



Dr. Bhimrao Ambedkar University, Agra

A State University of Uttar Pradesh (Paliwal Park, Agra -282004)

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A Documentary Support
for
Matric No. – 1.1.2
employability/ entrepreneurship/ skill development

under the
Criteria - I
(Curriculum Design and Development)

Key Indicator - 1.1

in
Matric No. – 1.1.2

B.E. MECHANICAL ENGINEERING

1998

Mapping of course to:




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Measurement and Metrology Lab (BME-451)

Course Outcomes (COs):

After completing this course, a student will be able to:

1. Understand the concept of vernier caliper and use it for measurement of gear tooth and learn to measure taper of a shaft.
2. Understand the concept of limit gauge and slip gauge and learn the use of micrometer.
3. Perform the test of roundness, concentricity and understand the concept and use of dial gauge.
4. Understand the concept of autocollimator and to perform test of thermocouple and stroboscope.

Engineering Fluid Mechanics (BME-402)

L T P C
3 1 2 5

Prerequisite: Basic knowledge of engineering physics.

Course Outcomes (COs):

After completing this course, a student will be able to:

1. Understand property of fluid, measurement of pressure and broad principles of fluid statics.
2. Inculcate knowledge on description of fluid motion, stream and velocity potential, their properties and applications.
3. Understand the dynamics of fluid flow -energy equation and its applications and gain knowledge about dimensional and model analysis
4. Analyse the Flow through Pipes, Laminar and turbulent flows, major and minor losses in pipes.
5. Understand and solve the boundary layer problems and evaluate friction over surface.

Engineering Fluid Mechanics Lab (BME-452)

Course Outcomes (COs):

After completing this course, a student will be able to:

1. Verify the Bernoulli's Theorem.
2. Determine the friction factor for the pipes.
3. Determine the coefficient of discharge of Venturimeter and Orifice meter.
4. Determine the minor losses due to sudden enlargement, sudden contraction and bends.
5. Determine the coefficient of discharge of Notch (V and Rectangular types).


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Manufacturing Science I (BME-403)

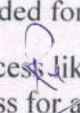
L T P C
3 0 2 4

Prerequisite: Course on Workshop Technology

Course Outcomes (COs):

After completing this course, a student will be able to:

1. Define the term manufacturing and its importance towards technological and social economic development.
2. Classify the basic principles of casting processes and discuss its type's defects and remedies.
3. Design of gating/riser system needed for casting
4. Describe the various forming processes like (rolling, forging, extrusion, drawing, sheet metal operation) and Implement a suitable forming process for a given component.
5. Compare the various types of joining processes and select the appropriate one according to the application.


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Manufacturing Science I Lab (BME-453)

Course Outcomes (COs):

After completing this course, a student will be able to:

1. Design the gating and riser system needed for casting and requirements to achieve defect free casting.
2. Understand the basic geometry of pattern making and their application.
3. To gain the knowledge of Forging technique and application in industrial domain.
4. Design the jigs and fixtures required for various mechanical works.
5. Understand the working of press working operation like blanking and piercing.

Theory of Machines I (BME-404)

L T P C
3 1 0 4

Prerequisite: A course on Engineering Thermodynamics and Engineering Drawing.

Course Outcomes (COs):

After completing this course a student will be able to:

1. Define various components of mechanisms, Develop mechanisms to provide specific motion.
2. Draw velocity and acceleration diagrams of various mechanisms.
3. Basic ideas of kinematic synthesis
4. Understand the importance of Cams, Gain the basic ideas of kinematics of Cams,
5. Understand the basic ideas of gears and also Analyze speed and number of teeth in various gears, Select appropriate power transmission for specific application.

Applied Thermodynamics (BME-405)

L T P C
3 1 2 5

Prerequisite: A course on Engineering Thermodynamics and Engineering Drawing.

Course Outcomes (COs):

After completing this course a student will be able to:

1. Analyze the cycle of internal combustion engine in order to perform heat, work and efficiency calculation.
2. Understand the vapour cycle in order to carry out the calculation on system performance.
3. Understand boilers and their performance, understand condenser and their performance.
4. Construct steam engine velocity diagram in order to determine the stage calculation mathematically and graphically.
5. Analyze the various gas turbine plant system arrangement in order to perform heat, work, efficiency calculation.

Applied Thermodynamics Lab (BME-455)

Course Outcomes (COs):

After completing this course a student will be able to:

1. Understand the working principles & knowledge of parts of boilers.
2. Understand the working principles & parts of two stroke I C Engines.
3. Understand the working principles & parts of four stroke I C Engines.

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- Demonstrate the performance of internal combustion engine.
- Understand the working Principles & parts of steam & gas turbine.

Human Value and Professional Ethics (MC402/MC-302)

LTPC
2000

Prerequisite:

Course Outcomes (COs):

After completing this course a student will be able to:

- Understand the significance of value inputs in a classroom, distinguish between values and skills, understand the need, basic guidelines, content and process of value education, explore the meaning of happiness and prosperity and do a correct appraisal of the current scenario in the society
- Distinguish between the Self and the Body, understand the meaning of Harmony in the Self the Co-existence of Self and Body.
- Understand the value of harmonious relationship based on trust, respect and other naturally acceptable feelings in human-human relationships and explore their role in ensuring a harmonious society
- Distinguish between ethical and unethical practices, and start working over the strategy to actualize a harmonious environment wherever they work.

Internal Combustion Engines (BME-501)

LTPC
3125

Prerequisite:

Course Outcomes (COs):

- Understand various types of I.C. engines and cycles of operation.
- Understand the normal and abnormal combustion phenomenon in SI and CI engines.
- Identify fuel metering and fuel supply systems for different types of engines
- Interpret different alternative fuels and its emissions, then the method to control these emissions and their effect on environment.
- Understand supercharging and its effect on performance of SI and CI engine.

Internal Combustion Engines Lab (BME-551)

Course outcome (COs):

- Identify the various types of I.C. Engines and cycles of operation.
- Express the effect of various operating variables on engine performance.
- Demonstration of fuel metering and fuel supply systems for different types of engines.

Theory of Machines II (BME-502)

Prerequisite: A course on Engineering Mechanics and Thermodynamics.

Course Outcomes (COs):

After completing this course a student will be able to:

- Understand of force analysis of linkages and Demonstrate functioning of single slider crank mechanism and its inversions based systems.
- To analyze the different types of governors and flywheels.

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LTPC
3125

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3. Understand the concept of gyroscopic couple for ships, aero planes and road vehicles.
4. To balancing of the reciprocation and rotatory systems.
5. Demonstrate functioning clutches and brakes.

Theory of Machines II Lab (BME-552)

Course Outcomes (COs):

After completing this course a student will be able to:

1. Understand the profiles of cams and its effect on follower intermittent motion.
2. Understand the concept of gyroscopic couple for ships, aero planes and road vehicles.
3. To analyze the different types of governors.
4. Examine the balancing of rotating masses in dynamic balancing.
5. Demonstrate functioning of gears.

Departmental Elective I Manufacturing Science II (DE-ME-501)

LTPC
3104

Prerequisite: Course on Workshop Technology.

Course Outcomes (COs):

1. Detailed knowledge of cutting tool & their geometry, nomenclature, tool materials, their properties.
2. Identify the different machines on the basis of their operations- Lathe, shaper, slotter, planer, milling, drilling and boring.
3. Understand the use of Grinding machines.
4. Understanding the concept of limits, fits, tolerances and surface finish and their utility in the industrial context
5. Identify different non-conventional machining processes and the applications of non-conventional welding.

Rapid Prototyping and Rapid Tools (DE-ME-502)

LTPC
3104


Prerequisite: Course on Computer aided Design and Manufacturing and Basic course on manufacturing, numerical control and robotics

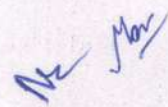
Course Outcomes (COs):

After completing this course a student will be able to:

1. Understand basics of rapid prototyping and modeling and steps of preparing prototypes.
2. Understand liquid, solid and powder based prototyping systems.
3. Understand practical applications of rapid prototyping and tooling in modern industries.
4. Become familiar with recent advances in rapid prototyping and tooling.
5. Apply the Process of Rapid Prototyping in Advanced techniques.


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Rapid Prototyping and Rapid Tools (DE-ME-502)

LTPC
3104

Prerequisite: Course on Computer aided Design and Manufacturing and Basic course on manufacturing, numerical control and robotics

Course Outcomes (COs):

After completing this course a student will be able to:

1. Understand basics of rapid prototyping and modeling and steps of preparing prototypes.
2. Understand liquid, solid and powder based prototyping systems.
3. Understand practical applications of rapid prototyping and tooling in modern industries.
4. Become familiar with recent advances in rapid prototyping and tooling.
5. Apply the Process of Rapid Prototyping in Advanced techniques.

Open Elective I

Industrial Engineering and Automation (OE-ME-501)

LTPC
3003

Prerequisite: Basic Knowledge of Workshop Practice.

Course Outcomes (COs):

After completing this course a student will be able to:

1. Analyze and explain productivity concepts and measurements.
2. Explain various Industrial Layout and time study.
3. Exhibit skills towards program evaluation and review technique.
4. Analyze and perform Break even analysis.
5. Understand of High Volume Production Systems, Transfer Devices and Feeder.

Total Quality Management (OE-ME-502)

LTPC
3003

Prerequisite: Basic Knowledge of Industrial Engineering

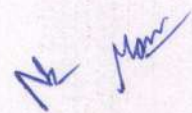
Course Outcomes (COs):

After completing this course a student will be able to:

1. Describe the dimensional barrier regarding Quality.
2. Summarize the Total quality principles.
3. Demonstrate the tools utilization for quality improvement. Analyze the various types of techniques are used to measure quality
4. Discover the new decision of principle in real time projects.
5. Apply the various quality systems in implementation of Total quality management.


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Production Planning and Control (OE-ME-503)

LTPC
3003

Prerequisite:

Course Outcomes (COs):

After completion of this course student will be able to:

1. Understand the role Production Planning and control activities in Manufacturing and Services.
2. Understand and perform various Forecasting techniques and problems.
3. Understand and perform various Inventory Management techniques and apply in real manufacturing scenario/How to use MRP/ERP.
4. Demonstrate various Scheduling procedures/Balancing concepts.
5. Understand and Evaluate Dispatching procedures.

Value Engineering (OE-ME-504)

LTPC
3003

Prerequisite:

Course Outcomes (COs):

After completing this course a student will be able to:

1. Understand concepts of value engineering and value analysis.
2. Understand the evaluation techniques of function and problem setting and solving systems.
3. Describe various phases involved in value engineering job plan and techniques of value engineering.
4. Understand the applications of value Analysis of management practice in different organizations.
5. Demonstrate their ability to apply value analysis in various fields.

Occupational Health and Safety (BMC-501)

LTPC
3000

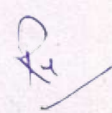
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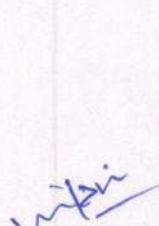
Course Outcomes (COs):

After learning the course the students should be able to:

1. Identify the diseases associated with occupation.
2. Manage safety in industries by suggesting safety measures.
3. Identify the accidental causes & apply the preventions.
4. Identify Fire Explosion & apply PPE.
5. Identify & apply Hazards & Risk identification, Assessment and control techniques.


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Industrial Management (BHSM-501)

LTPC
3003

Prerequisite:

Course Outcomes (COs):

1. Understand the basic concepts of management and explain the various principles of management
2. Understand the various functions of personal management and solves workers related problem
3. Recall the concept of marketing and examine various marketing strategies.
4. Explain the importance of financial management, relate it with break-even analysis and budget.
5. Understand the various principles of plant management & classify different type of material handling equipment's.

Design of Machine Elements (BME-601)

LTPC
3104

Prerequisite: Basic knowledge of Engineering Drawing and Machine Drawing.

Course Outcomes (COs):

After completing this course a student will be able to:

1. Understanding of Design requirements, Design procedure, Design for Static Load by using Theory of failure.
2. Be able to apply knowledge of the stress and strain for analyze and Design for Fluctuating Loads. Develop Logical and Analytical ability to apply Knowledge to Design of Riveted Joints.
3. Apply the knowledge of stress & strain in combined loading condition to design Shaft, Keys and Couplings.
4. Understand the standard geometry, application, failures of Spur and Helical Gear and Design and Developed effectively Spur and Helical Gears for different loading conditions.
5. Understand the standard geometry, applications, failures of Sliding contact bearings and Design and Developed effectively sliding contact bearings for different loading conditions as per manufacturer catalog.

Heat and Mass Transfer (BME-602)

LTPC
3125

Prerequisite: Basic Knowledge of Thermodynamics and Fluid Mechanics.

Course Outcomes (COs):

After completing this course a student will be able to:

1. Explain the laws of heat transfer, modes of heat transfer and fundamentals Conduction.
2. Mathematically model and analyze the consequence of heat and transfer in thermal analyses of engineering systems and fins concepts.
3. Apply empirical correlations for forced, free convection and phase change process.
4. Formulate, evaluate and develop solution for radiation heat transfer problems in different situations.
5. Understand the consequence of heat transfer in thermal analyses of engineering systems like heat exchanger. Analyze different phenomenon occurring in engineering systems involving mass transfer in steady state.


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Heat and Mass Transfer Lab (BME-652)

Course Outcomes (COs):

After completing this course a student will be able to:

1. Understand laws of heat transfer, modes of heat transfer and fundamentals of heat exchangers.
2. Mathematically model and analyze the consequence of heat and transfer in thermal analyses of engineering systems.
3. Formulate, evaluate and develop solution for conduction, convection and radiation heat transfer problems in different situations.
3. Apply empirical correlations for forced, free convection and phase change process.
4. Understand, apply principles and analyze mass transfer phenomenon in different processes /systems.

Automobile Engineering (BME-603)

LTPC
3024

Prerequisite: Basic Knowledge of I C Engines

Course Outcomes (COs):

After completing this course a student will be able to:

1. Understand the basic requirements from automobile and technology used in them.
2. Demonstrate understanding of different functional systems of automobile such as brakes, suspension system, steering mechanism, gear box and transmission system.
3. Analyze different functional systems of automobiles and the advancements in them.
4. Carry out calculations pertaining to vehicle dynamics.
5. Understand and analyze impact of automobile on environment, different measures and regulations for its control.

Automobile Engineering Lab (BME-653)

Course Outcomes (COs):

After completing this course a student will be able to:

1. Explain the various types of chassis, frame and functions of I C Engine parts.
2. Distinguish between the manual transmissions with automatic transmission systems.
3. Demonstrate how the steering, brakes and the suspension system operate.
4. Justify the importance of alternative fuels.

Unconventional Manufacturing (DE-ME-601)

LTPC
3003

Prerequisite: Basic Knowledge of Manufacturing Science

Course Outcomes (COs):

After completion of the course a student will be able to:

1. Understand the process capability of unconventional manufacturing process.
2. Understand various non-conventional manufacturing processes.
3. Develop competency to selecting various un-conventional manufacturing processes.
4. Explain the working principles of thermal energy based processes.
5. Understand the Diffusion and Photo- Lithography process for electronic-device.


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Experimental Stress Analysis (DE-ME-602)

LTPC
3003

Prerequisite: Basic Knowledge of Engineering Mechanics and Mechanics of Solids.

Course Outcomes (COs):

After completing this course a student will be able to:

1. Analyse the 3-D state of stress in components with application of plane stress and plane strain conditions.
2. Analyse 3D state of strain in the components.
3. Understand various practical methods of analyzing strain in the components.
4. Understand the parameters, and practical applications of strain gauges.
5. Understanding various aspects of photo elasticity and its application for stress analysis.

Reliability and Maintenance Engineering (DE-ME-603)

LTPC
3003

Prerequisite: Basic Knowledge of Power Plant Engineering.

Course Outcomes (COs):

After completion of this course student will be able to:

1. Explain maintenance objectives and functions, need for maintenance plan and organization, and cost of maintenance, equipment and production delays.
2. Understand equipment wear records and standards and various kinds of NDT methods for predictive maintenance.
3. Explain maintenance of mechanical drives such as belt drive, chain drive and gears
4. Understand the maintenance of pumps, compressors and control valves.
5. Explain the principles and techniques applicable in life testing and reliability improvements.

Additive Manufacturing (DE-ME-604)

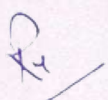
LTPC
3003

Prerequisite: Basic Knowledge of Computer Aided Design.

Course Outcomes (COs):

After completion of this course student will be able to:

1. Describe various CAD issues for 3D printing and rapid prototyping and related operations for STL model manipulation.
2. Formulate and solve typical problems on reverse engineering for surface reconstruction from physical prototype models through digitizing and spline based surface fitting.
3. Formulate and solve typical problems on reverse engineering for surface reconstruction from digitized mesh models through topological modelling and subdivision surface fitting.
4. Explain and summarize the principles and key characteristics of additive manufacturing technologies and commonly used 3D printing and additive manufacturing systems.
5. Explain and summarize typical rapid tooling processes for quick batch production of plastic and metal parts


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Open Elective Course II

Composite Materials (OE-ME-601)

LTPC
3003

Prerequisite: Basic Knowledge of Materials Science.

Course Outcomes (COs):

1. Knowledge of the different types of engineering materials.
2. Knowledge of the types of reinforcements and fibers.
3. Understand the various types of composites used in engineering and their properties.
4. Describe the processing of composite materials and manufacturing techniques.
5. Understand and analyze the various methods of testing the composites.

Entrepreneurship (OE-ME-602)

LTPC
3003

Prerequisite: Basic Knowledge of industrial management.

Course Outcomes (COs):

1. Understand entrepreneurship and its related theory and government policies
2. Understand various Business Enterprises and Ownership Structure
3. Prepare project report and able to understand project evaluation method.
4. Understand various strategies and policies in management and enterprises.
5. Understand Institutional support towards the development of entrepreneurship.

Mechanical System Design (OE-ME-603)

LTPC
3003

Prerequisite: Basic Knowledge of Industrial Engineering.

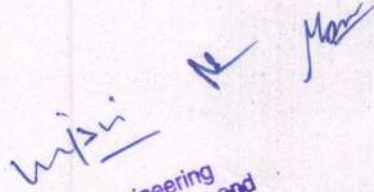
Course Outcomes (COs):

After completing this course a student will be able to:

1. Understand the attributes characterizing a system and case study.
2. Explain the system modelling and case study compound bar system.
3. Differentiate and understand the graph modelling, graph analysis and materials handling systems.
4. Understand the method for optimization model with single system.
5. Justify the inventory control in production plant.


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Product Design and Development (OE-ME-604)

LTPC
3003

Prerequisite:

Course Outcomes (COs):

After completing this course a student will be able to:

1. Understand how to create new product based on mechanical design engineering.
2. Understand all mechanical aspects of product design by incorporating concept, creativity, structural, manufacturing, esthetic etc.
3. Solve open-ended problem belongs to design engineering that meet the requirements.
4. Understand various product designing methods.
5. Understand human factors and cost evaluation in industrial design concepts.

Economics for Industry (BHSM-601)

LTPC
3003

Prerequisite: Basic knowledge of economics.

Course outcomes (COs):

At the end of the course, the students will be able to:

1. Define the main concepts and describe the models and methods in economic analysis.
2. Explain economic events in individual markets and the aggregate economy using basic theory and tools.
3. Apply supply and demand analysis to relevant economic issues.
4. Explain how individual decisions and actions as a member of society affect the economy locally, nationally and internationally.
5. Distinguish between perfect competition and imperfect competition and explain the welfare loss in non-competitive markets.

Mechanical Vibration (BME-701)

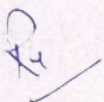
LTPC
3024

Prerequisite: Basic Knowledge of Engineering Mathematics.


Course Outcomes (COs):

After completing this course a student will be able to:

1. Understand the basic concepts of vibrations.
2. Develop analyze the one degree to multi-degree of freedom vibration problems.
3. Understand the vibration control mechanisms and systems.
4. Practice the numerical techniques used for solving the vibrational models of mechanical systems.
5. Analysis of different method such as Rayleigh's, Dunkerley's, and Critical Speed of shaft with one disc with and without damping.


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Mechanical Vibration Lab (BME-751)

Course Outcomes (COs):

After completing this course a student will be able to:

1. Understand the basic concept of pendulum.
2. Explain analyze the one degree vibration problems.
3. Understand the forced vibration of spring mass system.
4. Solving the vibrational models of mechanical systems.
5. Analysis of Torsional Vibration.

Advanced Welding Technology (BME-702)

LTPC
2002

Prerequisite: Basic Knowledge of Workshop Technology and Manufacturing Science.

Course Outcomes (COs):

After completing this course a student will be able to:

1. Understand the theoretical and practical aspects of welding and it's phenomena.
2. Understand the various welding process.
3. Describe the basic metallurgy of the melted and heat affected zone of a metal or alloy and heat transfer involved in different welding process.
4. Understand the various process involved in repair and maintenance of welding and the weldability of different metal.
5. Demonstrate their ability to check the weldment quality using various inspection and testing methods.

Departmental Elective-III

Refrigeration and Air Conditioning (DE-ME-701)

LTPC
3024

Prerequisite: Basic Knowledge of Engineering Thermodynamics.

Course Outcomes (COs):

After completing this course a student will be able to:

1. Illustrate the fundamental principles and applications of refrigeration and air conditioning system.
2. Analyse performance of vapor compression refrigeration system.
3. Study the working principles of vapor absorption system and different refrigerants used.
4. Analyse the air conditioning processes using principles of Psychrometry.
5. Study the different refrigeration equipment's and its application in cold storage ,ice plant.

Refrigeration and Air Conditioning Lab (DE-ME-751)

Course Outcomes (COs):

After completing this course a student will be able to:

1. Understand the concept of refrigeration test rig and its applications.
2. Understand the concept of different types of expansion devices and its application.
3. Remembering concept of evaporators in refrigeration systems.
4. Learn and use of condensers.

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5. Analyze the basic components of air conditioning system.
6. To study basic components of air-conditioning system.
7. Evaluate the various performance parameters use in refrigeration test rig.
8. Understand the concept of air washer and window air conditioner

Design and Analysis of Heat Exchangers (DE-ME-702)

L T P C
3 0 2 4

Prerequisite: Basic Knowledge of Heat and Mass Transfer.

Course Outcomes (COs):

After completing this course a student will be able to:

1. Understand LMTD method and NTU method of analysis of common types of heat exchangers.
2. Understand the method to design of heat exchangers subject to fouling.
3. Understand the design procedure of double pipe heat exchangers and Shell & tube heat exchangers.
4. Understand the designing aspects of compact heat exchangers and thermal design of shell & tube condensers.
5. Describe the thermal analysis of evaporator and understand performance evaluation of Heat transfer Enhancement technique.

Design and Analysis of Heat Exchangers Lab (DE-ME-752)

Course Outcomes (COs):

After completing this course a student will be able to:

1. Understand the concept of LMTD method and Applications.
2. Understand the concept effectiveness-NTU method and Applications.
3. Understand the concept and analysis of double pipe heat exchanger with parallel and counter flow arrangement.
4. Understand the design and analysis of shell and tube type heat exchangers.
5. Understand the concept of plate type heat exchanger.

Open Elective Course III

Non-Conventional Energy Resources (OE-ME-701)

L T P C
3 0 0 3

Prerequisite: Basic Knowledge of Power Plant Engineering.

Couse Outcomes (COs):

1. Illustrate the generation of electricity from various Non-Conventional sources of energy, have a working knowledge on types of fuel cells.
2. Study the solar energy, Utilization of it, Principles involved in solar energy collection and conversion of it to electricity generation.
3. Study the working principle of geothermal energy, Magneto-hydrodynamics (MHD) and fuel cell technology for energy generation.
4. Explore the concepts involved in wind energy conversion system by studying its components, types and performance.
5. Study the working principle of bio mass, wave and tidal wave and OTEC.

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Institute of Engineering and
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Nanotechnology (OE-ME-702)

LTPC
3003

Prerequisite: Basic Knowledge of Materials Science.

Course Outcomes (COs):

After completion of this course student will be able to:

1. Explain the fundamental principles of nanotechnology and their application to engineering.
2. Apply engineering and physics concepts to the Nano-scale and non-continuum domain.
3. Study the properties of individual Nano particles, metal Nano clusters and semi conducting nanomaterial.
4. Discuss and evaluate state-of-the-art characterization methods for nanomaterial, and determine nanomaterial safety and handling methods required during characterization.
5. Explain methods of fabricating nanostructures of carbon Buckey Ball, Carbon nano-tubes

Non-Destructive Evaluation (OE-ME-703)

LTPC
3003

Prerequisite: Basic Knowledge of Material Science and Engineering.

Course Outcomes (COs):

After completion of this course student will be able to:

1. Obtain the fundamental knowledge about different NDT methods and visual inspection.
2. Explain the principles and testing knowledge of DPT(liquid penetrate inspection) and MPT for product testing.
3. Explain the principles and techniques in Radiography Testing.
4. Describe the knowledge about Ultrasonic Testing for products.
5. Understand the materials and testing procedure for Eddy Current Inspection & Thermography Testing.

Introduction to Mechanical Micro Machining (OE-ME-704)

LTPC
3003

Prerequisite: Basic Knowledge of Conventional machining processes..

Course Outcomes (COs):

1. Understand of process of Ultra Sonic Micro Machining, Abrasive Jet Micro Machining, Water Jet Micro Machining etc.
2. Explain the Beam Energy based micro machining, Electron Beam Micro Machining, Laser Beam Micro Machining, Electric Discharge Micro Machining etc.
3. To understand the Magneto Rheological abrasive flow finishing, Magnetic Float polishing, Elastic Emission Machining etc.
4. Understand of Micro bending with LASER, LASER micro welding, Electron beam for micro welding.
5. Understand the Metrology for micro machined components and Machining of Micro gear, micro nozzle, micro pins, Applications.


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Dr. Bhimrao Ambedkar University,
Khandari Campus Agra

Computer Aided Design and Manufacturing (BME-801)

LTPC
3024

Prerequisite: Basic Knowledge of Computer.

Course Outcomes (COs):

1. Acquire the knowledge of geometric modelling and Execute the steps required in CAD software for developing 2D and 3D models and perform transformations.
2. Develop mathematical models to represent curves and surfaces.
3. Develop programs for NC and CNC to manufacture industrial components.
4. Illustrate group technology, CAPP and CIM concepts.
5. Understand the concept of FMS and Robotics.

Computer Aided Design and Manufacturing (BME-851)

Course Outcomes (COs):

1. Modeling of simple machine parts and assemblies from the part drawings using standard CAD packages.
2. Generate CNC Turning and Milling codes for different operations using standard CAM packages. Write manual part programming using ISO codes for turning and milling operations.

Thermal Turbo Machines (BME-802)

LTPC
3003

Prerequisite: Course on Applied Thermodynamics.

Course Outcomes (COs):

After completion of this course student will be able to:

1. Understand the principles of operation of thermal turbo machines.
2. Design different work absorbing turbo machines like compressors and pumps.
3. Design different work producing turbo machines like gas and steam turbines.
4. Understand the functional parameters and components in different turbo machines.

Departmental Elective IV

Reverse Engineering (DE-ME-801)

LTPC
3003

Prerequisite: Basic knowledge of Additive manufacturing.

Course Outcomes (COs):

1. Acquire basic knowledge about the main opportunities provided by Reverse Engineering and Rapid Prototyping tools.
2. Represents an opportunity to learn how to conduct detailed product design by benefitting from cutting-edge technologies.

Computational Fluid Dynamics (DE-ME-802)

Prerequisite: Basic knowledge Engineering Fluid Mechanics.

Course Outcomes (COs):

After completion of this course student will be able to:

1. Apply the physical principles to derive the governing equations which govern fluid flow and heat transfer.
2. Solve the diffusion problems using finite difference methods.


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3003
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- Solve the diffusion problems using finite volume methods.
- Understand the various concepts of Finite Volume Method for Convection Diffusion.
- Apply various algorithms to analyze the flow field and understand the turbulence models for the given problem.

Open Elective IV Power Plant Engineering (OE-ME-801)

LTPC
3104

Prerequisite: Basic Knowledge of Thermodynamics and I C Engines.

Course outcomes (COs):

- Understand the basics of power plants.
- Analyze the working and layout of the of steam power plant.
- Define the working principles of Diesel power plant, its layout, safety principles and compare it with other types of plants.
- Discuss the working principle and basic components of the nuclear power plants and Hydro-electric power plants and safety precautions involved with it.
- Discuss and analyze the mathematical and working principle of different electrical equipment involved in the generation of the power.

Optimization Method in Engineering (OE-ME-802)

LTPC
3104

Prerequisite: Course on calculus, matrix

Course Outcomes (COs):

After completion of the course a student will be able:

- Learn one dimensional optimization methods.
- Learn constrained optimization of multi-variable function.
- Apply integer programming methods.
- Dynamic programming and operation research problems
- Learn soft computing based optimization.

Fracture Mechanics (OE-ME-802)

LTPC
3104

Prerequisite: Basic Knowledge of Mechanics of Solids and Theory of Elasticity.

Course Outcomes (COs):

- Basic Understanding of Crack in a Structure, Fracture Toughness, Types of Fracture.
- Analyze elastic and elastic-plastic stress fields at the crack-tip in a solid material..
- Estimate crack growth based on energy balance.
- Demonstrate standard fracture mechanics tests for finding J-Integral and Crack Opening Displacement.
- Inspect a solid material for the presence of crack.


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Mechanics Engineering
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Chimrao Ambedkar University
Chimrao Campus Agra

Machine Tool Design (OE-ME-804)

LTPC
3104

Prerequisite: Basic Knowledge of Workshop Technology.

Course Outcomes (COs):

After successful completion of this course students will be able to

1. Understand classification of machine tools with their nomenclature, specification and uses.
2. Explain working of various drives mounted in machine tools.
3. Analyze the speed and feed box with the regulation of speed and feed rates.
4. Design components like structural bed, column, power screws etc.
5. Apply knowledge to study dynamics of machine tool and its control.

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Employability

Entrepreneurship

Skill Development