Dr. Ambedkar Institute of Technology

Department of Industrial Engineering and Management

The Enclosed Document is Verified and Approved.

HOD

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Dr. Ambedkar Institute of Technology
Department of Industrial Engineering & Management

Course Outcomes

II Year:

18MA31	**TRANSFORMS & BOUNDARY VALUE PROBLEMS**
CO1	Analyse the basic concepts of integral transforms, statistical techniques and boundary value problems.
CO2	Apply appropriate statistical technique to solve problems connected to mechanical and industrial engineering.
CO3	Apply the least squares method of curve fitting to a set of experimental data points connected to solid and fluid mechanical problems.
CO4	Use Bessel's and Legendre's functions in partial differential equations and obtain series solution of ordinary differential equations.
CO5	Solve boundary value problems involving heat conduction and diffusion using Laplace equations.

18IM31	**MECHANICAL MESUREMENTS AND METROLOGY**
CO1	Define and classify Measurements and measurement systems
CO2	Distinguish and sketch different measurement of force, torque, pressure and temperature, strain measuring instruments.
CO3	Define standards of measurement and solve problems on building of slip gauges.
CO4	Illustrate and define Indian Standards, principles of limits of size and tolerances and solve problems on limits and fits.
CO5	Classify comparators and determine gear parameters and solve problems on building of angles.

18IM32	**MATERIAL SCIENCE AND METALLURGY**
CO1	Distinguish between different materials and their properties
CO2	Test materials for impact, fatigue, torsion, creep, hardness and fracture
CO3	Construct phase diagrams
CO4	Explain different types of heat treatment processes
CO5	Discuss advanced material processing technology, characterization techniques.

18IM33	THERMAL AND FLUIDS ENGINEERING
CO1	Estimate the various fluid properties, thermodynamic properties, work transfer and heat transfer.
CO2	Analyze the different forms of energy and restrictions imposed by the first law of thermodynamics on conversion from one form to another.
CO3	Analyze the performance of refrigeration and heat pump systems.
CO4	Assess the working of internal combustion engines and their performance analysis.
CO5	Determine the velocity and flow rate measurement techniques for flow through pipes.

18IM34	MANUFACTURING TECHNOLOGY
CO1	Describe the primary and secondary manufacturing processes and industrial applications in different sectors.
CO2	Explain the concepts of sand moulding methods and metal melting process and also testing of casting and to produce defect free products.
CO3	Classify different metal joining methods through welding technologies.
CO4	Illustrate the characteristics of cutting tool materials.
CO5	Learns the principles and concepts of conventional and semiautomatic machines

18IM35	MECHANICS OF MATERIALS
CO1	Analyze two dimensional basic stress, strain, and effect of temperature on the axially loaded members
CO2	Interpret the effect of pressure on thin and thick cylinders
CO3	Evaluate the basic design of mechanical part under shear and bending and torsional load of different cross section of beams and column.

18IM36	PYTHON Programming
CO1	Develop and execute algorithmic solutions to simple computational problems with python programs.
CO2	Decompose a Python program into functions.
CO3	To be able to understand the various data structures available in Python programming language and apply them in solving computational problems.
CO4	To be able to do testing and debugging of code written in Python.
CO5	Ability to Text Processing scripts.

18IML38	MANUFACTURING TECHNOLOGY LAB
CO1	The students will be able to utilize foundry and forging tools for various applications
CO2	Will be able to develop different foundry & forging models
CO3	Will be able to determine different properties of sand

18HS31	CONSTITUTION OF INDIA & PROFESSIONAL ETHICS
CO1	Students come to know that who are all take part in the framing of Indian Constitution and how it was framed, what it contained. The Rights they can enjoy as a citizen of India. Case law gives detailed knowledge to the students about their fundamental rights. Procedure of enforcement of fundamental rights.
CO2	Student gets the knowledge about procedure of conducting of election by the election commission, its duties and powers along with powers and functions of judiciary.
CO3	Student comes to know regarding system of parliamentary form of government .and how the representative of Central and State Government are elected their powers and functions
CO4	Student comes to know the correct meaning of ethics and their ethical duties and responsibilities and using of honesty in their profession, and the decision making ability.
CO5	Student gets the knowledge of using the intellectual property rights and its protection and its application in their profession.

18HS32	Environmental Studies
CO1	The students will be introduced and refreshed about the ecology and ecosystem in general and understand the effect of human activities on environment.
CO2	The students will be able to analyse the importance of natural resources and its protection.
CO3	The students will understand the value of environment protection by studying past episode.
CO4	The students will acquire the skill to adopt the suitable method for sustainable development through environmental impact assessment and rainwater harvesting.

18HS33	SOFT SKILLS -III semester
CO1	After the completion of this unit students will know about their self-assessments and personality that how to handle various situations in a positive way.
CO2	At the end of this unit student will be able to see how important it is to consider things carefully and from different angles, something one sees, hears, experiences or reads in order to understand it fully. The student will also have understood the importance of soft skills and thinking creatively.
CO3	At the end of this unit students will have learnt some simple ways of planning to achieve his dream and also feel enthusiastic about doing something individually and as well in team.
CO4	After the completion of this unit students writing skills will have improved.

18MAD31	BASIC ENGINEERING MATHEMATICS-I
CO1	Analyse the basic concepts of calculus like differentiation and integration
CO2	Apply the concepts of partial differentiation and differential equations arising in a variety of engineering applications.
CO3	Assess the practical importance of polar curves, Jacobians and radius of curvature
CO4	Apply the concepts in problem solving and relate the solutions to the various engineering streams

18MA41	NUMERICAL METHODS & APPLIED STATISTICS
CO1	Analyze the basic concepts of calculus of variations, numerical and statistical methods.
CO2	Construct finite element models using calculus of variations for problems connected to solid and fluid mechanics.
CO3	Apply numerical methods to identify and solve problems related to fluid mechanics, gas dynamics, heat and mass transfer, thermodynamics, vibrations, automatic control systems, kinematics, design etc.
CO4	Understand the basics of hypothesis testing.
CO5	Implement a variety of statistical techniques to solve problems of engineering connected to industrial production, quality management and design of experiment.

18IM41	WORKSTUDY AND ERGONOMICS
CO1	Describe the concept of productivity and the importance of productivity.
CO2	Analyze the existing methods of working for a particular job and develop an improved method through questioning technique.
CO3	Construct the various charts use recording techniques for improving productivity.
CO4	Provide appropriate allowances for the jobs under analysis.
CO5	Analyze and calculate the level of risk of the job causing stress, fatigue and musculoskeletal disorders among the employees of an organization.

18IM42	THEORY OF MACHINES
CO1	Discuss the common mechanisms used in machines and everyday life.
CO2	Calculate mobility (number of degrees-of-freedom) and enumerate rigid links and types of joints within mechanisms.
CO3	Analyze the complete (translational and rotational) mechanism velocity and acceleration graphically.

CO4	Classify gear mechanism and analyse gear train, and interpret gear standards and specification in design.
CO5	Explain cam mechanism and cam motion profiles, and calculi the velocity and acceleration of cam.

18IM43	**ENGINEERING ECONOMY**
CO1	Perform and evaluate present worth, future worth and Annual worth analyses on one of more economic alternatives.
CO2	Assess the payback period and capitalized Cost on one or more economic alternatives.
CO3	Carry out and estimate the benefit/cost, life cycle.
CO4	Interpret breakeven analyses on one or more economic alternatives

18IM44	**STATISTICS FOR ENGINEERS**
CO1	Apply the statistical data in the form of Tabular and Graphical display.
CO2	Identify discrete type of probability and solve the various engineering problems.
CO3	Solve Continuous type of probability and solve the various engineering problems
CO4	Estimate the hypothesis and give inference to random experiments.
CO5	Evaluate the statistical parameters by estimation.

18IML45	**COMPUTER AIDED MACHINE DRAWING**
CO1	Ability to use standard software tools to create part assemblies
CO2	Ability to create fully constrained solid models that can be quickly modified using standard software tools
CO3	Ability to identify and explain standard features in solid modelling including protrusion, revolution, cut-outs and patterns.
CO4	Ability to use standard software tools to create engineering drawings to describe the geometries and dimensions of parts
CO5	Ability to create computer aided drawings by interpreting and applying drafting standards.

18IML46	**WORKSTUDY AND ERGONOMICS LAB**
CO1	Use basic fundamental concepts of Industrial engineering to practical applications.
CO2	Construct various charts and diagrams for manufacturing activities to minimize the delays and unnecessary activities.
CO3	Draw and develop different plant layouts for feasibility check.
CO4	Perform rating experiments for good observation.
CO5	Test the statistical parameters by regression and correlation.

18IML47	MECHANICAL MESUREMENTS AND METROLOGY LAB
CO1	Will be able to demonstrate standard operational procedures of different measuring instruments
CO2	Able to Calibrate Precision Instruments
CO3	Able to identify the different operating and instrument errors for calibration
CO4	Able to plot and interpret the operation characteristic and learning curves and also can give remedies/ suggestions for improvement that can be error free instrument.

18IML48	MATERIAL TESTING LAB
CO1	Demonstrate the Non-destructive testing methods
CO2	Experiment and compute loads, deflection, strains and hardness and various other parameters using basic material testing equipment's.
CO3	Evaluate the strengths of metallic specimens using UTM

18HS41	CONSTITUTION OF INDIA & PROFESSIONAL ETHICS
CO1	Students come to know that who are all take part in the framing of Indian Constitution and how it was framed, what it contained. The Rights they can enjoy as a citizen of India. Case law gives detailed knowledge to the students about their fundamental rights. Procedure of enforcement of fundamental rights.
CO2	Student gets the knowledge about procedure of conducting of election by the election commission, its duties and powers along with powers and functions of judiciary.
CO3	Student comes to know regarding system of parliamentary form of government .and how the representative of Central and State Government are elected their powers and functions
CO4	Student comes to know the correct meaning of ethics and their ethical duties and responsibilities and using of honesty in their profession, and the decision making ability.
CO5	Student gets the knowledge of using the intellectual property rights and its protection and its application in their profession.

18HS42	Environmental Studies
CO1	The students will be introduced and refreshed about the ecology and ecosystem in general and understand the effect of human activities on environment.
CO2	The students will be able to analyse the importance of natural resources and its protection.
CO3	The students will understand the value of environment protection by studying past episode.

CO4	The students will acquire the skill to adopt the suitable method for sustainable development through environmental impact assessment and rainwater harvesting.

18HS43	**EMPLOYABILITY SKILLS**
CO1	After the completion of this unit students will have learnt to make presentations both in formal and informal situations. And also will have learnt the art of resume writing.
CO2	After the completion of this unit student will have learnt how to do a project report using referencing skills. And also they will have learnt how to write abstract and will have been familiarized with research paper guidelines.
CO3	This unit will have helped student to communicate with various skills required for job interviews.
CO4	After the completion of this unit the students will have learnt the strategies of vocabulary.
CO5	After the completion of this unit student will have learnt to use idioms and phrases in everyday conversation.

MADIP41	**BASIC ENGINEERING MATHEMATICS-II**
CO1	Analyze the basic concepts of partial differential equations and their solutions through standard methods.
CO2	Use the idea of gradient, divergence, curl involved in vector fields arising in fields and wave transmission theory.
CO3	Assess the practical importance of Laplace and inverse Laplace transforms and their utility in network analysis, circuit theory and convection problems.
CO4	Apply logical thinking to problem-solving in context and identify an appropriate solution for various engineering streams.
CO5	Use the skills in understanding Mathematical knowledge.

III Year:

18HS51	MANAGEMENT & ENTREPRENEURSHIP
CO1	The students will gain domain knowledge on management concepts, evolution, management functions.
CO2	The students will be able to gain domain knowledge on Entrepreneurship, entrepreneurial process
CO3	The students will get an in depth knowledge of entrepreneurial process & contribute to the betterment of the society.
CO4	Students will be able to identify business opportunities & design a project report.

18IM51	OPERATIONS RESEARCH
CO1	Can formulate the LPP using constraints and solve by graphical method.
CO2	Able to determine the optimum solution using Simplex method.
CO3	Can find out the optimum transportation and assignment cost.
CO4	Can identify and apply different queuing model to service and arrival pattern problems and solve the game problems by graphical method and dominance property rule.
CO5	Able to determine the Critical path and its duration using PERT/CPM.

18IM52	COMPUTER INTEGRATED MANUFACTURING
CO1	Summarize the role of CAD/CAM in modern design and manufacturing
CO2	Create and analyse the capabilities of Computer Aided Designing Systems for designing mechanical parts and elements in 2D and 3D dimensions.
CO3	Compare and distinguish between the modern concepts of manufacturing using NC, CNC and DNC.
CO4	Compile and illustrate manual part program to carryout drilling, milling, and turning operations on CNC machine tools.
CO5	To demonstrate the concepts of industrial robotics and its applications to industries

18IM53	DESIGN OF MACHINE ELEMENTS
CO1	Illustrate how the static and dynamic strength parameters affect the material and to know the concepts of factor of safety.
CO2	Conduct a failure analysis for the design of mechanical components subjected to cyclic load
CO3	Calculate the stress distribution for axial, shear forces and bending moments and torques in spring and joints using the “strength of materials” approach.
CO4	Explain the gear type and design the spur gear

18IM54	QUALITY ASSURANCE AND RELIABILITY
CO1	Able to identify the Quality products using dimensions of quality and be Aware of Quality Assurance and relate the ISO series
CO2	Can determine six sigma and process capability and construct control charts for variables.
CO3	Can determine control limits and construct control charts for attributes.
CO4	Can evaluate the acceptance criteria using sampling distribution.
CO5	Can Explain and evaluate the failure models and reliability of the system.

18IM551	ADVANCED MACHINING PROCESSES
CO1	Explain the modern manufacturing process and define the concepts of non-conventional machining process.
CO2	Describe the working principle, process parameters and variables in mechanical energy-based machining process.
CO3	Define the concepts of electrical energy-based metal removal process.
CO4	Illustrate the process of chemical and electro chemical machining.
CO5	Explain the machining process of thermal energy-based machine tools.

18IM552	MARKETING MANAGEMENT
CO1	Develop an ability to assess the impact of the environment on marketing function.
CO2	To use the STP model in marketing to analyze the product, its price.
CO3	Identify and analyze the strategic elements of product development processes
CO4	Understand the role of packaging, labelling, pricing and distribution in the brand-building process
CO5	Understand the effectiveness of advertising and sales promotion.

18IM553	RAPID PROTOTYPING
CO1	Understand the Rapid Prototyping system, its applications and growth.
CO2	Analyse the Selective Laser Sintering and Fusion Deposition modelling technique and applications.
CO3	Learn the concepts of Solid Ground Curing, Laminated Object Manufacturing and the Concepts Modelers.
CO4	Explain the different Rapid tooling types.
CO5	Appreciate the rapid prototyping software and Rapid Manufacturing Process Optimization.

18IM554	ENTERPRISE RESOURCE PLANNING AND E-COMMERCE
CO1	Demonstrate the core interactions and dependencies that exist between the key functions of a business.
CO2	Appraise the role of information systems in the support of business functions and, particularly, cross-functional business processes
CO3	Explain the way Enterprise planning Systems have developed, their functional capabilities and the role of the underpinning technologies
CO4	Demonstrate an Determining of the foundations and importance of E-commerce Analyze the impact of E-commerce on business models and strategy

18IM555	DATA WAREHOUSING AND MINING
CO1	Explain different methods of pre-processing data.
CO2	Design and implement a simple data warehouse.
CO3	Develop simple data cubes for online analytical processing.
CO4	Evaluate data mining tools for various engineering applications.

18IM561	OPERATIONS RESEARCH
CO1	Can formulate the LPP using constraints and solve by graphical method.
CO2	Able to determine the optimum solution using Simplex method.
CO3	Can find out the optimum transportation and assignment cost.
CO4	Can identify and apply different queuing model to service and arrival pattern problems and solve the game problems by graphical method and dominance property rule.
CO5	Able to determine the Critical path and its duration using PERT/CPM.

18IML57	QUALITY ENGINEERING LAB
CO1	Able to identify type of probability distribution and solve the various manufacturing problems.
CO2	Able to test the hypothesis and give inference to random experiments.
CO3	Can make use or test the statistical parameters by estimation.
CO4	Able to apply 7 QC tools

18IML58	Computer Integrated Manufacturing Lab
CO1	Explain the concepts and modeling and the usage of models in different engineering applications.
CO2	Explain the benefits of a comprehensive and integrated CAD/CAM system.
CO3	Create accurate and precise geometry of complex engineering systems and use the geometric models in different engineering applications.
CO4	Compare the different types of modeling techniques and explain the central role solid models play in the successful completion of CAD/CAM-based product development.
CO5	Use and assess state-of-the-art CAD/CAM codes efficiently, effectively and intelligently in

18IM61	MATERIALS MANAGEMENT
CO1	Explain the concepts and Importance of Integrated Materials Management
CO2	Elaborate about the concepts of purchasing, types, objectives, procedure including vendor rating.
CO3	Design and layout for a stores, do codification, use selective control techniques to stock the items in stores.
CO4	Explain the basic concepts on inventory, inventory costs, EOQ.
CO5	Use the inventory models in practical applications.

18IM62	FACILITIES PLANNING AND DESIGN
CO1	Solve facility location problems and prepare a facilities layout for the efficient flow of materials through a facility
CO2	Analyze material handling systems through different material handling equipment and material handling principles used in the warehousing, manufacturing
CO3	Plan the layout and evaluate facilities related problems using different layout planning algorithms
CO4	Identify activity, relationships and space requirements for various departments
CO5	Evaluate and select facilities plan

18IM63	LEAN MANUFACTURING
CO1	Appreciate the birth of lean manufacturing and the history before it evolution.
CO2	Discuss and apply the various tools and techniques of lean manufacturing.
CO3	Know the concepts of JIT and JIDOKA.
CO4	Understand the Lean culture and its analysis.

18IM64	SIMULATION MODELLING AND ANALYSIS
CO1	Illustrate basic concepts in modeling and simulation (M&S).

CO2	Classify various simulation models and give practical examples for each category.
CO3	Construct a model for a given set of data and motivate its validity.
CO4	Generate and test random number variates and apply them to develop simulation models.
CO5	Fit statistical distributions to input data, obtain parameter estimation and goodness of fit.

18IM651	**PRODUCT DESIGN AND DEVELOPMENT**
CO1	Understand the design phases
CO2	Formulate need statement and specifications
CO3	Apply decision making statement
CO4	Learn Computer Aided Modelling concepts.

18IM652	**MAINTENANCE & SAFETY ENGINEERING**
CO1	Able to memorize types of maintenance systems
CO2	Able to evaluate machine failure and performance of the machines
CO3	Able to evaluate the economics of maintenance and express the use of computers in maintenance
CO4	Demonstrate and outline the Industrial safety through proper safety standards to reduce accidents.
CO5	Demonstrate and outline the Industrial pollution control and fire prevention and protection.

18IM653	**COMPOSITE MATERIALS**
CO1	Students are able to explain the different concepts of manufacturing of fiber reinforced composites.
CO2	Laminate design for different combinations of plies with different orientations of the fibre.
CO3	To Explain the machining of composite materials
CO4	To Explain the Manufacturing routes and application of Metal matrix and Ceramic matrix composites

18IM655	**MANAGEMENT INFORMATION SYSTEM**
CO1	Able to determine and define the basic concepts and technologies used in the field of information systems for business operations.
CO2	Able to apply and operate E-business
CO3	Able to operate and extend the use of E-commerce
CO4	Able to summarize, judge the ethical, social, and security issues of information systems.
CO5	Able to understand global businesses planning functions and applications

18IM656	ADVANCED MANUFACTURING TECHNOLOGY
CO1	Explain the advanced manufacturing technologies and define the concepts of various manufacturing process.
CO2	Describe the differences and of the application of a range of additive manufacturing processes
CO3	Describe the specific process characteristics of various advanced manufacturing technologies
CO4	Understand the operating principles, capabilities, and limitations of liquid and solid based additive manufacturing system, including fused deposition modelling and stereolithographic.
CO5	Explain the various advanced manufacturing technologies and identify their possible applications.

18IM661	PROJECT MANAGEMENT
CO1	Apply the concept, tools and techniques for managing large projects.
CO2	Construct project plans for different types of organizations.
CO3	Evaluate a project to develop the scope of work, provide accurate cost estimates and to plan the various activities;
CO4	Will be able to explain on resource and time planning, controls, communication mechanisms, reviews and other project management tools.
CO5	Analyze and evaluate risks in large and complex project environments

18IML67	SIMULATION LAB
CO1	Able to identify type of probability distribution and analyze nature of input data
CO2	Able to apply various simulation models using common and basic process templates
CO3	Will be able to solve the various manufacturing related problems and analyze output data

18HS 62	Intellectual Property Rights
CO1	The students once they complete their academic projects, they get awareness of acquiring the patent
CO2	They also learn to have copyright for their innovative works.
CO3	They also get the knowledge of plagiarism in their innovations which can be questioned legally.

IV Year:

18HS71	**COST MANAGEMENT OF ENGINEEREINGT PROJECTS**
CO1	Understand and apply fundamental accounting concepts, principles and conventions and to carry out journal entries and adjustments.
CO2	Prepare financial statements in accordance with generally accepted accounting principles.
CO3	Prepare and analyze a trial balance, cash flow statement, cost sheet variance analysis.
CO4	To prepare and analyze different types of budget
CO5	To explain the concepts of financial management, working capital and their applications to industries.

18HS72	**OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA)**
CO1	Acquire knowledge on OSHA policies, Laws and regulations.
CO2	Identify hazards in the workplace that pose a danger or threat to the safety or health, or that of others.
CO3	Control unsafe or unhealthy hazards and propose methods to eliminate the hazards.
CO4	Discuss the role of health and safety in the workplace and effects of industries on environment.
CO5	Identify workplace hazards, safety considerations and roles and responsibilities of workers, supervisors and managers.

18IM71	**OPERATIONS MANAGEMENT**
CO1	Able to memorize history and describe importance of OM to take decision based on different models.
CO2	Able to calculate forecasted values using different forecasting methods
CO3	Will be able to operate the production activities on Aggregate planning, MPS and MRP
CO4	Will be able to operate the production activities based on priorities and capacity.
CO5	Will be able to select the best course of action for better production quality and quantity based on new methods of production.

18IM72	SUPPLY CHAIN MANAGEMENT
CO1	Will be able to indicate the utilization of supply chain management systems and resources being effectively used in an organization
CO2	Will be able to identify capacity allocation facility location models, apply Managerial levers to improve supply chain profitability
CO3	Will be able to plan and manage inventories to improve supply chain profitability
CO4	Will be able to identify factors affecting transportation decisions and design transportation network to improve supply chain operations
CO5	Will be able to relate Bullwhip effect, role of information technology in supply Chain,

18IM731	**PROJECT MANAGEMENT**
CO1	Apply the concept, tools and techniques for managing large projects.
CO2	Construct project plans for different types of organizations.
CO3	Evaluate a project to develop the scope of work, provide accurate cost estimates and to plan the various activities;
CO4	Will be able to explain on resource and time planning, controls, communication mechanisms, reviews and other project management tools.
CO5	Analyze and evaluate risks in large and complex project environments

18IM732	NANOTECHNOLOGY
CO1	Remember, understand and apply knowledge about of nanomaterials and their uses.
CO2	Interpret and apply the techniques of manufacturing and characterization processes
CO3	Apply the knowledge of Nano sensors, related to Nano sensors in electronics, mechanical, chemical and Biological systems.
CO4	Create and evaluate Nano Design and System in various disciplines

18IM733	**HUMAN RESOURCE MANAGEMENT**
CO1	Apply the knowledge and skills needed to effectively manage human resources
CO2	Examine current issues, trends, practices, and processes in HRM
CO3	Compare the common methods for recruiting and selecting human resource
CO4	Contribute to employee performance management and organizational effectiveness
CO5	Evaluate employee orientation, training, and development programs.

18IM734	**DATA BASE MANAGEMENT SYSTEM**
CO1	Distinguish Data Base systems, Data models and DBMS architecture.

CO2	Model the data models for database design and experiment storage devices.
CO3	Write relational algebra operations, and queries in relational algebra.
CO4	Demonstrate the Structured Query Language (SQL) to query, update and manage a database
CO5	Define and relate the database design guidelines, and guidelines for relational systems.

18IM735	**TECHNOLOGY MANAGEMENT**
CO1	Describe and assess tool, techniques and strategies of the management of technology and innovation.
CO2	Examine the management of techno logy and innovation from the perspective of research and development, new product development, production, operations, finance, commercialization and strategy.
CO3	Analyze the high levels of complexity and risk associated with the management of technology and innovation and develop company strategies.

18IM741	**DESIGN OF EXPERIMENTS**
CO1	Determine the importance of statistical design of experiments and benefits in R&D
CO2	CO2: Investigate the logic of hypothesis testing, including analysis of variance and the detailed analysis of experimental data.
CO3	Design and conduct orthogonal array experiments for process improvement.
CO4	Choose an appropriate experimental design based on the study objectives
CO5	Interpret the results of the experiment and report the conclusions based on S/N ratio analysis

18IM742	**STRATEGIC MANAGEMENT**
CO1	Articulate a vision that gives meaning to all the firm's stakeholders of the firm's objectives
CO2	Formulate a strategic plan that operationalizes the goals and objectives of the firm
CO3	Implement a strategic plan that takes into account the functional areas of business
CO4	Evaluate and revise programs and procedures in order to achieve organizational goals
CO5	Analyse dynamics in competitive rivalry including competitive action and response, for acting both proactively and defensively.

18IM743	**PRODUCT DESIGN AND MANUFACTURING**
CO1	Determine principles and concepts of effective product design
CO2	Apply creative thinking skills for idea generation
CO3	Illustrate conceptual ideas through clear drawing.
CO4	Construct ideas using software and to develop the drawings

18IM744	TOTAL QUALITY MANAGEMENT
CO1	Ability to Determine the TQM philosophies in organization and concepts of leadership.
CO2	To Define and Determine the evolution of quality concepts, methods and customer satisfaction.
CO3	To gain the knowledge of quality control tools in TQM.
CO4	To determine the concepts of reliability and quality failure.
CO5	To Determine the fundamental concepts of quality management systems

IM745	INDUSTRIAL RELATIONS AND LABOUR WELFARE
CO1	Students will know how to resolve industrial relations and human relations problems and promote welfare of industrial labour.

18IM751	HUMAN RESOURCE MANAGEMENT
CO1	Apply the knowledge and skills needed to effectively manage human resources
CO2	Examine current issues, trends, practices, and processes in HRM
CO3	Compare the common methods for recruiting and selecting human resource
CO4	Contribute to employee performance management and organizational effectiveness
CO5	Evaluate employee orientation, training, and development programs.

18IML76	STATISTICS LAB
CO1	Apply the statistical data in the form of Tabular and Graphical display.
CO2	Identify discrete type of probability and solve the various engineering problems.
CO3	Solve Continuous type of probability and solve the various engineering problems
CO4	Estimate the hypothesis and give inference to random experiments.
CO5	Evaluate the statistical parameters by estimation.

18IML77	ENTERPRISE RESOURCE PLANNING and OR LAB
CO1	Develop the skills and knowledge to support the implementation and maintenance of Enterprise Resource Planning (ERP) systems.
CO2	Formulate and solve Linear programming problems, transportation and assignment Problems

18HS81	COST MANAGEMENT OF ENGINEEREINGT PROJECTS
CO1	Understand and apply fundamental accounting concepts, principles and conventions and to carry out journal entries and adjustments.
CO2	Prepare financial statements in accordance with generally accepted accounting principles.
CO3	Prepare and analyze a trial balance, cash flow statement, cost sheet variance analysis.
CO4	To prepare and analyze different types of budget
CO5	To explain the concepts of financial management, working capital and their applications to industries.

18HS81	COST MANAGEMENT OF ENGINEEREINGT PROJECTS
CO1	Understand and apply fundamental accounting concepts, principles and conventions and to carry out journal entries and adjustments.
CO2	Prepare financial statements in accordance with generally accepted accounting principles.
CO3	Prepare and analyze a trial balance, cash flow statement, cost sheet variance analysis.
CO4	To prepare and analyze different types of budget
CO5	To explain the concepts of financial management, working capital and their applications to industries.

18HS82	OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA
CO1	Acquire knowledge on OSHA policies, Laws and regulations.
CO2	Identify hazards in the workplace that pose a danger or threat to the safety or health, or that of others.
CO3	Control unsafe or unhealthy hazards and propose methods to eliminate the hazards.
CO4	Discuss the role of health and safety in the workplace and effects of industries on environment.
CO5	Identify workplace hazards, safety considerations and roles and responsibilities of workers, supervisors and managers.