduction and classification. Abrasive Jet Machining: Fundamental principles, process parameters, application& limitations. Ultrasonic Machining: Fundamental principles, process parameters, application and limitations.

UNIT -II **9 Hrs.**

Electrochemical Machining: Classification, fundamental principles, elements of process, electrochemistry of process. Electrochemical Grinding: Fundamental principles, process parameters.

UNIT -III **8 Hrs.**

Electrical Discharge Machining: Mechanisms of metal removal, Basic circuitry, tool material, dielectric fluid. Laser Beam Machining: Features, metal removal, application & limitation. Principle of Electron Beam Machining.

UNIT -IV **8 Hrs.**

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Choice Based Credit System (CBCS) in light of NEP-2020
Diploma in Mechanical Engineering
SEMESTER V (2023-2026)

COURSE CODE	CATE-GORY	COURSE NAME	TEACHING &EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
DTME502N	DC	ADVANCE MANUFACTURING PROCESSES	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.

Plastics: Composition of plastic materials, Molding methods - Injection molding, compression molding, transfer molding, extrusion molding, Blow molding, Laminating & Reinforcing, Welding of plastics.

UNIT -V **9 Hrs.**

Powder Metallurgy: Introduction, process of sintering, Applications, advantages and disadvantages of powder metallurgy.
Additive Manufacturing: Introduction, Scope and applications, Types of AM techniques. Liquid jet based printing processes, solid filament based AM processes.

References Books:

1. *"Banga& Sharma", "Industrial Organization & Management",2010.Andreas Gebhardt,Understanding additive manufacturing: rapid prototyping, rapid tooling, rapid-manufacturing, Hanser Publishers, 2011.*
2. *Dr. Bhattacharya Amitabh, New Technology, The Institution of Engineers Publication.*
3. *William J. Patton, Plastic Technology Theory, Design & Manufacturing, Reston Publishing Comp. INC, A P.H. Comp.*
4. *Pandey P. C. & Shan H. S., Modern Machining Process, Tata McGraw Hill.*

List Of Practical:

1. Prepare a list of components produced through advanced manufacturing processes.
2. Prepare a technical report on specification of advanced manufacturing processes.
3. Prepare a list of operating procedure and selection of advanced manufacturing processes.
4. To do comparative study of EDM and ECM.
5. Other practical (as suggested by course coordinator).

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Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Technology and Science
Choice Based Credit System (CBCS) in light of NEP-2020
Diploma in Mechanical Engineering
SEMESTER V (2023-2026)

COURSE CODE	CATE-GORY	COURSE NAME	TEACHING &EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
DTME504	DC	HEAT TRANSFER	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):

To introduction with (A) Importance of heat transfer, (B) various modes of heat transfer in detail (C) Heat Exchanger (D)Radiation.

Course Outcomes (COs):

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

1. Students would be able to understand various modes of heat transfer.
2. Students would be able to analyses basics difference of conduction, convection, and radiation.
3. Students would be able to understand significant of various dimension less no in convection.
4. Students will be able to understand concept of radiation.
5. Students would be able to explain concept boiling of liquids.

Syllabus

UNIT - I

Basic Concepts: Modes of heat transfer; Fourier's law; Newton's law; Stefan Boltzmann law; thermal resistance and conductance; analogy between flow of heat and electricity; combined heat transfer process.

Conduction: Fourier heat conduction equation; its form in rectangular coordinates; thermal diffusivity, linear one-dimensional steady state conduction through a slab; electrical analogies, critical-insulation-thickness for pipes; effect of variable thermal conductivity.

UNIT-II

Transient Heat Conduction: Lumped heat capacity; time constant; transient heat conduction in solids with finite conduction.

Heat Transfer from Extended Surface: Types of fins; heat flow through rectangular fin; efficiency and effectiveness of fin; Biot number.

UNIT-III

Convection: Newton's law of cooling; Dimensional analysis applied to forced and free convection;

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Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Technology and Science
Choice Based Credit System (CBCS) in light of NEP-2020
Diploma in Mechanical Engineering
SEMESTER V (2023-2026)

COURSE CODE	CATE-GORY	COURSE NAME	TEACHING &EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
DTME504	DC	HEAT TRANSFER	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.

dimensionless numbers and their physical significance; empirical correlations for free and forced convection, Continuity, momentum, and energy equations.

UNIT-IV

Heat Exchangers: Types- parallel flow, counter flow; evaporator and condensers; overall heat transfers coefficient; fouling factors; long-mean temperature difference (LMTD); method of heat exchanger analysis; effectiveness of heat exchanger.

UNIT-V

Radiation: Introduction, absorption and reflection of radiant energy, Emission, Black and nonblack bodies, Kirchhoff's law; intensity of radiation, radiation Exchange between black surface; geometric configuration factor.

Reference Books:

1. *Kumar DS; "Heat and mass transfer;" SK Kataria and Sons Delhi,2008.*
2. *RK Rajput; "Heat and mass transfer" S Chand Publication New Delhi,2010.*
3. *Kothandaraman, CP., "Fundamentals of Heat and Mass Transfer", Second Edition, New Age International Publishers, Chennai, 1997.*
4. *Sachdeva, KC, "Fundamentals of Engineering Heat and Mass Transfer", New Age International Publishers, New Delhi, 1996.*
5. *Holman, J.P., "Heat Transfer", Tata McGraw Hill Book Company, 1988.*

List of Practical's:

1. Conduction through a rod to determine thermal conductivity of material.
2. Forced and free convection over circular cylinder.
3. Free convection from extended surfaces.
4. Parallel flow and counter flow heat exchanger effectiveness and heat transfer rate.
5. Experimental determination of Stefan-Boltzmann constant.

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Shri Vaishnav Institute of Technology and Science
Choice Based Credit System (CBCS) in light of NEP-2020
Diploma in Mechanical Engineering
SEMESTER V (2023-2026)

COURSE CODE	CATE-GORY	COURSE NAME	TEACHING &EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
DTME505	DC	AUTOMOBILE ENGINEERING	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):

To convey students with the knowledge of chassis layout, suspension system, braking system, wheel and tyres, frame and body, transmission, steering system, ignition-system, and automobile safety

Course Outcomes (COs):

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

1. Students would be able to understand the need of automobile in society.
2. Students would be able to analyses basics of automobile and able to understand various applications.
3. Students would be able to understand I C engines, their working and operating conditions.
4. Students will be able to understand the basics of gearbox, drives, steering system, and suspension system.
5. Students would be able to understand automobile safety and their need.
6. Students would be able to understand clutches, brakes, and ignition system.

Syllabus

UNIT - I

Introduction: Need, Scope & importance of Automobile Engineering; elements of automobile; Types of Internal combustion engines; comparison of petrol and diesel engines.

UNIT- II

Gear Boxes: Types of gearboxes, Sliding mesh and constant mesh; synchromesh and Epicyclic gear boxes; Automatic transmission system.

Drives/Transmission: Types of drives, overview of belt, chain and rope drives, Propeller shaft; Differential; Rear axle drives.

UNIT-III

Wheels and Tyres: Tyre types, Tyre wear and their causes and application.

Steering system: Steering; steering linkages; steering mechanism; Steering Geometry-Effect of camber, caster, king pin inclination, toe in and toe out.

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Shri Vaishnav Institute of Technology and Science
Choice Based Credit System (CBCS) in light of NEP-2020
Diploma in Mechanical Engineering
SEMESTER V (2023-2026)

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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*				
DTME505	DC	AUTOMOBILE ENGINEERING	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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Suspension system: Overview of suspension system used in automobile; objective and requirements.

UNIT-IV
Clutches: Introduction, types of clutches; Single plate, multi-plate, cone clutch.
Brakes: Introduction, Classification and function; Mechanical, hydraulic and pneumatic brakes, Brake shoes and lining materials.

UNIT-V
Ignition System: Introduction; System components and requirements; automotive lighting: Wiring systems, head lamp, electric horn, and fuel level indicator.
Automobile Safety: Safety requirements; Safety Devices- Air bags, belts, radio ranging, NVS (Night Vision System) and GPS (Global Positioning System).

Reference Books:

1. *Kripal Singh, Automobile Engineering, Standard Edition 2003*
2. *R K Rajput, a Text book of Automobile Engineering, Laxmi Publication. (2007)*
3. *JornsenReimpell Helmut Sto; the Automobile Chassis: Engineering Principles, Jurgen Betzler (P) Ltd.*
4. *Basic Automobile Engineering (Hindi) 19/e (PB)By: Nakara C P,Dhanpat Rai &Sons (2015)*
5. *P S Gill, a Textbook of Automobile Engineering, KATSON Books VOL 1&2 Edition 2010*
6. *S K Gupta, a Textbook of Automobile Engineering, S Chand Publication.*
7. *Sudhir Kumar Saxena, Automobile Engineering, Laxmi Publication (P) Ltd. (2010)*

List of Practical's:

1. Study of various tools used in Automobile workshop.
2. Study of conventional layout of vehicle.
3. Study and inspection of suspension system of vehicles.
4. Study of mechanical and hydraulic braking system.
5. Study of Steering system.

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Choice Based Credit System (CBCS) in light of NEP-2020
Diploma in Mechanical Engineering
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6. Study of clutch (single plate & multi plate).
7. Study of sliding mesh, constant mesh, gear boxes.
8. Study of Propeller shafts, Universal joints.
9. Study of frame & body of vehicle.
10. Visit to nearby auto workshop and service station.

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DTME507	PW	MINOR PROJECT	0	0	0	30	20	0	0	4	2

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Syllabus

Purpose:

To conduct a design project in one of the specializations of the program with substantial multidisciplinary component.

Instructional Objectives:

To guide the students in such a way so that they conduct a work on a topic as a forerunner to the full-fledged project work to be taken subsequently in VI semester; the project work shall consist of substantial multidisciplinary component

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DTME508	AEC	INDUSTRIAL TRAINING	0	0	0	30	20	0	0	4	2

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Course Educational Objectives (CEOs):

(A) To develop the ability to solve a specific problem right from its identification and literature review till the successful solution of the same (B)To train the students in preparing project reports and to face reviews and viva voce examination.

Course Outcomes (COs):

After completion of this course the students are expected to be able to

1. Identify real world problems of mechanical engineering and related systems.
2. Interpret the working of mechanical engineering systems.
3. Apply the principles of mechanical engineering in real world systems.
4. Criticize and experiment to arrive at solutions for real world mechanical engineering problems.
5. Analyze and evaluate to obtain solution for problems in mechanical engineering systems.
6. Develop a prototypes/models, experimental set-up, and software systems necessary to meet the objectives.
7. Identify methods and materials to conduct experiments/develop code.
8. Reorganize the procedures with a concern for society, environment, and ethics.
9. Analyze and discuss the results to draw valid conclusions.
10. Prepare a report as per recommended format and defend the work.

Syllabus

1. Internship:

A student is encouraged to take an industrial tour with reputed organizations or firms chosen by the institute. In such cases the student will stay with the firm and conduct the project (if any). The project will be guided by the faculty member and the concerned officer in the industry. However, reviews will be conducted in the institute which the student shall attend.

2.1 Course Description:

An internship experience provides the student with an opportunity to explore career interests while applying knowledge and skills learned in the classroom in a work setting. The experience also helps students gain a clearer sense of what they still need to learn and provides an opportunity to build professional networks.

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2.2 Learning Goals:
The internship will provide students with the opportunity to:

1. Gain practical experience within the business environment.
2. Acquire knowledge of the industry in which the internship is done.
3. Apply knowledge and skills learned in the classroom in a work setting.
4. Develop a greater understanding about career options while more clearly defining personal career goals.
5. Experience the activities and functions of business professionals.
6. Develop and refine oral and written communication skills.
7. Identify areas for future knowledge and skill development.

3. General Rules of Selection/Allotment of Dissertation-I Title and Its Submission:
3.1) The selection of dissertation title should be non-trivial, analytical, practical/hardware implementation based, application oriented (relevant to the need of industries) and should involve the elementary research and/or development effort based on a specific theme.

3.2) Students may be encouraged to undertake industry defined dissertation. For the industry defined dissertation there shall be one external supervisor of the industry and one internal supervisor of student's own department. It will be the sole responsibility of internal supervisor to define the research problem, scope, methodology and outcome from the dissertation in consultation with external supervisor.

3.3) Supervisors for the dissertation can suggest the titles of dissertation considering their long-term goal for research.
3.4) Students can also discuss the titles of their choice or titles given from industries with the supervisors and if feasible and accepted by supervisors, can be included in the list of suggested titles.

3.5) Consolidated list of suggested dissertation titles will be communicated to the students in semester VI

3.6) In case, if two students give choice for same title; title will be allotted based on merit.

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3.7) Final allotment of titles and supervisors will be published on notice board in consultation with Head of the Department.

3.8) Requirement of change in the title of dissertation work should be applied to the Head of the Department with sufficient reasons for the change, before the exam of Dissertation Progress Review-I.

3.9) After Dissertation Progress Review-I exam, change of the title will be permitted based on the comments of internal examiner. Such cases should apply for the change in titles and should get approval from the Head of the Department.

4. Dissertation-I Work in Collaboration with Industry:
4.1) It is preferable that students, with the approval of the Head of the Department, visit industry or a Research Laboratory for data collection, discussion of the dissertation, experimental work, survey, field studies, etc. during the project period. Projects sponsored by the Industries or R&D organizations will be encouraged and a close liaison with such organizations will be maintained.

4.2) Students shall acknowledge the involvement and / or contribution of an Industries or R&D organizations for their dissertations.

4.3) Satisfactory completion certificate issued by the Industry or R&D organization should be attached with the dissertation report.

4.4) Internal supervisor, should monitor the progress of his/her students by remaining in contact with the students and external supervisors by emails, video conferencing and/or by making visits to the industries at least once in a month, depending on the need of project and as decided by concerned Head of the Department.

5. Supervisors:
5.1) Students shall be assigned one or two supervisors(s) from the Institute.

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5.2) In case any supervisor leaves the Institute permanently or temporarily for a period exceeding one semester, the Head of the Department shall appoint new supervisor for the concern students. Any such arrangements made, should get approval from Head of the Institute.

5.3) A faculty can supervise maximum 6 (Six) Dissertations at a time.

5.4) In case of interdisciplinary areas, at least one supervisor must belong to the discipline in which the student is registered.

6. Dissertation-I Evaluations:

6.1) For continuous evaluation (*CE), a comprehensive internal assessment of the dissertation work should be made by an internal review panel formed by Head of the Department, supervisor and at least two senior faculty with expertise in same field of dissertation work.

6.2) Internal review panel will review the progress of the students in the last week of 1st, 2nd, 3rd and 4th month of semester VI (i.e. four presentation in front of internal review panel) and finally give his/her assessment of the work done by the students for internal continuous evaluation marks with comments of the review.

6.3) Dissertation-I and External Viva-Voce:

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