RAJENDRA MANE COLLEGE OF ENGINEERING & TECHNOLOGY, AMBAV

Department of Automobile Engineering

PEO

1. Develop within our graduates, the technical proficiency to successfully apply the knowledge of Automobile Engineering to meet industry needs as well as to persue higher studies.
2. Develop within our graduates, effective communication skill, professional and ethical attitude and multidisciplinary approach to meet societal needs.
3. Develop within our graduates scientific & technical proficiency to persue research & consultancy.
4. Develop within our graduates, the leadership qualities, team work and commitment towards lifelong learning.
5. Develop within our graduates the awareness towards public interest, safety & environment.

PO

a)Graduates will be able to apply knowledge of mathematics, automotive and mechanical engineering.
b) Graduates will demonstrate an ability to identify, formulate and solve engineering and management problems.
c) Graduates will have an ability to analyze and interpret data by carrying out the experiments.
d) Graduates will be able to design the vehicle and automotive components as per the specifications and needs of automotive industries.
e) Graduates will be able to diagnosis, troubleshoot and maintain the various automobile systems.
f) Graduates will demonstrate skills to use statistical tools, modeling and analysis software in research and development.
g) Graduates will demonstrate an ability to work with multidisciplinary tasks related to mechanical engineering, production engineering electronics engineering
h) Graduates will be able to communicate effectively in both verbal and written form and demonstrate knowledge of professional and ethical responsibilities in the profession.
i) Graduates will show the understanding of impact of engineering solutions on the society and also will be aware of contemporary issues at global context.
j) Graduates will develop confidence for entrepreneurship, self-education and ability for life-long learning in Automobile field and management.
k) Graduates will demonstrate an ability to participate and succeed in competitive examinations like GATE and CAT.
l) Graduates will able to apply engineering knowledge for sustainability of environment.

PSO

1. Will be able to design and develop engine and chassis systems in a view to meet the needs of the society by harnessing the potential of electronic systems and modern software tools.
2. Will be able to explore possibilities of viable alternate fuels and to develop emission control technologies and safety systems
3. Will be able to work in an industry as a team member as well as an individual with professional qualities and evolve oneself for lifelong learning.

Department of Automobile Engineering

COURSE OUTCOMES

Class: S. E. Automobile **Semester: ODD**

Name of the Course	COURSE OUTCOMES
1) Applied Mathematics- III **Course Code:** AEC 301	1. Able to state Cauchy's Integral theorem, Cauchy's Residue theorem, properties of Laplace transform, define orthogonal set of functions, analyticity of the given functions, solve differential equation by Laplace transform & inverse Laplace transform, solution of wave equation & heat equation by numerical method, Apply Parseval's identity for the given function. 2. Able to find Laplace and inverse Laplace transform of the given function, analytic function, orthogonal trajectories for the given family of curves, image of the given region under given transformation, bilinear transformation, poles, residues & singularities of the given function, correlation coefficient, lines of regression, equation of curve by using least square method, obtain Laurent's & Taylors series, solution of wave & heat equation, Test analyticity of the given function. 3. Able to evaluate definite integral by Laplace transform and inverse Laplace transform of the given function, integral by Cauchy's integral formula & Cauchy's residue theorem.
2) Thermodynamics **Course Code:** AEC 302	1. Able to state and describe basic definitions and terminology as well as special definitions related to thermodynamics point of view, why and how the natural process occurs only in one direction. 2. Able to classify, compare and differentiate types of thermodynamics process, gas power cycles, vapor power cycle, flow, and non-flow processes. 3. Able to solve the problems Steady flow energy equation, laws of thermodynamics, calculate the efficiencies and relate them to what occurs in an actual power plant, the reactive system, determine what changes of state will result in improving the performance. 4. Able to analyze and test cycles based on thermodynamics, compare the performance of various cycles for energy production, Draw conclusions on the behavior of various cycles operating between temperature limits. Able to create, design and draw P-V, T-S diagrams, formulate mathematical models for thermal efficiency of cycle.
3) Strength of materials **Course Code:** AEC 303	1. Demonstrate fundamental knowledge about various types of loading and stresses induced. 2. Draw the SFD and BMD for different types of loads and support

	conditions. 3. Analyse the stresses induced in basic mechanical components. 4. Estimate the strain energy in mechanical elements. 5. Analyse the deflection in beams. 6. Analyse buckling and bending phenomenon in columns, struts and beams.
4) Production process- I **Course Code:** AEC 304	1. Demonstrate understanding of casting process. 2. Illustrate principles of forming processes 3. Demonstrate applications of various types of welding processes. 4. Differentiate chip forming processes such as turning, milling, drilling, etc. 5. Illustrate the concept of producing polymer components and ceramic components. 6. Distinguish between the conventional and modern machine tools.
5) Material Technology **Course Code:** AEC 305	1. Identify various defects and failure mechanisms . 2. Explain effect of alloying elements on properties 3. Differentiate microstructure of different materials. 4. Select appropriate heat treatment process for specific requirements. 5. Interpret Iron - Iron carbide, TTT & CCT diagram & their significance.
6) Computer Aided Machine drawing **Course Code:** AEL 301	1. Visualize and prepare detail drawing of a given object. 2. Read and interpret the drawing. 3. Draw details and assembly of different mechanical systems. Able to analyze stability using Root locus, Bode plot & Nyquist plots. 4. Convert detailed drawing into assembly drawing using modelling software. 5. Convert assembly drawing into detailed drawing using modelling software.

	6. Prepare detailed drawing of any given physical object/machine element with actual measurements.

Class: T. E. Automobile Semester: ODD

Name of the Course	COURSE OUTCOMES
1) Internal Combustion Engine **Course Code:** AEC 501	1. Able to define and describe the various parts of reciprocating, rotary engines, methods of scavenging, objectives of MPFI system and variable specific heats with their functions. 2. Able to classify, compare and differentiate the various engines, combustion in SI and CI engines, detonation in SI and CI engines, methods of turbo charging and supercharging. 3. Able to prepare the heat balance sheet on SI and CI engines, Pressure crank angle dia. For SI and CI engines with their essential stages. 4. Able to calculate Air standards cycle efficiencies, mixture strength requirement in carburetor, fuel injection time and various performance characteristics of internal combustion engine. 5. Able to answer the oral questions/queries by examiner/evaluators and write assignments and answers in English.
2) Mechanical Measurement & Control **Course Code:** AEC 502	1. Able to state define basic concepts and classify different measurement and control systems. 2. Able to explain and compare various measuring devices, concepts of stability. 3. Able to compute time domain specification parameters, steady state error, error coefficient for different type of systems using step, ramp & parabolic inputs. 4. Able to analyze stability using Root locus, Bode plot & Nyquist plots. 5. Able to design mathematical model of system / process for standard input responses. 6. Able to answer the oral questions/queries by examiner/evaluators and write assignments and answers in English.
3) Heat Transfer **Course Code:** AEC 503	1. Identify the three modes of heat transfer (conduction, convection and radiation). 2. Illustrate basic modes of heat transfer. 3. Develop mathematical model for each mode of heat transfer. 4. Develop mathematical model for transient heat transfer. 5. Demonstrate and explain mechanism of boiling and condensation. 6. Analyse different heat exchangers and quantify their

	performance.
4) Automotive Systems **Course Code:** AEC 504	1. Able to practically identify different automotive systems and subsystems 2. Able to practically identify different automotive components. 3. Able to illustrate working and functions of various automotive components.
5) Press Tool Design **Course Code:** AEDLO 5011	1. Able to demonstrate various press working operations for mass production of sheet metal parts. 2. Able to identify press tool requirements to build concepts pertaining to design of press tools 3. Able to prepare working drawings and setup for economic production of sheet metal components 4. Able to select suitable materials for different elements of press tools 5. Able to illustrate the principles and blank development in bent & drawn components 6. Able to elaborate failure mechanisms of pressed components, safety aspects and automation in press working.
6) Design of jigs & Fixtures **Course Code:** AEDLO 5013	1. Able to write methodically, the sequence of operations of simple work-piece 2. Able to identify and select locating and clamping points on work-piece 3. Able to demonstrate construction of drill jig 4. Able to illustrate construction of milling fixture 5. Able to identify appropriate combination of tools, jigs and fixture, suitable for a particular machining operation 6. Able to design assembly of jigs and fixtures on simple work-piece
7) Business Communication and Ethics **Course Code:** AEL 506	1. Design a technical document using precise language, suitable vocabulary and apt style. 2. Develop the life skills/ interpersonal skills to progress professionally by building stronger relationships. 3. Demonstrate awareness of contemporary issues knowledge of professional and ethical responsibilities.

	4. Apply the traits of a suitable candidate for a job/higher education, upon being trained in the techniques of holding a group discussion, facing interviews and writing resume/SOP. 5. Deliver formal presentations effectively implementing the verbal and non-verbal skills.

Class: B. E. Automobile Semester: ODD

Name of the Course	COURSE OUTCOMES
1) Chassis Body Engineering **Course Code:** AEC 701	1. Able to list, state and describe chassis, body, body material, various aerodynamic forces, moments and loads on the vehicle. 2. Able to identify, classify, sketch and discuss types of structure, car, bus, and commercial vehicle body details and overall criteria for vehicle Comparison 3. Able to explain the design and requirements of vehicle visibility, vehicle safety, Driver seat, Passenger seat, child seat, preliminary design, Shear Panel Method and the latest trends in design, manufacturing, and materials. 4. Able to analyses and calculate drag, loading cases and various body optimization techniques for minimum drag.
2) CAD/CAM/CAE **Course Code:** AEC 702	1. Identify proper computer graphics techniques for geometric modeling. 2. Transform, manipulate objects and store and manage data. 3. CAM Tool path Creation and NC- G code output. 4. Use rapid prototyping and tooling concepts in any real life applications. 5. Identify the tools for Analysis of a complex engineering component.
3) Automotive Design **Course Code:** AEC 703	1. Design automotive component to meet desired needs. 2. Apply the fundamental knowledge of Applied Mechanics, Strength of Materials, Engineering Materials and Theory of Machine for actual design problems. 3. Answer oral questions/queries by examiner/evaluators and write assignments and answers in English.
4) Product Design & Development	1. State and describe the concepts, functions and applications of chip

Course Code: AEC 704	formation, dynamometer, presses, indexing devices, NTM processes, Additive manufacturing etc. 2. Compare, discuss and explain, Merchant's theory, tool forces, dynamometers, tool geometry economics of metal cutting, cutting tool materials, Sheet metal operations, jigs and fixtures. 3. Compare, discuss and explain, Merchant's theory, tool forces, dynamometers, tool geometry economics of metal cutting, cutting tool materials, Sheet metal operations, jigs and fixtures. 4. Differentiate sheet metal dies, Jig and Fixtures, EDM and ECM, AJM and WJM, AM and CNC machining and calculate total pressure, Scrap strip layout, other elements of press 5. Answer oral questions/queries by examiner/evaluators and write assignments and answers in English.
5) Transport Management Motor Industry **Course Code:** AEE 7017	1. Demonstrate transport management systems 2. Implement advance techniques in traffic management 3. Demonstrate understanding of motor vehicle act. 4. Interpret about vehicle insurance and taxation. 5. Illustrate the knowledge of Passenger transport operation. 6. Illustrate the knowledge of Goods transport operation.

Class: S. E. Automobile Semester: EVEN

Name of the Course	COURSE OUTCOMES
1) Applied Mathematics- IV **Course Code:** AEC 401	1. Able to State Cayley Hamilton theorem, uses of Chi-square test, Explain Type I and Type II error, one tailed and two tailed test, Find Eigen values and Eigen vectors of matrix, quadratic forms, mean, variance and probability, directional derivative, unit vector, work done, angle between surfaces, Use Cayley Hamilton theorem, Solve LPP. 2. Able to Show the matrix is diagonalizable, derogatory, Prove solenoidal, irrotational vector field, Prove statement on function of square matrix. 3. Able to Verify Cayley Hamilton theorem, green's theorem, Evaluate surface integral using Stoke's, Gauss divergence theorem. 4. Able to Test hypothesis for large, small samples, non parametric test, equality of variance.
2) Fluid Mechanics **Course Code:** AEC 402	1. Define properties of fluid and classification of fluid 2. Evaluate hydrostatic force on various surfaces and predict

	stability of floating body 3. Formulate and solve equation of the control volume for fluid flow system 4. Apply Bernoulli's equations of the control volume for fluid flow system 5. Calculate resistance to flow of incompressible fluid. 6. Apply fundamentals of compressible fluid flows to relevant system.
3) Industrial Electronics **Course Code:** AEC 403	1. Able to illustrate construction, working principles and applications of power electronic switches.. 2. Able to identify digital circuits for industrial applications. 3. Able to solve the problems on semi converter, full converter, number system, Boolean algebra. 4. Able to analyze speed-torque characteristics of electrical machines for speed control. 5. Able to design circuits using op-amp, timer555, and microcontroller.
(4) Production process- II **Course Code:** AEC 404	1. State and describe the concepts, functions and applications of chip formation, dynamometer, presses, indexing devices, NTM processes, Additive manufacturing etc. 2. Compare, discuss and explain Merchant's theory, tool forces, dynamometers, and tool geometry economics of metal cutting, cutting tool materials, Sheet metal operations, jigs and fixtures. 3. Sketch and draw Merchant circle, Dynamometers, cutting tool geometry, press tool dies, jigs and fixtures elements, NTM processes, AM systems etc 4. Differentiate sheet metal dies, Jig and Fixtures, EDM and ECM, AJM and WJM, AM and CNC machining and calculate total pressure, Scrap strip layout, other elements of press in the design of Blanking die, Piercing die.
5) Kinematics of Machinery **Course Code:** AEC 405	1. Able to state define and describe basic concepts of kinematics and kinetics of machine 2. Able to explain and compare various types of mechanism & power transmission devices. 3. Able to compute different parameters of cam & follower, belts, chains, gear & gear train mechanism. Also DOF of mechanisms. 4. Able to plot displacement-time, velocity-time, acceleration-time &

	jerk-time diagrams for cam profile. Also draw cam profile. 5. Able to draw velocity diagram by Instantaneous Centre method. Also draw velocity & acceleration diagrams for four bar mechanism & for slider crank mechanism by relative method. **6.** Able to develop & build mechanisms to provide specific motion.
6) Data Base and Information Retrieval **Course Code:** AEL 401	1. Identify data models and schemes in DBMS 2. Demonstrate the features of database management systems and Relational database 3. Use SQL- the standard language of relational databases 4. Demonstrate understanding of functional dependencies and design of the database 5. Design graphical user Interface for specific application. 6. Create visual software entities.

Class: T. E. Automobile Semester: EVEN

Name of the Course	COURSE OUTCOMES
1) Chassis and Body Engineering **Course Code:** AEC 601	1. Able to list, state and describe chassis, body, body material, various aerodynamic forces, moments and loads on the vehicle. 2. Able to identify, classify, sketch and discuss types of structure, car, bus, and commercial vehicle body details and overall criteria for vehicle Comparison 3. Able to explain the design and requirements of vehicle visibility, vehicle safety, Driver seat, Passenger seat, child seat, preliminary design, Shear Panel Method and the latest trends in design, manufacturing, and materials. 4. Able to analyses and calculate drag, loading cases and various body optimization techniques for minimum drag.
2) Machine Design - I **Course Code:** AEC 602	1. Demonstrate understanding of various design considerations. 2. Illustrate basic principles of machine design. 3. Design machine elements for static as well as dynamic loading. 4. Design machine elements on the basis of strength/ rigidity concepts. 5. Use design data books in designing various components. 6. Acquire skill in preparing production drawings pertaining to various designs.
3) Finite Element Analysis **Course Code:** AEC 603	1. Solve differential equations using weighted residual methods 2. Develop the finite element equations to model engineering problems governed by second order differential equations. 3. Apply the basic finite element formulation techniques to solve engineering problems by using one dimensional elements.

	4. Apply the basic finite element formulation techniques to solve engineering problems by using two dimensional elements. 5. Apply the basic finite element formulation techniques to find natural frequency of single degree of vibration system 6. Use commercial FEA software, to solve problems related to mechanical engineering.
4) Mechanical Vibrations **Course Code:** AEC 604	1. Develop mathematical model to represent dynamic system. 2. Estimate natural frequency of mechanical system. 3. Analyze vibratory response of mechanical system. 4. Estimate the parameters of vibration isolation system. 5. Balance an existing unbalanced rotating and reciprocating system completely/partially. 6. Comprehend the application of condition monitoring and fault diagnosis on a live project/case study.
5) Mechatronics **Course Code:** AEDLO 6021	1. Able to identify the suitable sensor and actuator for a Mechatronics system. 2. Able to select suitable logic controls. 3. Able to analyse continuous control logics for standard input conditions. 4. Able to develop ladder logic programming. 5. Able to design hydraulic/pneumatic circuits. 6. Able to design a Mechatronics system.

Class: B. E. Automobile Semester: EVEN

Name of the Course	**COURSE OUTCOMES**
1) Autotronics **Course Code:** AEC 801	1. To study basic and advance Automotive Electronics systems. 2. To study working of different Automotive Electronics systems and subsystems. 3. To study basic and advance electronics technologies like Battery, Fuel Cell, ECM etc. 4. To have basic idea about how automotive electrical systems are d eveloped.

2)	Vehicle Dynamics **Course Code:** AEC 802	1. Analyze the vehicle directional stability. 2. Enumerate the suspension systems, tire dynamics & directional stability of the vehicle. 3. Develop physical and mathematical models to predict the dynamic response of vehicles 4. Demonstrate the ride characteristic of the vehicle. 5. Analyze the vehicle roll behavior 6. Comprehend the various trends in Vehicle Dynamics.
3)	Vehicle Maintenance **Course Code:** AEC 803	1. Effectively use automotive diagnostic tools in industries. 2. Improve existing vehicle maintenance practices in industries. 3. Answer oral questions/queries by examiner/evaluators and write assignments and answers in English.
4)	Vehicle Safety **Course Code:** AEE 8022	1. Comprehend Vehicle design from safety point of view. 2. Apply concepts of accident reconstruction analysis in real world. 3. Enumerate interrelation ship among occupant, restraint systems and vehicles in accidents. 4. Illustrate role and significance of seat in Rear crash safety 5. Demonstrate different active and passive safety systems available in vehicles 6. Illustrate various standards related to vehicle safety.

Department of Computer Engineering

PEO

- Develop within our graduates the technical proficiency and apply fruitfully the knowledge of Computer Engineering.
- Develop within our graduates, the ability to communicate effectively, function ethically and legally to fulfill societal needs.
- Instill commitment into graduates towards life-long learning to remain updated in the profession.
- Develop within the graduates to protect public interest, safety and environment.

PO

Our students in the computer engineering program should, at the time of their graduation, have:

- PO1: an ability to demonstrate mathematics, discrete structures, science fundamentals along with computer engineering principles in real time computer software and hardware problems.
- PO2: an ability to identify, formulates, and review literature's to analyze and solve complex computer engineering problems.
- PO3: an ability to design, implement, and evaluate a computer-based system, component, process or program to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability..
- PO4: an ability to organize, analyze and interpret data in order to design and conduct experiments.
- PO5: an ability to use the techniques, skills and modern hardware and software tools necessary for computer engineering practices.
- PO6: the broad education necessary to understand the impact of computing in global, economic, environmental and societal context.
- PO7: an ability to understand contemporary issues related to social and environmental context for sustainable development of engineering solutions.
- PO8: an ability to understand professional, legal and ethical responsibilities as it pertains to computer engineering.
- PO9: an ability to function effectively as an individual, as a member or leader in diverse and multidisciplinary domains.
- PO10: an ability to effectively communicate technical information in speech, presentation and in writing.
- PO11: an ability to apply engineering principles and management skills in individual work and team work for project development in multidisciplinary domains.
- PO12: a recognition of the need for an ability to engage in lifelong learning.

PSO

1. Understand and develop computer programs related to algorithms, database, system software, web designing and networking.
2. Apply the knowledge of computer engineering for providing solutions to real world problems by designing and developing software and hardware applications.

Department of Computer Engineering

COURSE OUTCOMES

Class: SE Computer **Sem:III**

Name of the Course	COURSE OUTCOMES
Applied Mathematics III	1. Understand complex variable theory, application of harmonic conjugate to get orthogonal trajectories and analytic function. 2. Plot the image of the curve by a complex transformation from z-plane to w-plane. 3. Expand the periodic function by using Fourier series and complex form of Fourier series. 4. Understand the concept of Laplace transform and inverse Laplace transform of various functions and its application to solve ordinary differential equations. 5. Apply the concept of Z- transformation and its inverse of the given sequence. 6. Apply the concept of Correlation and Regression to the engineering problems.
DM	1. Understand the notion of mathematical thinking, mathematical proofs and to apply them in problem solving. 2. Ability to reason logically. 3. Ability to understand relations, Diagraph and lattice.. 4. Ability to understand use of functions, graphs and their use in programming applications. 5. Understand use of groups and codes in Encoding-Decoding 6. Apply discrete structures into other computing problems such as formal specification, verification, artificial intelligence, cryptography, Data Analysis and Data Mining etc.
DLDA	1. To understand different number systems and their conversions. 2. To analyze and minimize Boolean expressions. 3. To design and analyze combinational circuits. 4. To design and analyze sequential circuits
DS	1. Students will be able to implement various linear and nonlinear data structures. 2. Students will be able to handle operations like insertion, deletion, searching and traversing on various data structures. 3. Students will be able to select appropriate sorting technique for given problem. 4. Students will be able to select appropriate searching technique for given problem. 5. Students will be able to apply the learned concepts in various domains like DBMS and Compiler Construction. 6. Students will be able to choose appropriate data structure for specified

	problem domain.
ECCF	1. To understand the use of semiconductor devices in circuits and analyze them. 2. To understand importance of oscillators and power amplifiers in communication system. 3. To understand basic concepts of operational amplifier and their applications. 4. To understand the fundamental concepts of electronic communication 5. To apply knowledge of electronic devices and circuits to communication applications. 6. To study basic concepts of information theory.
OOPM	1. To apply fundamental programming constructs. 2. To illustrate the concept of packages, classes and objects. 3. To elaborate the concept of strings, arrays and vectors. 4. To implement the concept of inheritance and interfaces. 5. To implement the notion of exception handling and multithreading. 6. To develop GUI based application.

Class: SE Computer **Sem:IV**

Name of the Course	**COURSE OUTCOMES**
AM-IV	CO1 : Able to State Cayley Hamilton theorem, uses of Chi-square test, Explain Type I and Type II error, one tailed and two tailed test, Find Eigen values and Eigen vectors of matrix, quadratic forms, mean, variance and probability, directional derivative, unit vector, work done, angle between surfaces, Use Cayley Hamilton theorem, Solve LPP. CO2: Able to Show the matrix is diagonalizable, derogatory, Prove solenoidal, irrotational vector field, Prove statement on function of square matrix. CO3: Able to Verify Cayley Hamilton theorem, green's theorem, Evaluate surface integral using Stoke's, Gauss divergence theorem. CO4: Able to Test hypothesis for large, small samples, non parametric test, equality of variance.
AOA	1. Analyze the running time and space complexity of algorithms. 2. Describe, apply and analyze the complexity of divide and conquer strategy. 3. Describe, apply and analyze the complexity of greedy strategy. 4. Describe, apply and analyze the complexity of dynamic programming strategy. 5. Explain and apply backtracking, branch and bound and string matching techniques to deal with some hard problems. 6. Describe the classes P, NP, and NP-Complete and be able to prove that a certain problem is NP-Complete.
CG	1. Understand the basic concepts of Computer Graphics. 2. Demonstrate various algorithms for scan conversion and filling of basic objects and their comparative analysis. 3. Apply geometric transformations, viewing and clipping on graphical objects. 4. Explore solid model representation techniques and projections. 5. Understand visible surface detection techniques and illumination

	models.
COA	1. To describe basic structure of the computer system. 2. To demonstrate the arithmetic algorithms for solving ALU operations. 3. To describe instruction level parallelism and hazards in typical processor pipelines. 4. To describe superscalar architectures, multi-core architecture and their advantages 5. To demonstrate the memory mapping techniques. 6. To Identify various types of buses, interrupts and I/O operations in a computer system
OS	1. Understand role of Operating System in terms of process, memory, file and I/O management. 2. Apply and analyse the concept of a process, thread, mutual exclusion and deadlock. 3. Evaluate performance of process scheduling algorithms and IPC. 4. Apply and analyse the concepts of memory management techniques. 5. Evaluate the performance of memory allocation and replacement techniques. 6. Apply and analyze different techniques of file and I/O management
OST	1. To understand basic concepts in python and perl. 2. To explore contents of files, directories and text processing with python 3. To develop program for data structure using built in functions in python. 4. To explore django web framework for developing python based web application. 5. To understand file handling and database handling using perl. 6. To explore basics of two way communication between client and server using python and perl

Class: TE Computer **Sem:V**

Name of the Course	**COURSE OUTCOMES**
MP	1. Describe architecture of x86 processors. 2. Interpret the instructions of 8086 and write assembly and Mixed language programs. 3. Explain the concept of interrupts 4. Identify the specifications of peripheral chip 5. Design 8086 based system using memory and peripheral chips 6. Appraise the architecture of advanced processors
DBMS	1. Understand the fundamentals of a database systems 2. Design and draw ER and EER diagram for the real life problem. 3. Convert conceptual model to relational model and formulate relational algebra queries. 4. Design and querying database using SQL. 5. Analyze and apply concepts of normalization to relational database design. 6. Understand the concept of transaction, concurrency and recovery.
CN	1. Demonstrate the concepts of data communication at physical layer and compare ISO - OSI model with TCP/IP model. 2. Demonstrate the knowledge of networking protocols at data link layer. 3. Design the network using IP addressing and subnetting / supernetting

	schemes. 4. Analyze various routing algorithms and protocols at network layer. 5. Analyze transport layer protocols and congestion control algorithms. 6. Explore protocols at application layer .
TCS	1. Identify the central concepts in theory of computation and differentiate between deterministic and nondeterministic automata, also obtain equivalence of NFA and DFA. 2. Infer the equivalence of languages described by finite automata and regular expressions. 3. Devise regular, context free grammars while recognizing the strings and tokens. 4. Design pushdown automata to recognize the language. 5. Develop an understanding of computation through Turing Machine. 6. Acquire fundamental understanding of decidability and undecidability.
MS	1. To identify basics of multimedia and multimedia system architecture. 2. To understand different multimedia components. 3. To explain file formats for different multimedia components. 4. To analyze the different compression algorithms. 5. To describe various multimedia communication techniques. 6. To apply different security techniques in multimedia environment.

Class: TE Computer **Sem:VI**

Name of the Course	**COURSE OUTCOMES**
SE	1. Understand and demonstrate basic knowledge in software engineering. 2. Identify requirements, analyze and prepare models. 3. Plan, schedule and track the progress of the projects. 4. Design & develop the software projects. 5. Identify risks, manage the change to assure quality in software projects. 6. Apply testing principles on software project and understand the maintenance concepts.
SPCC	1. Identify the relevance of different system programs. 2. Describe the various data structures and passes of assembler design. 3. Identify the need for different features and designing of macros. 4. Distinguish different loaders and linkers and their contribution in developing efficient user applications. 5. Construct different parsers for given context free grammars. 6. Justify the need synthesis phase to produce object code optimized in terms of high execution speed and less memory usage
DWM	1. Understand Data Warehouse fundamentals, Data Mining Principles 2. Design data warehouse with dimensional modelling and apply OLAP operations. 3. Identify appropriate data mining algorithms to solve real world problems 4. Compare and evaluate different data mining techniques like classification, prediction, clustering and association rule mining 5. Describe complex data types with respect to spatial and web mining. 6. Benefit the user experiences towards research and innovation.
CSS	1. Understand system security goals and concepts, classical encryption techniques and acquire fundamental knowledge on the concepts of modular

	arithmetic and number theory. 2. Understand, compare and apply different encryption and decryption techniques to solve problems related to confidentiality and authentication 3. Apply the knowledge of cryptographic checksums and evaluate the performance of different message digest algorithms for verifying the integrity of varying message sizes. 4. Apply different digital signature algorithms to achieve authentication and design secure applications. 5. Understand network security basics, analyze different attacks on networks and evaluate the performance of firewalls and security protocols like SSL, IPSec, and PGP. 6. Analyze and apply system security concept to recognize malicious code.
ML	1. Gain knowledge about basic concepts of Machine Learning 2. Identify machine learning techniques suitable for a given problem 3. Solve the problems using various machine learning techniques 4. Apply Dimensionality reduction techniques. 5. Design application using machine learning techniques

Class: BE Computer **Sem:VII**

Name of the Course	**COURSE OUTCOMES**
DSIP	1. Apply the concept of DT Signal and DT Systems. 2. Classify and analyze discrete time signals and systems 3. Implement Digital Signal Transform techniques DFT and FFT. 4. Use the enhancement techniques for digital Image Processing 5. Differentiate between the advantages and disadvantages of different edge detection techniques 6. Develop small projects of 1-D and 2-D Digital Signal Processing.
MCC	1. To identify basic concepts and principles in mobile communication & computing, cellular architecture. 2. To describe the components and functioning of mobile networking. 3. To classify variety of security techniques in mobile network. 4. To apply the concepts of WLAN for local as well as remote applications. 5. To describe and apply the concepts of mobility management 6. To describe Long Term Evolution (LTE) architecture and its interfaces.
AISC	1 Identify the various characteristics of Artificial Intelligence and Soft Computing techniques. 2 Choose an appropriate problem solving method for an agent to find a sequence of actions to reach the goal state. 3 Analyse the strength and weakness of AI approaches to knowledge representation, reasoning and planning. 4 Construct supervised and unsupervised ANN for real world applications. 5 Design fuzzy controller system. 6 Apply Hybrid approach for expert system design.
ASSDF	1. Understand cyber attacks and apply access control policies and control mechanisms. 2. Identify malicious code and targeted malicious code. 3. Detect and counter threats to web applications. 4. Understand the vulnerabilities of Wi-Fi networks and explore different measures to secure wireless protocols, WLAN and VPN networks. 5. Understand the ethical and legal issues associated with cyber crimes and be able to mitigate impact of crimes with suitable policies. 6. Use different forensic tools to acquire and duplicate data from

	compromised systems and analyse the same.
DBA	1. Understand the key issues in big data management and its associated applications for business decisions and strategy. 1. Develop problem solving and critical thinking skills in fundamental enabling techniques like Hadoop, Mapreduce and NoSQL in big data analytics. 2. Collect, manage, store, query and analyze various forms of Big Data. 3. Interpret business models and scientific computing paradigms, and apply software tools for big data analytics. 4. Adapt adequate perspectives of big data analytics in various applications like recommender systems, social media applications etc.

Class: BE Computer **Sem:VIII**

Name of the Course	COURSE OUTCOMES
HMI	1. Identify User Interface (UI) design principles. 2. Analysis of effective user friendly interfaces. 3. Apply Interactive Design process in real world applications. 4. Evaluate UI design and justify. 5. Create application for social and technical task.
HPC	1. Memorize parallel processing approaches 2. Describe different parallel processing platforms involved in achieving High Performance Computing. 3. Discuss different design issues in parallel programming 4. Develop efficient and high performance parallel programming 5. Learn parallel programming using message passing paradigm using open source APIs.
NLP	1. Have a broad understanding of the field of natural language processing. 2. Have a sense of the capabilities and limitations of current natural language technologies, 3. Be able to model linguistic phenomena with formal grammars. 4. Be able to Design, implement and test algorithms for NLP problems 5. Understand the mathematical and linguistic foundations underlying approaches to the various areas in NLP 6. Be able to apply NLP techniques to design real world NLP applications such as machine translation, text categorization, text summarization, information extraction...etc.
AWN	1. Identify the characteristics and features of Adhoc Networks. 2. Understand the concepts & be able to design MAC protocols for Ad Hoc networks 3. Implement protocols / Carry out simulation of routing protocols of Adhoc Networks 4. Interpret the flow control in transport layer of Ad Hoc Networks 5. Analyze security principles for routing of Ad Hoc Networks 6. Utilize the concepts of Adhoc Networks in VANETs
CCL	1.Adapt different types of virtualization and increase resource utilization. 2. Build a private cloud using open source technologies. 3. Analyze security issues on cloud. 4. Develop real world web applications and deploy on commercial cloud. 5. Demonstrate various service models.

Department of Electronics and Telecommunication Engineering

PEO

I. Develop in our graduates to excel in Electronics and Telecommunication Engineering field so as to pursue postgraduate programs and succeed in industry
II. Develop in our graduates the scientific and technical proficiency to pursue Research and Consultancy.
III. Instil Commitment in Graduates the ability to cater to changing needs of society with good Technical and ethical values.
IV. Develop within the Graduates leadership qualities and the life-long learning passion.

PO

1. Graduates will demonstrate knowledge of mathematics with differential equations, vector calculus, complex variables, matrix theory, and statistics probability theory. They will be able to use Lap lace Transforms, Fourier Transforms in Electrical circuit applications. They will posses fundamental knowledge of Physics, Chemistry, Mechanics, Civil, Mechanical, Electrical and Electronics Engineering languages and modern manufacturing practices.
2. Graduates will demonstrate an ability to identify, formulate and solve Electronics and Telecommunication Engineering problems, analysis and interpretation of the same.
3. Graduate will demonstrate an ability to design Electrical and Electronic circuits and conduct experiments with electronic systems, analyze and interpret data. Graduate will be able to study the parametric analysis on performance of electronic systems. They will be able to handle various lab apparatus and instruments and draw conclusions.
4. Graduates will demonstrate an ability to design and build digital and analog systems knowing specifications of various components.
5. Graduate will demonstrate skills to use modern engineering tools, various software applications and state of art equipments for analysis and development.
6. Graduates will able to apply knowledge of professional engineering practices to assess social, health, legal and cultural issues.
7. Graduate will show the understanding of impact of engineering solutions on the social and environmental issues and also will be aware of contemporary issues and demonstrate the knowledge of advanced topics in Electronics and Telecommunication Engineering like PIC, ARM Processor, IPTV, Markov Chain etc for sustainable development.
8. Graduates will demonstrate knowledge of professional and ethical responsibilities. They will bear a good moral character to be a responsible citizen.
9. Graduate will able to function effectively as member or leader in diverse teams, and in multidisciplinary settings
10. Graduate will be able to communicate effectively in both verbal and written form. They will be able to present a topic effectively, will be able to participate in group discussions and prepare a written report of any activity.
11. Graduate will demonstrate the knowledge and understanding of Electronics and Telecommunication Engineering along with management principles and apply the same in own work as a member or leader in a team, to manage projects and multidisciplinary tasks.

12. Graduate will develop confidence for self education and ability for life-long learning and can participate and succeed in competitive examinations like GATE, GRE, Energy Auditor and Manager, MPSC, UPSC and other competitive examinations.

PSO

At the end of the program, the student:

1. Should be able to clearly understand the concepts and applications in the field of Communication, computer networking, signal processing, embedded systems and semiconductor technology.

2. Should be able to associate the learning from the courses related to Image and Signal processing, Microcomputers, Embedded and Communication Systems to arrive at solutions to real world problems.

Department of Electronics and Telecommunication Engineering

COURSE OUTCOMES

Class: SE EXTC **Sem:III**

Name of the Course	COURSE OUTCOMES
Applied Mathematics- III	1. Able to find laplace & inverse laplace transform of the given function, analytic function, orthogonal trajectories for the given family of curves, image of the given region under given transformation, bilinear transformation, directional derivatives, work done, fourier series, half range fourier series, complex form, fourier integral of the given function, Bessel's fourier series, Obtain Laurent's & Taylor's series. 2. Able to prove properties of Laplace transform, orthogonal / orthonormal of the given set of functions, analyticity of the given function, harmonic function, statements of Bessel's functions, properties of curl, divergence & gradient, solve differential equation by laplace transform & inverse laplace transform. 3. Able to Verify Green's theorem, evaluate definite integral by laplace transform, laplace transform & inverse laplace transform of the given function, line integral over the given path, surface & volume integral.
Electronic Devices and Circuits I	1. Explain current-voltage characteristics of semiconductor devices. 2. Identify and solve problems on biasing for semiconductor devices. 3. Analyze dc circuits and relate ac models of semiconductor devices with their physicaloperation. 4. Design electronic circuits.
Digital System Design	1. Develop a digital logic and apply it to solve real life problems. 2. Analyze, design and implement combinational logic circuits. 3. Classify different semiconductor memories. 4. Analyze, design and implement sequential logic circuits. 5. Analyze digital system design using PLD. 6. Simulate and implement combinational and sequential circuits using VHDL

	systems.
Circuit Theory and Networks	1. Able to state Millman, Superposition, Thevenin, Norton's theorem, describe the advantages of LT for the analysis of electrical network and list the properties of Hurwitz polynomial, RL,RC and LC network for it's realization. 2. Able to explain different types of dependent sources, initial conditions for R, L and C, natural and forced response, necessary and sufficient conditions for positive real function, poles and zeros of network function, different parameters of RF lines. 3. Able to find values of controlled sources or variables using transient or frequency domain analysis, self inductance, mutual inductance, coefficient of coupling, driving point and transfer functions for two port networks, different parameters of different two port networks. 4. Able to analyze circuits with and without controlled sources using loop and node matrix method,differentiate between analysis and synthesis of electrical network,draw series parallel and cascade interconnection,draw normalized values of Z on smith chart, test for Hurwitz polynomial and Positive real function. 5. Able to derive real differentiation and integration properties of LT, conditions for symmetry and reciprocity for Z,Y,ABCD and h parameters, synthesize RL,RC and LC driving point functions using Cauer I,II and Foster I,II forms. 6. Able to justify why frequency domain method is preferred over time domain and the importance of impedance matching. 7. Able to answer the oral questions/queries by evaluators and write assignments and answers in English.
Electronic Instrumentation and Control	1. Explain principle of operation for various sensors. 2. Describe functional blocks of data acquisition system. 3. Write Input- output relationships by means of block diagrams, mathematical modeling and transfer functions. 4. Plot the bode and nyquist plots, root locus diagrams for a given control system and identify the parameters and carry out the stability analysis.

Class: SE EXTC **Sem:IV**

Name of the Course	**COURSE OUTCOMES**
Applied Mathematics- IV	1. Able to state and express the properties of Cayley Hamilton theorem, derogatory matrix, diagonalizable matrix, value class ,solve boundary value problem, find Eigen values and Eigen vectors of matrix, function of square matrix, correlation & regression, probability, mean variance & MGF, extremals of given function , vectors in R^n for given conditions, Orthogonal or orthonormal basis , The Taylor's and Laurent's series expansion, residue, poles and singularities of the function, use Cayley Hamilton theorem, fit Binomial & Poisson's distribution. 2. Able to Prove, show the matrix is diagonalizable, derogatory ,statement on function of square matrix ,given set is vector space,subspace,extremals of given function is a curve. 3. Able to evaluate the complex integral by Cauchy's integral theorem and Residue theorem, integral for given path, Verify Cayley Hamilton theorem, Cauchy-Schwartz inequality, Pyathagorean theorem ,given set is vector space,subspace ,Construct Orthogonal or orthonormal basis.

Electronic Devices and Circuits II	1. Able to state and describe different biasing techniques for MOSFET, different coupling methods, various negative feedback topologies, types of oscillator, large signal amplifiers. 2. Able to explain need of cascading of amplifier, effect of cascading number of stages on the performance of amplifier, effect of negative and positive feedback. 3. Able to analyze biasing circuits of MOSFET, multistage amplifiers, negative feedback amplifiers, power amplifiers and oscillators. 4. Able to classify and compare different coupling methods, various negative feedback topologies, oscillator, large signal amplifiers. 5. Able to design multistage amplifiers, negative feedback amplifiers, power amplifiers, oscillators, biasing circuits of MOSFET. 6. Able to answer the oral questions/queries by examiner/evaluators and write assignments and answers in English.
Linear Integrated Circuits	1. Understand the fundamentals and areas of applications for the integrated circuits. 2. Analyze important types of integrated circuits. 3. Demonstrate the ability to design practical circuits that perform the desired operations. 4. Understand the differences between theoretical, practical & simulated results in integrated circuits. 5. Select the appropriate integrated circuit modules to build a given application.
Signals & Systems	1. Understand about various types of signals and systems, classify them, analyze them, and perform various operations on them. 2. Understand use of transforms in analysis of signals and system in continuous and discrete time domain. 3. Observe the effect of various properties and operations of signals and systems. 4. Evaluate the time and frequency response of Continuous and Discrete time systems which are useful to understand the behaviour of electronic circuits and communication systems.
Principles of Communication Engineering	1. Use different modulation and demodulation techniques used in analog communication 2. Identify and solve basic communication problems 3. Analyze transmitter and receiver circuits 4. Compare and contrast design issues, advantages, disadvantages and limitations of analog communication systems.

Class: TE EXTC **Sem:V**

Name of the Course	**COURSE OUTCOMES**
Microprocessor & Peripherals Interfacing	1. Understand the basic concepts of microcomputer systems. 2. Understand the architecture and software aspects of microprocessor 8086. 3. Write Assembly language program in 8086. 4. Know the Co-processor configurations. 5. Interface peripherals for 8086. 6. Design elementary aspect of microprocessor-based system.
Digital Communication	1. Able to describe basics of probability theory, random variables & processes of signals, information theory, base band, band pass communication,

	source, channel coding and multiple access techniques and mitigate error in communication. 2. Able to compare different base band, band pass trans-receivers and differentiate between source, channel coding and multiple access techniques. 3. Able to demonstrate the concept in base band, band pass communication techniques and solve numerical on source and channel coding. 4. Able to analyze PDF and CDF of random variable, different base band, band pass modulation and demodulation tech. based on error probability, bandwidth, minimum number of bits per symbol and channel coding techniques based on no of errors that can be detected and corrected. 5. Able to design Shannon-Fano, Huffman Source, linear and convolutional codes. 6. Able to answer the oral questions/queries by examiner/evaluators and write assignments and answers in English.
Electromagnetic Engineering	After successful completion of the course student will be able to explain and evaluate EM fields and key physical parameters for: 1. Fields and energies in simple planar, cylindrical, and spherical geometries, Fields within conducting and anisotropic media 2. Electric and magnetic forces on charges, wires, and media Sinusoids and transients on TEM lines with mismatched impedances and tuning
Discrete Time Signal Processing	1. Able to state and describe the concepts of frequency response, phase delay, DFT,FIR & IIR systems & multirate signal processing. 2. Able to identify classify & explain types of filters based on magnitude & phase response, their designing methods & realization, applications of DSP. 3. Able to compute and apply magnitude & phase response of a system, DFT, windowing and frequency sampling for FIR design, BLT & impulse invariance for IIR design & sampling rate conversion of DT signals. 4. Able to analyze & calculate frequency response and pole zero diagram of a system, impulse response and transfer function of a system. 5. Able to design and realize FIR and IIR systems or filters & develop FFT flow graph. 6. Able to answer the oral questions/queries by xaminer/evaluators and write assignments and answers in English.
Data Compression and Encryption	1. Able to define data compression and encryption and describe different types of compression and encryption techniques/ algorithms with their applications in the area of telecommunication. 2. Able to explain all the key aspects of different network and system security. 3. Able to solve the problems on various methods of data compression techniques and number theory. 4. Able to distinguish among various types of data compression and encryption techniques/algorithms for text, audio, image and video data types. 5. Able to answer the oral questions/queries by examiner/evaluators and write assignments and answers in English.

Class: TE EXTC **Sem:VI**

Name of the Course	COURSE OUTCOMES
Microcontrollers & Applications	1. Define and describe the Features, architecture and pin configurations of 8051 microcontroller & ARM7. 2. Explain and Differentiate Microprocessor and Microcontroller, addressing mode, operating mode of 8051 microcontroller & ARM7. 3. Interface LED, LCD, keyboard, stepper motor and relay. 4. Draw & examine Connection to RS 232 for serial communication, ARM7 processor families, Concept of Cortex-A, the Cortex-R, the Cortex-M. 5. Design & Develop Microcontroller system with memory interfacing & write assembly programming for 8051 microcontroller & ARM7
Computer Communication Networks	1. Design a small or medium sized computer network including media types, end devices, and interconnecting devices that meets a customer‘s specific needs. 2. Perform basic configurations on routers and Ethernet switches. 3. Demonstrate knowledge of programming for network communications. 4. Learn to simulate computer networks and analyse the simulation results. 5. Troubleshoot connectivity problems in a host occurring at multiple layers of the OSI model. 6. Develop knowledge and skills necessary to gain employment as computer network engineer and network administrator.
Antenna & Radio Wave Propagation	1. Explain fundamental parameters of antennas for their analysis and design and also the radiation mechanism for antennas. 2. Visualize field radiated by various types of antennas. 3. Handle various antennas in the lab along with their applications and uses of various types of antennas. 4. Explain wave propagation phenomenon
Image Processing and Machine Vision	1. Describe visual perception of human, different transform used in Image processing, use of transform coefficients, basics of image segmentation, ,Image processing applications and models in Image Processing. 2. Carry out calculation on image in spatial domain, in frequency domain and demonstrate image segmentation. Interpret and analyze 2D signals in frequency domain through image transforms and compare techniques of image segmentation. 3. Justify and support use of spatial domain tool, frequency domain tool and image compression and segmentation techniques Apply quantitative models of image and video processing for various engineering applications. 4. Able to answer the oral questions/queries by examiner/evaluators and write assignments and answers in English.
Radar Engineering	1. Explain generalized concept of RADAR. 2. Solve problems using radar equations. 3. Describe different types of radar for specific application. 4. Explain concept of tracking radar. 5. Evaluate the design constraints for transmitter. 6. Evaluate the design constraints for receiver.

Class: BE EXTC **Sem:VII**

Name of the Course	**COURSE OUTCOMES**
Microwave Engineering	After successful completion of the course student will be able to 1. Characterize devices at higher frequencies. 2. Design and analyze microwave circuits. 3. Design and analyze amplifiers and oscillators at microwave frequencies. 4. Demonstrate skills of planning, design and deployment of microwave networks.
Mobile Communication System	After successful completion of the course student will be able to 1. Explain the cellular fundamentals and estimate the coverage and capacity of cellular systems. 2. Classify different types of propagation models and analyze the link budget. 3. Illustrate the fundamentals and system architecture of GSM, 2.5G and IS-95. 4. Apply the concepts of 3G technologies of UMTS and CDMA 2000. 5. Elaborate the principles of 3GPP LTE. 6. Identify the emerging technologies for upcoming mobile communication systems.
Optical Communication	After successful completion of the course student will be able to 1. List, write and explain fundamentals and transmission characteristics of optical fiber Communication. 2. List, write and explain principles and characteristics of various sources ,detectors and various fiber optic components 3. Calculate parameters for optical link budgeting and analyze the link
Internet Communication Engineering	After successful completion of the course student will be able to 1. Explain the operation of the components of a router including, DHCP, NAT/PAT, Routing function, Switching function. 2. Describe how DNS works in the global Internet including caching and root servers. 3. Understand the current state-of-the-art developments in Internet technologies for multimedia communications. 4. Understand the security protocol and services In the Internet 5. Appreciate the principles used in designing multimedia protocols, and so understand why standard protocols are designed the way that they are. 6. Understand the system design principles of multimedia communications systems. 7. Solve problems and design simple networked multimedia systems.
Operation Research	After successful completion of the course student will be able to 1. Understand the theoretical workings of the simplex method, the relationship between a linear program and its dual, including strong duality and complementary slackness. 2. Perform sensitivity analysis to determine the direction and magnitude of change of a model‘s optimal solution as the data change. 3. Solve specialized linear programming problems like the transportation and assignment problems, solve network models like the shortest path, minimum spanning tree, and maximum flow problems. 4. Understand the applications of integer programming and a queuing model and compute important performance measures
Management	After successful completion of the course student will be able to

Information System	1. Explain how information systems Transform Business 2. Identify the impact information systems have on an organization 3. Describe IT infrastructure and its components and its current trends 4. Understand the principal tools and technologies for accessing information from databases to improve business performance and decision making 5. Identify the types of systems used for enterprise-wide knowledge management and how they provide value for businesses

Class: BE EXTC **Sem:VIII**

Name of the Course	**COURSE OUTCOMES**
RF Design	After successful completion of the course student will be able to 1. Design impedance matching networks and passive RF filters. 2. Design and appraise RF amplifiers and oscillators. 3. Analyze EMI and EMC in RF circuits.
Wireless Networks	After successful completion of the course student will be able to 1. Explain the working of different wireless technologies like bluetooth and zigbee. 2. Understand the working of wireless LAN, PAN & MAN 3. Analyze the different types of Wireless Networks like LAN,PAN & MAN 4. Comprehend the working of Femtocells.
Satellite Communication	After successful completion of the course student will be able to 1. Explain basics of satellite communication, space segment and earth segment 2. Understand different satellite orbits and orbital parameters 3. Explain and analyze link budget of satellite signal for proper communication 4. Understand various applications of satellite communications
Project Management	After successful completion of the course student will be able to 1. Apply selection criteria and select an appropriate project from different options. 2. Write work break down structure for a project and develop a schedule based on it. 3. Identify opportunities and threats to the project and decide an approach to deal with them strategically. 4. Use Earned value technique and determine & predict status of the project. 5. Capture lessons learned during project phases and document them for future reference

Department of Mechanical Engineering

PEO

1) To develop the students to give outstanding performance in their professional career as employee in an industry or as an entrepreneur.
2) To motivate the students to pursue higher education or excel in multidisciplinary projects.
3) To inculcate professionalism, strong ethical values and lifelong learning ability in the students.

PO

1) Apply the basic knowledge of mathematics, Science and Engineering to solve the Mechanical Engineering problems.
2) Identify, formulate and analyse complex Mechanical Engineering problems and propose a substantial conclusion.
3) Design solution for complex Mechanical Engineering problems that will satisfy the specific need.
4) Demonstrate the ability to design and conduct experiments, interpret and analyse the data and report results.
5) Select and use appropriate modern Mechanical engineering tools to analyse and solve Mechanical Engineering problems.
6) Assess societal, health, safety, cultural issues and responsibility related to a Mechanical Engineering problem.
7) Understand the impact of Mechanical Engineering solution on environment and demonstrate the knowledge of need for sustainable development.
8) Apply ethical principles and be committed to professional ethics, responsibilities and norms of Mechanical Engineering practices.
9) Work effectively as an individual as well as in the teams and in multidisciplinary environment.
10) Communicate effectively in both verbal and written forms of communication.
11) Demonstrate knowledge of engineering and management principles and apply them to manage projects and finance.
12) Recognize the need for lifelong learning and will be engaged in it in the context of technological advancements.

PSO

1) Apply the Mechanical Engineering knowledge to design, analyze and solve the problems in Thermal Engineering, Mechanical Design and Manufacturing Engineering domain.
   2) Work effectively individually, in teams and manage the financial and technical aspects of projects in professional manner.
   3) Identify the revolutions in technology creating new learning opportunities and engage himself in lifelong learning.

Department of Mechanical Engineering

COURSE OUTCOMES

Class: SE Mechanical **Sem:III**

Subject	Course Outcomes
Strength of Material	1.Able to define Stress- strain, uni-axial, bi-axial and tri-axial stresses, tensile & compressive stresses, shear stress-Elastic limit, Hooke's Law, Define Poisson's Ratio, Modulus of elasticity, Modulus of rigidity, Bulk modulus, Yield stress, Ultimate stress, Factor of safety, state of simple shear, Mass Moment of Inertia , Area Moment Of Inertia, Axial force, shear force and bending moment, Resilience, proof Resilience, strain energy, Section moduli for different sections, beams for uniform strength, Flitched beams. Eccentric force, Core of Section 2.Able to explain types of stresses, strains, Elastic constants, Parallel Axis theorem, Polar Moment of Inertia, Principal axes, Principal moment of inertia, types of beams & loads, gradually applied load, suddenly applied load, impact load, double integration and Macaulay's Method for different type of loadings. 3.Able to derive relation between elastic constants, Volumetric Strain, Volumetric strain for tri-axial loading, Deformation of tapering members, Deformation due to self-weight, relation between shear force and bending moment, bending & torsion equation. 4.Able to calculate stresses, strains for simple bar, bar of varying cross section, Composite section, due to temperature, Area Moment Of Inertia for different shapes, bending, shear and direct & bending stresses for different sections, shaft diameter for solid and hallow shafts transmitting power when shafts in series and parallel, strain energy for gradually applied load, suddenly applied load, impact load, deflection using double integration and Macaulay's Method for different type of loadings, stresses in thin cylinders and spheres due to internal pressure, buckling load using Euler's & Rankine- Gordon Formula 5. Able to draw axial force, shear force and bending moment diagram, Bending & Shear stress distribution diagram.
Computer Aided Machine Drawing	1. Visualize and prepare detail drawing of a given object. 2. Read and interpret the drawing 3. Draw details and assembly of different mechanical systems. 4.Convert detailed drawing into assembly drawing using modeling software 5.Convert assembly drawing into detailed drawing using modeling software 6.Prepare detailed drawing of any given physical object/machine element with actual measurements
Material Technology	1. Students will be able to understand different types of imperfections, failure mechanisms and deformations in materials. 2. Students will be able to understand and plot different types of equilibrium diagrams. 3. Students will be able to understand different heat treatment processes and their applications. 4. Students will be able to differentiate microstructures of different materials. 5. Graduates will demonstrate an ability to participate and succeed in competitive examinations like GATE and Engg. Services.

Thermodynamics	1.State the Laws of thermodynamics and explain the various fundamental concepts related to thermodynamics. 2.Demonstrate the application of laws of thermodynamics to wide range of systems. 3. Solve the numerical problems related to basics of thermodynamics and also related to heat and work interactions in thermodynamic systems. 4. Demonstrate the classification of compressors and solve the numerical problems for various applications of compressor. 5. Analyze and solve the numerical problems based on vapour power cycles and gas power cycles.
Applied Mathematics III	1.Solve differential equations by Laplace transform and inverse Laplace transform, Partial differential equations by using Bender Schmidt and Crank Nicholson Method. Find Laplace and inverse Laplace transform of the given function, analytic function, orthogonal trajectories for the given family of curves, image of the given region under given transform, bilinear transformation, Fourier series, half range Fourier series, complex form, coefficient of correlation, lines of regression. Test analyticity of the given function. 2.Prove properties of Laplace transform, orthogonal/orthonormal of the given set of function, analyticity of the given function, harmonicness of given function 3.Evaluate definite integral by using Laplace transform, real integral by using Cauchy's theorem
Production Process - I	1.State and describe the concepts, functions, and types of casting processes, joining processes, forming processes, plastic moulding processes, machine tools, tool path in programming. 2.Compare, discuss, and explain casting processes, joining processes, forming processes, plastic moulding processes, machine tools, tool path in programming. 3.Sketch different types of casting processes, joining processes, forming processes, plastic moulding processes, machine tools, tool path in programming. 4.Differentiate conventional and modern machine tools, sand moulding and machine moulding, TIG and MIG processes, Rolling, forging and Extrusion processes, plastic moulding processes, chip forming processes, tool path in programming. To calculate solidification time in casting process and riser size. 5.Answer the oral questions/queries by examiner/evaluators and write assignments and answers in English.

Class: SE Mechanical **Sem:IV**

Subject	Course Outcomes
Fluid Mechanics	1. State and describe different fluid properties, types of flows, concepts and laws related to fluid statics, kinematics of flow, fluid dynamics, boundary layer theory, compressible flows, real fluid flows. 2. Classify, distinguish, explain and discuss different types of fluids, stability conditions of floating body, approaches to describe fluid motion, flow and pressure measuring devices, fundamental laws, Equations & their applications, flow measuring devices, methods to control boundary layer separation, different types of losses in pipe, fundamentals of compressible flow. 3. Formulate, illustrate and derive the mass, energy, momentum equation, Navier-Stokes equation, expression of discharge through flow measuring devices, velocity distribution for laminar and turbulent flow, Darcy-Weisbach equation and Reynolds transport theorem. 4. Solve problems on fluid statics, kinematics of flow, fluid dynamics,

	boundary layer theory, compressible flows, real fluid flows and flow through pipes. 5. Evaluate hydrostatic forces on various surfaces and calculate resistance to flow of incompressible fluids through closed conduits and over surfaces.
Kinematics of Machinery	1. Define various components of mechanisms 2. Develop mechanisms to provide specific motion 3. Draw velocity and acceleration diagrams of various mechanisms 4. Draw Cam profile for the specific follower motion 5. Analyse forces in various gears 6. Select appropriate power transmission for specific application
Industrial Electronics	1. Able to illustrate construction, working principles and applications of power electronic switches. 2. Able to identify digital circuits for industrial applications. 3. Able to solve the problems on semi converter, full converter, number system, Boolean algebra. 4. Able to analyze speed-torque characteristics of electrical machines for speed control. 5. Able to design circuits using op-amp, timer555, and microcontroller.
Applied Mathematics - IV	1. Solve the LPP by using Simplex, big M, Duality and Dual Simplex. Find Eigen values and Eigen vectors, functions of square matrix, quadratic form of matrix, orthogonal matrix, directional derivative, work done, Probability, Expectation, Variance, moments 2.Prove / Show the matrix is diagonalizable, derogatory, functions of square matrix, irrotational or conservative vector field 3.Evaluate / Expand the Line integral, real integral by using Green's, Stoke's and Gauss Divergence theorem, verify Cayley Hamilton theorem, Green's Theorem 4.Test the hypothesis for large or small samples, Independence of attributes and goodness of fit, Analysis of variance
Production Process - II	1. state and describe the concepts, functions and applications of chip formation, dynamometer, presses, indexing devices, NTM processes, Additive manufacturing etc. 2. compare, discuss and explain, Merchant's theory, tool forces, dynamometers, tool geometry economics of metal cutting, cutting tool materials, Sheet metal operations, jigs and fixtures. 3. sketch and draw Merchant circle, Dynamometers, cutting tool geometry, press tool dies, jigs and fixtures elements, NTM processes, AM systems etc. 4. differentiate sheet metal dies, Jig and Fixtures, EDM and ECM, AJM and WJM, AM and CNC machining and calculate total pressure, Scrap strip layout, other elements of press in the design of Blanking die, Piercing die. 5. answer oral questions/queries by examiner/evaluators and write assignments and answers in English.

Class: TE Mechanical **Sem:V**

Subject	Course Outcomes
Heat Transfer	4. Able to identify the three modes of heat transfer (conduction, convection, radiation) 5. Able to illustrate basic modes of heat transfer 6. Able to develop mathematical model for each mode of heat transfer 7. Able to develop mathematical model for transient heat transfer 8. Able to demonstrate and explain mechanism of boiling & condensation 9. Able to analyze different heat exchangers quantify their performance
Dynamics of Machinery	1. Demonstrate working Principles of different types of governors and Gyroscopic effects on the mechanical systems 2. Illustrate basic of static and dynamic forces 3. Determine natural frequency of element/system 4. Determine vibration response of mechanical elements / systems 5. Design vibration isolation system for a specific application 6. Demonstrate basic concepts of balancing of forces and couples
Internal Combustion Engine	1.Understand Present Scenario of ICE, Name Conventional Systems and State Limitations or Disadvantages, Types and Selection of ICE Systems and Load Calculation. State Details of Engine Rating, Working Cycles, Pollution and Pollution Control. 2. Discuss various conventional Systems and Distinguish between Conventional and Non-conventional System, Explain different working cycles, Engine Accessories and their effect on the Performance. Identify Operational Characteristics. Distinguish between Two Stroke and Four Stroke Engines, Distinguish between Petrol and Diesel Engine. Distinguish between Conventional and Modern Engine, Different Ignition Systems, Lubrication and Cooling Systems, Discuss Various Majors taken for Pollution Control. 3. Applying Basic Concepts to Predict Capacity of ICE, Adverse Effect if any(Knocking, Dissociation, etc.) 4. Analyze ICE Working Parameters and Calculate Operational Effectiveness and Losses (Heat Balance Sheet) 5. Answer the Oral Questions. Explain Working of any ICE Component, ICE Phenomenon and Process
MSTD	1. Define various terms in machining sciences and tool design. 2. Explain construction and details of various machining processes and related instruments. 3. Demonstrate the inter-relationship between cutting parameters and machining performance measures like power requirement, cutting time, tool life and surface finish and illustrate the properties of various cutting tool materials and hence select an appropriate tool material for particular machining application 4. Calculate the values of various forces involved in the machining operations and solve problems on theory and economics of metal cutting. 5. Analyse heat generation in machining operation, coolant operations and economics of machining operations 6. Design various single and multipoint cutting tools

Mechanical Measurement & Control	1. State and explain the various fundamental concepts related to Mechanical measurement and control systems. 2. Classify, select and explain the working principle of various measuring instruments used in Mechanical measurement. 3.Solve the numerical problems related to static characteristics and measuring instruments. 4.Formulate the mathematical model and analyze the block diagrams to obtain transfer function of control systems. 5.Analyze and solve the numerical problems to determine time response specifications, steady state error and stability of control system. 6.Analyze the control system to represent it using Root Locus, Bode Plot, Nyquist Plot and State space model.
Press Tool Design	1. State, Describe and list Press tool elements and press working operations for mass production of sheet metal parts. 2.Describe, discuss, classify, and identify sheet metal working techniques and safety aspects and atomization for design of press tool. 3.Sketch working elements of press tools and setups for economic production of sheet metal components using Progressive, drawing, blanking and piercing dies. 4.Select and differentiate suitable material for different elements of press tool and to calculate total pressure, centre of pressure, other elements of press in the design of Blanking die, Piercing die, Drawing die and bending die. 5.Answer the oral questions/queries by examiner/evaluators and write assignments and answers in English.

Class: TE Mechanical **Sem:VI**

Subject	**Course Outcomes**
Finite Element Analysis	1. Calculate the values of various forces involved in the machining operations 2. Design various single and multipoint cutting tools 3. Analyse heat generation in machining operation and coolant operations 4. Illustrate the properties of various cutting tool materials and hence select an appropriate tool material for particular machining application 5. Demonstrate the inter-relationship between cutting parameters and machining performance measures like power requirement, cutting time, tool life and surface finish 6. Analyse economics of machining operations
Refrigeration & Air-Conditioning	1. Able to demonstrate fundamental principles of refrigeration & air-conditioning 2. Able to identify and locate various important components of the refrigeration & air-conditioning system 3. Able to illustrate various refrigeration air- conditioning processes using psychrometric chart 4. Able to design air- conditioning system using cooling load calculation 5. Able to estimate air- conditioning system parameters 6. Able to demonstrate understanding of duct design concepts
MQE	1. Students should be able to Define Metrology, fit, tolerance, comparator, surface roughness, terminology of screw thread and gear, quality and related terms and SQC. 2. To explain standards, IS 919, gauges, types of comparators, roughness parameters, various measurement instruments and methods, SQC tools and sampling techniques.

	3. Students should be able to Apply inspection gauge and checking systems and Demonstrate the understanding of purpose of critical dimensions in manufacturing. 4. To Solve the problems on limits, fits, tolerance and SQC charts 5. Design gauges and Analyse simple parts for dimensional accuracy and functionality. 6. Graduates will demonstrate an ability to participate and succeed in competitive examinations like GATE and Engg. Services.
Mechatronics	1. State and describe the basic concepts related to mechatronics and the various elements used for developing mechatronics Systems. 2. Draw the schematic/Functional block diagrams for the components of Mechatronics system and Explain their construction and working principle. 3. Analyse the control system for block diagram, stability, transient response, steady state errors, Root locus, bode plot, Nyquist plot, PID controllers. 4. Design and develop hydraulic, pneumatic, electro pneumatic, electro hydraulic circuits and PLC ladder logic diagram for given sequence or control application. 5. Select the Mechano-Electrical actuators and explain their working principle.
Industrial Automation	1. state concepts, principles, functions and applications of Automation, Pneumatics and Hydraulics, Sensors, Actuators, PLC and Robots. 2. discuss, classify, describe and explain, basic elements of an automated system, assembly line automation and material storage and transport systems, elements of Pneumatic and Hydraulic systems, Sensors and Mechano-elecrical Actuators, Programmable logic controller, and Robot feedback controls. 3. sketch and draw basic elements of an Automated system, hardwares used in assembly line automation, design of Hydraulic and Pneumatic circuits, Robot configurations. 4. differentiate Mechanization and Automation, types of Automation, Pneumatics and Hydraulics, Continuous and Discrete control, Robot configuration and to create ladder programming for different logic gates. 5. answer the oral questions/queries by examiner/evaluators and write assignments and answers in English

Class: BE Mechanical **Sem:VII**

Subject	Course Outcomes
Operation Research	1. Able to state and describe the concepts, assumptions, types in LPP, Assignment model, Transportation model, Inventory management, Game theory, Replacement model, Queuing model and simulation. 2. Able to classify, differentiate and discuss various optimization techniques such as LPP, Assignment, Transportation, Sequencing, Scheduling, Methods of Game theory, inventory control models and related concepts. 3. Able to solve the problems on LPP, Assignment, Transportation, Sequencing, Scheduling, Methods of Game theory, inventory control models, Replacement model and simulation. 4. Able to analyze and test optimality of LPP, assignment and

	transportation model. 5. Able to Formulate LPP, Assignment problem, Transportation problem for the purpose of optimization. 6. Able to apply the principles of economics and finance to determine minimum cost associated with inventory management and replacement cost and period.
CAD/CAM/CAE	1. Identify proper computer graphic techniques for geometric modeling 2. Able to transform, manipulate objects and store and manage data. 3. Able to prepare part programming applicable to CNC machine 4. Able to use rapid prototyping and tooling in any real life application 5. Able to identify the tools for analysis of a complex engg. Components.
Mechanical Utility Systems	1.Able to describe operating principles of compressors and pumps 2.Able to evaluate performance of reciprocating and rotary compressors 3.Able to illustrate and analyze characteristics curves of pumps 4.Able to interpret possibilities of energy conservation in pumping & compressed air systems
Production Planning & Control	1. Able to state and describe the concepts, functions, and types, factors influencing Activities of PPC, Forecasting, process planning, product planning Inventory, Project Management and advance production planning. 2. Able to classify, compare and discuss products, processes, forecasting methods, sequencing models, CPM/PERT, Assignment and transportation. 3. Able to solve the problems on forecasting, inventory, selection of process or machine, sequencing and scheduling, PERT/CPM, LPP, and Simplex, Assignment and Transportation model. 4. Able to analyze and test forecasting accuracy and optimality of LPP, assignment and transportation model. 5. Able to Formulate, construct, and draw a project network, LPP, Process sheets, work orders, shop or production orders, inspection orders, store issue orders. 6. Able to apply the principles of economics and finance to determine minimum cost of project and inventory management. 7. Able to answer the oral questions/queries by examiner/evaluators and write assignments and answers in English.
Machine Design II	1. Select appropriate gears for power transmission on the basis of given load and speed. 2. Design gears based on the given conditions. 3. Select bearings for a given applications from the manufacturers catalogue. 4. Select and/or design belts for given applications. 5. Design cam and follower and clutches

Class: BE Mechanical **Sem:VIII**

Subject	**Course Outcomes**
Renewable Energy Sources	1. Able to demonstrate need of different Renewable Energy Sources & their importance 2. Able to calculate & analyze utilization of solar and wind energy 3. Able to illustrate design of biogas plant 4. Able to estimate alternate energy sources in India

Automobile Engineering	1. Able to practically identify different automotive systems. 2. Able to describe importance and features of different systems. 3. Able to explain principle, construction and working with applications of various sensors in modern automobiles.
Refrigeration And Air Conditioning	1. Understand Present Scenario of HVAC and RAC, Name Conventional Systems and State Limitations or Disadvantages, Types and Selection of RAC Systems and Load Calculation. State Details of BEE Star Rating, Working Cycles, Need for Aircraft Refrigeration. OD and GW Effect 2. Discuss various conventional Systems and Distinguish between Conventional and Non-conventional System, Explain different working cycles, Multi-staging and its effect on the Performance. Identify Cooling Load for AC System Design. Distinguish between Different Aircraft Refrigeration System. Distinguish between various AC Systems. Discuss Various Protocols for Controlling OD and GW 3. Applying Basic Concepts Predict Capacity of Refrigeration System, HVAC System, Cooling Tower, Ducting System and Compute Cooling Load, Operating Cost. 4. Analyze Refrigeration and AC System Working Parameters and Calculate Operational Effectiveness and Losses 5. Answer the Oral Questions. Explain Working of any RAC Application.
Industrial Engineering and Management	1. State and describe the concept of IE & Productivity, Value engineering, roles and responsibilities of IE, factory layouts, CM and GT, principles of material handling 2. Explain the material handling systems, factors affecting facility location decisions, issues in cell design and differentiate between production & productivity, models of productivity measurement etc. 3. Prepare action plan for IE techniques implementation, illustrate the basic and secondary functions for any product, solve numerical problems related to productivity, time study, work sampling and line balancing 4. Construct network diagram for any project and FAST diagram for any product, perform job evaluation and assess effectiveness of MOST in certain applications. 5. Answer the oral questions/queries by examiner/evaluators and write assignments and answers in English and present a seminar on any case study of Value Engineering/ Topics on IE techniques.
Design of Mechanical Systems	1. Design material handling systems such as hoisting mechanism of EOT Crane, belt conveyors. 2. Design engine components such as cylinder, piston, connecting rod and crankshaft from system design point of view. 3. Design pumps for the given applications. 4. Prepare layout of machine tool gear box and select number of teeth on each gear.

Department of First year Engineering

COURSE OUTCOMES

Class: First Year **Semester-I**

Name of the Course	Course outcomes
Applied Mathematics – I	1. Able to state and express the Euler's theorem, types of Matrices, Taylor's series, Demoivre's theorem, Partial derivative & Jacobian of given function. Also solve, find the problems on roots of equation, Rank of matrix, n^{th} order derivative, simultaneous equation and extreme values of the function. 2. Able to Prove, show and test the properties of matrices, result on Jacobian, separation of real & Imaginary parts, fitting of curve, statement on Euler's theorem & partial derivative as well as complex number. 3. Able to verify, evaluate the Euler's theorem, consistency of simultaneous equations, linear dependence or independence of vector and the limit of given function.
Applied Physics – I	1. Able to state and describe basics of crystal structure parameters, X rays, liquid crystal phases, Semiconductor, Acoustics and Ultrasonic's, Dielectric and Magnetic materials. 2. Able to explain X ray diffraction techniques, variation of Fermi level position , applications of semiconductors , good acoustics, production, materials & applications of ultrasound, magnetic materials and differentiate between types of defects, semiconductor, magnetic materials. and derive characteristics of crystal structure, inter planar distance, Ohms law in magnetic circuit and relation between different parameters of dielectric material. 3. Able to Calculate the parameters of Crystal structure, semiconductor, acoustical of hall, ultrasonics, Magnetic circuit and dielectric materials. 4. Analyze the data and draws conclusion based on solution of problems on crystal structures, Miller Indices, semiconductors.
Applied Chemistry – I	1. Able to Define and explain Hardness of water its types, BOD & COD, Disinfection, reverse osmosis, polymer, polymerization, plastics and its types rubber, their preparation properties and uses,GT, lubricant and its properties, phase rue cement, refractory and CNTs. 2. Able to discuss estimation of hardness and methods of softening of water, lubrication with mechanism, compounding and fabrication of plastics, applications of plastics in medicine surgery and industry, vulcanization of rubber,reduced phase rule, limitations of phase rule manufacture of cement refractoty and CNT. 3. Able to differentiate or compare various methods of water softening, various types of plastics and various mechanisms of lubrications and apply the phase rule to water system and Pb-Ag system

	4. Able to solve numerical based on calculating hardness of water, and softening of water by lime soda and zeolite method, COD of water, Acid No. and Saponification No. of lubricating oil.
Engineering Mechanics	1. Able to state and describe the concepts and types of Force system, Moment, Couple, Equilibrium, Beam and support reaction, Friction, Truss and Basic concept related to Dynamics. 2. Able to identify, classify and explain Types of force system, Conditions of Equilibrium, Zero force member processes, Work energy principle, D'Alemberts principle, Conservation of momentum, draw a-t, v-t, x-t curves. 3. Able to solve the problems on Resultant of force system in 2D and 3D, Support reaction at various load, Centroid, Wedge and ladder friction, Kinematics of particles, kinematics of Rigid body and Kinetics of a Particle. 4. Able to analyze Truss, Friction, Rectilinear Motion, Projectile Motion, Velocities based on Instantaneous Centre of rotation. 5. Able to answer the oral questions/queries by examiner/evaluators and write assignments and answers in English.
Basic Electrical and Electronics Engineering	1. State and describe different theorems and equations in D.C and A.C circuits. 2. Classify, compare and explain different electrical and electronics circuits and their analyzing methods. 3. Solve the problems on D.C and A.C circuits. 4. Analyze and calculate parameters of A.C series /parallel circuit and 1phase xmer. 5. Derive and determine expression's and conditions for given circuits. 6. Answer the oral questions/queries by examiner/evaluators and write assignments and answers in English.
Environmental Studies	1. Able to define EVS, its scope & importance, Natural resources; renewable energy resources, sustainable development, environmental pollution and its sources, MoEF, functions of pollution control boards; Green Building, In-door air pollution, Carbon Credit, Disaster management, earthquake 2. Able to explain effects of environmental pollution, need of public awareness, ecosystem, energy & mass transfer in an ecosystem, social, economic and environmental aspects of sustainable development, 3R, Concept of carbon credit. 3. Able to classify, compare and explain energy resources, Classification & Importance of Natural resources. Explain the impact of global environmental crisis, Ecological succession. Carrying Capacity 4. Able to illustrate, effect of depletion of natural resources, working principle of hydropower, geothermal plants, wind turbines, PV cells, disaster management techniques for earthquake, control of air pollution, various case studies related to Environmental degradation.

Class: First Year **Semester-II**

Name of the Course	Course outcomes
Applied Mathematics – II	1. Able to solve the differential equation, Compute definite integral by using numerical integration, Find Area and mass bounded by curves, Apply numerical methods for solving first order differential equation, Change the order of integration. 2. Able to Prove, show identities on numerical interpolation, mathematical statement on beta and gamma function, DUIS. 3. Able to Evaluate Definite integral, Double and triple integral by Cartesian to polar coordinates, Volume bounded by curves.
Applied Physics – II	1. Define basics of interference in thin film & diffraction, optical fiber, Laser , quantum mechanics, superconductivity, and state types and merits of optical fiber, diffraction, de Broglie's duality & uncertainty principle , fundamental blocks of CRO and their applications, approaches of nanotechnology and methods to produce nano materials. 2. Describe and explain the characteristics of thin film , diffraction grating & their applications, optical fiber, construction and working of types of LASER, blocks of CRO & applications, superconductors under different conditions and their applications, approaches and tools of nanotechnology and Derive an expression for thin film interference conditions and its application, Fraunhoffer's diffraction due to silts, optical fiber parameter, equations in quantum mechanics and differentiate between Types of superconductor & optical fiber. 3. Solve numerical based on thin film interference, diffraction, optics parameter, quantum mechanics, electron focusing system 4. Analyze the data and draws conclusion based on solution of problems of thin film interference, diffraction, fiber optics, quantum mechanics, superconductivity, nanoscience & explains applications of thin film interference, superconductivity, nanotechnology and CRO.
Applied Chemistry – II	1. Able to Define and explain Corrosion, Chemical and Electrochemical corrosion, Paint, Metallic coating, Alloy, Purposes of making alloy, composition, properties and uses of non ferrous alloy, Powder metallurgy, Fuel, Characteristics of good fuel, Calorific value, Refining, Knocking, Cracking Octane number and cetane number, propellant, Composite, matrix phase & dispersed phase, Adhesive, Green Chemistry, 12 Principles of green chemistry. 2. Able to discuss Types of corrosion, mechanism. Factors affecting the rate of corrosion. Classification of alloy, steps involved in P.M., Ceramics, Classification, HCV & LCV, Analysis of coal, Refining, Knocking, Cracking, Biodiesel, power alcohol Types of Composite materials, Physical and chemical factors affecting adhesive action, Bonding process, Synthesis of adipic acid & indigo dye. 3. Able to differentiate between galvanizing and tinning. Or anodic and cathodic coating. Methods of controlling corrosion, effect of alloying elements, Advantages and Applications of PM, Catalytic and thermal cracking. Adv. Of biodiesel, Anti knock agents, Advantages and applications of Composite material and adhesives, Applications of Green chemistry. 4. Able to solve numerical based on calculating GCV & NCV of fuel, the

	components and elements present in solid fuel. Also the amount of Oxygen and air by weight & volume required for complete combustion of given fuel, atom economy in green chemistry.
Communication Skills	1. Communicate effectively in verbal form through basic language skills 2. Apply grammar and vocabulary effectively for life-long learning 3. Develop basic official correspondence for effective written communication 4. Demonstrate self-education through comprehension of technical texts and basic technical writing
Engineering Drawing	1. Able to introduce the basic idea of drawing instruments, symbolic lines & geometric constructions by 1st angle method & significance of I. S. conventions. 2. Able to visualize various views of solid objects, sections & sectional views of given objects. 3. Able to draw & read various orthographic projections & isometric projections of engineering components. 4. Able to draw various engineering curves by standard procedure. 5. Able with basic concepts required to study Machine Drawing especially for Mechanical & Automobile engineering branches.
Structured Programming Approach	1. Able to state, define and describe Algorithms, Data types, operators, function, Control statements, Data Input and Output, Array, String, structure, union. 2. Able to classify, explain and compare control statements and looping constructs in C, Storage Classes, structure and union, Referencing operator & Dereferencing operator. 3. Able to apply, demonstrate and illustrate Looping and Control statements, Passing Arguments to a Function, function concept on problem statements. 4. Able to calculate and analyze One-dimensional and Multidimensional array, Structure within structure, Operation on structures, Array of Structure. 5. Able to create, design and construct different Algorithm and flowchart, control and looping constructs in C. 6. Able to communicate basic concepts in C using different techniques.

Department of Master of Management Studies

PEO

- Demonstrate an understanding of management terminology and organize and manage the business to track the progress records of an organization.
- Conduct a survey of the business environment, identifying opportunities and formulating an effective and efficient means to capitalize on that opportunity creating something of value
- Formulate and communicate an original business idea to the broader business public, and/or formulate and communicate an original business plan.
- Perform skills directly used in a specific business specialty practice or context developed through projects in their program.
- Research any aspects of business practice to produce a solid empirical basis for decision-making.
- Read a set of financial books regarding the profit and loss statements of an organization, formulate a cogent assessment of the situation and develop recommendations for increased financial health of the organization.
- Assess the potential market for a specific set of products and services, and formulate a marketing plan for selling those products services to that constituency

PO

Leadership and Ethics
The qualities of strong leadership in constantly changing world are far more complex than they were just a decade ago. This programme teaches the fundamentals and requisite skill sets of effective leadership in a global environment and does so within an over-arching framework of social responsibility.

Strategic Planning
Visionary leaders see the big picture, the end-results, well before they implement a business plan. They know how to communicate and structure their ideas into logical steps that utilize their resources, respect social and cultural boundaries, and establish best practices with colleagues, customers, and suppliers.

Decision Making Tools
To reduce the risk of failure, it is essential, particularly in a global marketplace, to have a well-round understanding and knowledge of all elements involved. This programme examines decision-making tools in the context of e-commerce, customer service, and global business issues in an efforts to empower analytical thinking and reasoning skills.

Problem Solving
Effective global managers are problem sharp-shooters. Problem solving skills result from a firm understanding of the basic of tenets of global business practices and further refined through exposure to actual problem solving strategies. This programme relies on a mix of case studies as well as on real-life problems presented by global managers of successful area businesses.

Competencies
The programme inculcates the competencies like critical thinking, communications, teamwork, Self-Management, Professionalism.

PSO

1) Acquire the managerial professional attributes and be Capable of decision making by applying the knowledge of Management discipline.
2) Explore the entrepreneurial quality and start new business venture with innovative ideas.
3) Prepare students to undertake different researches in management programme.

Department of Master of Management Studies

Course Outcomes

Class: F. Y. MMS **SEM: I**

Name of the Course	Course outcomes
Perspective Management	1. Able to list, define and describe characteristics of management, planning, objectives and importance of strategy, management, planning, strategy & policies, functions of management and styles of leadership. 2. Able to compare, differentiate, discuss and explain strategies with policies, individual decision making vs group decision making, Principals of Management, types of plan, objectives, strategy, policies, and management process. 3. Able to prepare, choose, select and practice strategic plan to startup new small scale business, best suitable strategy, policy , leadership quality and decision making authority, best type of planning and strategy, principals of management and decision making tools in real life. 4. Able to analyze, test and experiment nature of organizing, and functions of management in problem solving, nature of strategy, Principals of Management in real life. 5. Able to design and conclude levels of strategy and policies and how management principals are effective.
Financial Accounting	1. Able to list, define and describe the items of accounting cycle, current assets, current liabilities, Accounting, book keeping, depreciation, inventory, Balance sheet, profit & loss account, inventory, Journal, Ledger, Trial balance. 2. Able to compare, differentiate, identify, discuss & explain Trial balance & balance sheet, Journal & ledger, Book keeping & accounting, Straight line method & written down value method, fraud & errors, revenue & capital income, final account & trial balance, types of account, accounting process, accounting concepts, various cost concepts, types of accounts, inventory, depreciation, Final account, income statement, balance sheet.

	3. Able to prepare, select, apply, illustrate & solve final account, store ledger, ledger accounts, trial account, depreciation account, cost sheet, statement of changes in financial position, most appropriate method for calculation of depreciation, inventory valuation, accounting principles for passing journal entries, accounting concepts, ledger accounts, final account, depreciation account, store ledger. 4. Able to analyze & calculate financial position with the help of Profit & loss account & balance sheet, requirement of inventory, working capital. Able to create and construct trial balance, cost sheet, balance sheet, cost sheet.
Business Statistics	1. Apply these basic concepts in business situations, Analyse charts graphs to analyse business situations. 2. Understand the uncertainty in business situations as probability. 3. Understand decision under risk, use of conditional expectation as basis for comparison. 4. Use of distributions in Quality control, Six sigma and process control. 5. Understand Confidence interval as way of hypothesis testing. 6. Understand Model building.
Operations Management	1. Understand the basic concepts and learn how to apply the same. 2. Understand the physical processes. 3. Understand characteristics of equipment, machines and workflow. 4. Understand how, when, what and how much to order, stock and cost implications. 5. Understand capacity utilization, overall production planning and control. 6. Understand quality and control methods, understand sources of variation and identify them on charts & process improvement.
Managerial Economics	1. To demonstrate perpetual base for multi-disciplinary principles in managerial economics for achieving organizational goals. 2. To become life-long learners of the skills and competencies necessary to adapt and manage global economic challenges. 3. Develop research based thinking and use of quantitative and statistical tools for business decision making.
Effective & Management Communication	1. Able to list, define and describe channels of communication, elements of communication, models of communication, Communication, Public Speaking, Group Discussion, Meeting, personal barriers arising in communication, semantic barriers and psychological barriers arising in communication. 2. Able to compare, differentiate, discuss & explain theories of communication, verbal and non-verbal communication, differentiate between formal and

	informal, Do's and Don'ts of group discussion, process of communication, types of grapevine, types of meetings, horizontal communication with its merits and demerits, types of reports, 7c's of business communication, objectives, features of communication. 3. Able to prepare, illustrate , practice & solve report on improving discipline in college, the development of technology for managers, business etiquette when dealing with people, tips to become self-confident while communicating, Case Study. 4. Able to analyze the use of modern services in business communication
E-commerce	1. Able to list, define and describe the e-commerce, models of e-commerce, EDI, Product & Service Digitization, Infrastructure of e-commerce, Ethical issues in e-commerce & Security issues in e-commerce. 2. Able to compare, differentiate, identify, discuss & explain B2B, B2C, C2C, C2B, B2G, G2B & G2C models of e-commerce, traditional commerce vs e-commerce, e-commerce vs m-commerce, impact of e-commerce on supply chain management & positive & negative side of increased usage of technology in business & society. 3. Able to prepare, choose, demonstrate & practice analytical chart of active & passive attacks, more suitable e-payment option, usage of Paytm, e-banking, debit card, credit card & other e-payment techniques & ethical & security issues during online transactions. 4. Able to analyze, test & experiment management challenges & opportunities of e-commerce, impact of changes in business processes & risk management options & usage of smart card in real life. 5. Able to design and conclude catalogues in B2C e-commerce, digital signature, when & how to use e-commerce models.
Personal Grooming/Personal Effectiveness	1. Know yourself (Your Values, Abilities and Goals). 2. Identify influences of their attitudes towards success, achievement, and disappointment both in personal and professional lives. 3. Enhancing corporate and social Image, learning grooming basics and personal hygiene management. 4. An understanding of the key role listening plays in the ability to solve problems, work effectively with customers, and be a valuable team member. 5. Augment skills related to this important dimension of the selection process in organizations.

Class: F. Y. MMS **SEM: II**

Name of the Course	Course outcomes
Marketing Management	1. Able to list, define and describe importance of marketing, characteristics of effective segmentation, need, demand, want, product, value, satisfaction, market, marketing management, segmentation market positioning and methods of segmentation. 2. Able to differentiate, identify, discuss & explain between selling and marketing, trends of economic environment, concepts of marketing and modern marketing concepts, bases of segmentation, de-marketing and reasons for doing segmentation. 3. Able to choose, apply & illustrate effective segmentation a criterion's, positioning strategies on segmented market, classification of product, concept and components of marketing mix and consumer's decision making process. 4. Able to analyze, test & experiment levels of market segmentation, factors affecting pricing, factors affecting choice of distribution channels, factors influencing consumer behavior, steps involved in target marketing, consumer behavior and Experiment factors affecting marketing environment. 5. Able to design and assess tools for promotional activities, consumer purchase process, macro environment members and micro environment members.
Financial Management	1. Able to list, define and describe the sources of Finance, Financial Management, Working Capital, Inventory Management, approaches of working capital finances 2. Able to compare, differentiate, identify, discuss & explain proposals with the help of capital budgeting, different sets of capital structure planning , gross working capital vs net working capital, impact of discounting factors for selection of proposal, positive & negative side of excessive working capital, financial management, ratio analysis, working capital, inventory management, cash management, receivables management, capital budgeting, capital structure, leverage, cost of capital 3. Able to prepare, choose, select & compute Performa of financial statement, statement of working capital requirement, statement of inventory management, more suitable proposal with the help of capital budgeting, best suitable option among different proposals with the help of capital budgeting, optimal capital structure 4. Able to analyze, calculate financial statements using various ratios, working

	capital policies, Working capital requirement, optimal capital structure
Operations Research	1. Understand application in business. Data Envelopment Analysis as extension of LPP model. 2. Understand special cases of LPP and apply in appropriate situation**.** 3. Understand Competitive environment of business. 4. Understand project management techniques. 5. Understand queue model as a measure of performance of system.
Business Research Methods	1. Able to List, Define, Describe, Types of research, Types of Research Hypothesis, Classification of Research Design, Classification of Data, Sources of Data Collection, Research, Research Problem, Hypothesis, Research Design, Sampling, Research Report, Process of Research, Research applications in social & business, Research Design, Types of Research Proposals. 2. Able to Compare, Differentiate, Identify, Discuss, Explain Research Problem & Research Design, Descriptive vs Inferential Analysis, Primary Data & secondary data, Decision problem & Research Problem, Research Process, Classifications of Research Designs, Features of good Research study, classification of data, Research, Types of Research, Research Design, Hypothesis 3. Able to Prepare, choose, select, apply, employ, Illustrate, demonstrate, practice, compute, Solve Research Proposal, Research Report, Methods of Data Collection, Research Problem, Management Problem, Sampling Method, methods of data collection. 4. Able to Analyze, Calculate, test, experiment The process of Research, Classification of Research design, Testing of Hypothesis, data with the help of MS Excel. 5. Able to Design, Create, Construct, Assess, Conclude Questionnaire, Schedule for data collection, A report; structures questionnaire, Questionnaire; schedule, Research ethics; responsibility of ethics in research
Human Resource Management	• To be able to Contribute to the development, implementation & evaluation of employee selection, retention plans processes. • To be able to Facilitate with the concept of HRM towards development of professional practices imbibe by the students. • To be able to analyze information needs for current & emerging technologies • To be able to manage own professional development to conduct & organizational research activities. • To be able to understand key skills to enable students to effectively contribute dynamic organizations.

Cost & Management Accounting	1. Able to list, define and describe the elements of cost , process costing, normal loss, abnormal loss, abnormal gain, job costing, cost accounting, budget the classification of cost, job costing procedure, methods of costing, target costing, lifecycle costing 2. Able to compare, differentiate, identify, discuss & explain traditional costing, activity based costing, cost, and financial & management accounting, marginal costing & absorption costing, the impact of activity based costing on manufacturing firm, the relationship between financial, cost & management accounting, cost & management accounting, objectives of budgetary control, marginal costing, Break-even point, contribution, margin of safety and fixed cost. 3. Able to prepare, choose, apply & process account, job costing account, the best method of costing ,job costing procedure to complete the order of products to be delivered , sales budget, cash budget, flexible budget 4. Able to analyze, calculate the cost according to the classification, breakeven point, margin of safety, P/V ratio, sales, profit, contribution 5. Able to design and construct the process account, job costing account, the statement of cost sheet
Entrepreneurship Management	1. Able to list, define and describe the factors affecting women entrepreneur, internal & external motivating factors, and components of business plan. Entrepreneurship, entrepreneur, venture capital, women entrepreneur, enterprise, business plan, innovation, creativity, the factors affecting women entrepreneur, feasibility study involved in launching an enterprise, advantages of entrepreneurship, general, region specific & public policy conditions. 2. Able to compare, differentiate, discuss & explain opportunity, social & technopreneurship between entrepreneur, intrapreneurs & manager the opportunities in International Business, the product to start a business, the project to launch the start-up international variations in entrepreneurship, make in India campaign & Digital India Campaign, process of entrepreneurship, types of innovation, principles of innovation, steps involved in launching an enterprise, legal framework to start a business in India. 3. Able to prepare, choose & solve EPRG business plan the best route to start a business case study. 4. Able to analyze business opportunities in domestic & global market, who are entrepreneurs, PEST factors? 5. Able to design & assess the various fund raising options & financial institutions, the process of creativity .
Management Information	1. Able to list, define and describe characteristics of good information,

System	competitive advantages of information & MIS, data, information and MIS, need of MIS and information system development stakeholders. 2. Able to differentiate, identify, discuss & explain Manual vs computerized information system, threats in information security, transaction processing system, office automation system, knowledge work system, management information system, decision support system, and executive support system, several components of MIS and their relationship and porter's value chain model. 3. Able to choose, illustrate & demonstrate proper type of attack and type of security system, steps of system analysis, system design and reasons for having e-security. 4. Able to analyze, test & experiment influence of IT on organizational goals, analytical model of information system and several types of information system in real life. 5. Able to design and assess system development life cycle, marketing information system, financial information system, transaction processing system, manufacturing information system and HR information system.

Class: S. Y. MMS **SEM: III**

Name of the Course	**Course outcomes**
MMS 3rd Semester (Common subjects)	
International Business	1. Able to list, define and describe different modes of entering into international business, International Business, contract manufacturing, country risk analysis, Offshore Banking, Determinants of Porter Diamond Model, CAGE Framework of Pankaj Ghemawat, role of MNC's in India, nature & scope of IB 2. Able to compare, differentiate, discuss & explain globalization & international business, between domestic & international business, off shoring & outsourcing, in brief the international business approaches, the matrix organizational structure, advantages & disadvantages of MNC to host country, importance & objectives of IB, nature & scope of IB, supply and political factors influencing FDI, ways of optimizing supply chain management, principles of WTO 3. Able to prepare & choose EPRG model, the alternative for Foreign Direct Investment. 4. Able to design & assess various organizational structures, country attractiveness based on country risk analysis.
Strategic Management (UA)	1. To be able to List, define & describe strategic planning & identify the

	process involve in strategy formulations. 2. To be able to Compare differentiate various matrixes applicable to different industry context. 3. To be able to Prepare, demonstrate VRIO analysis & organizational value chain. 4. To be able to understand & compare different strategies apply by different industries. 5. To be able to Assess offensive & defensive strategies of different industries & its sub types with reference industry context.
MMS 3rd Semester (Finance Specialization)	
Financial Markets & Institutions	1. Able to List, Define, Describe Fixed Income Securities, Financial Products, Components of Financial System, Derivative Products, Products issued by Financial Institutions, Indian Financial System, RBI, Mutual Funds, Stock Exchange, Formal & Informal Sector. 2. Able to Compare, Differentiate, Identify, Discuss, Explain Fixed Income Securities, high return securities, equity & debt market, types of bonds, Primary market & Secondary Market, Financial Institutions & Financial Intermediaries, The structure of Indian Financial System, The importance of derivatives, role of RBI, Role of Broking house, Role of SEBI, Formal & Informal Financial Sector, Functions of financial system, Mutual Funds, Types of Mutual Funds 3. Able to Prepare, select, Illustrate List of financial products for investment, list of financial products issues in domestic market & global market, Best investment products among different alternative available, Role of commercial banks, role of broking house, role of broker, role of clearing house. 4. Able to Analyze, Calculate Outline of basics of derivative products, various types of MF, Advantages of MF, Different measures of risk of fixed income securities 5. Able to Design, Conclude Portfolio management services, Role of foreign exchange market in financial system, the working of intermediary, role of RBI in Indian financial system
Security Analysis & Portfolio Management	1. Able to List, Define, Describe Types of Securities, Fixed income securities, types of bonds, Security, risk, return, portfolio, initial public offer, rights issue, Portfolio management process, equity research 2. Able to Compare, Differentiate, Identify, Discuss, Explain Risk & return analysis, Profitability vs absolute loss, Investment vs speculation, The criteria for evaluation; portfolio management process, Portfolio; initial public offer, rights issue, Portfolio management process, functions of financial markets, criteria for

	evaluation, primary market, structure of secondary market 3. Able to Prepare, choose, select, apply, Hypothetical portfolio, Appropriate techniques of valuation of equity shares, The best/optimal securities for creation of portfolio, Capital market theories, factor models & APT; Investment decision theory; portfolio theory 4. Able to Analyze, Calculate Portfolio management process, risk return relationship, company analysis, portfolio optimization, Risk return analysis, return on equity investment, prices using EMN 5. Able to Design, Construct, Assess, Portfolio, Portfolio management strategies, Portfolio performance measurement
Corporate Valuation & Mergers & Acquisition	1. Be able to understand the process and economic rationale for M&As. 2. Be able to understand typical valuation techniques in M&As. 3. Be able to apply the valuation techniques to M&A assessment and decision making. 4. Have acquired analytical skills in analyzing real-world cases in M&As. 5. Have developed skills in group work, including communication, collaboration, and presentation.
Financial Regulations	1. Able to list, define and describe elements of KYC, financial regulatory bodies in India, preamble of Foreign Regulation Contribution Regulation Act 2010, SEBI, FCRA, FEMA, and Foreign Contribution, structure of financial regulations in India, objectives and functions of SEBI, objectives of FERA. 2. Able to compare, differentiate, identify, discuss & explain qualitative and quantitative credit control, between FERA & FEMA, techniques and illegal sources adopted in money laundering, concept Competition Commission of India, advantages of KYC and risk based approach in KYC, function of financial system, process of registration with the central government, Financial Regulation, Insurance Regulatory and Development Authority. 3. Able to illustrate & compute the whole structure of financial system in India, the reason behind formation of FEMA. 4. Able to analyze the penalties of Unfair Trade Practices, Money Laundering and FEMA, impact of non-registration/offence & penalties under Foreign Contribution Regulation Act 2010.
Derivatives & Risk Management	1. Able to list, define and describe elements the participants of derivatives, properties of options, option, derivatives, arbitrage, hedgers, and speculators, mechanism of option, NSCCL, purposes of derivatives.

	2. Able to compare, differentiate, identify, discuss & explain option trading strategies, between spot market& future market, holder & writer, forward & future, the options for risk management, in brief the financial system & settlement in derivatives market, why should one trade in option, the types of derivatives, functions of derivatives, features of future contract, advantages of futures, different dimensions of risk option. 3. Able to choose, illustrate & solve the various trading strategies for risk management & basic instruments for trading in derivatives, Black Scholes Model, problem based on interest rate futures. 4. Able to Calculate the future value of the money invested & forward price based on deal.
Banking & Financial Services Institutions	1. Understanding different kinds of financial services available in Indian financial institutions. 2. Do comprehension of various services and products available for retail and corporate by banks in India. 3. Understand different insurance products and plans available in India. 4. Comprehend different mutual fund products and plans available in India 5. Understand concept of leasing and leasing procedures followed by various Indian financial institutions. 6. Do comprehension of hire purchase financing and consumer credit financing in India.
MMS 3rd Semester (HRM Specialization)	
Training & Development	• Introduction to the concept of human resource development. • Exploring the concept of learning organization. • Introduction to adult learning and different methodologies. • Introduction to preparation of training budget, calendar and training modules. • Understanding the process of training needs assessment. • Understanding the method of competency modeling and mapping. • Exploring various types of training. • Introduction to training evaluation, cost benefit analysis and ROI.
Compensation & Benefits	• Understanding business context for reward strategies and preparing strategies. • Understanding the elements of reward strategy and management. • Exploring Compensation / Remuneration place in Reward Strategy.

	• Understanding Elements of Compensation Structure. • Learning to Cost the CTC of each element of Compensation Structure. • Understanding the concept of Inflation. • Understanding Provident Fund, ESIC, Gratuity, Superannuation, Bonus under Payment of Bonus Act. • Learning various types of Variable Pay. • Preparing the CTC of an employee.
Competency Based HRM & Performance Management	• Basic Understanding of concept of Competency and its relevance to modern day Organizations. • Gaining knowledge about the various methods of data collection in mapping process and knowledge of validating the Competency model. • Knowledge about running the assessment centre and Report writing and learning about how to give feedback. • Learning about the conceptual frame work of Performance Management System and its linkage with HR practices. • Learning about the Implementation of Performance Management System, issues and challenges. • Overview of ethical practices in performance management.
Labor Laws & Implications on Industrial Relations	• To give a snapshot of IR and the faculty to relate importance of IR to Labor Laws, changing dynamics of IR. • Understanding court jurisdictions and basics of labor laws. • To study history, provisions, case laws & amendments under each law.
HR Planning & Application of Technology in HR	• Introduction to HR Planning and forecasting. • Learning the concept of job analysis and selection. • Understanding the nuances of workforce diversity. • Overview of application of technology in HR. • Introduction to HR Analytics.
Employee Relations, Labor Laws & Alternate Dispute Resolution	• Discuss the history of the IR movement and growth in India. • Discuss various definitions of IR & IR approaches with their advantages and disadvantages. • Understanding the genesis of conflict in IR and various methods prevent the same. • Understanding various methods to solve the conflict. Drafting simple settlement agreements and discuss issues related to enforceability of

	agreements. • To highlight the importance of Labor welfare & workers participation in management and how can it help for smooth industrial relations. • This chapter is expected to be thought completely with practical examples of companies. No particular book required for the same
MMS 3rd Semester (Operations Specialization)	
Supply Chain Management	• Understanding of Supply chain. • Understanding of Logistics concept. • Understanding of Warehousing function. & distribution channel. • Understanding of Warehouse process and logistics information. • Understanding of customer service and performance measurement. • Understanding various distribution networks. • Understanding importance information in supply of chain. • Understanding various ethics, Rules and regulations in supply chain.
Operations Analytics	• Describe the major methods of customer data collection used by companies and understand how this data can inform business decisions. • Describe the main tools used to predict customer behavior and identify the appropriate uses for each tool. Communicate key ideas about customer analytics and how the field informs business decisions. Communicate the history of customer analytics and latest best practices at top firms.
Service Operations Management	• Better understanding of services. • Understanding of workflow of Services. • Understanding complexity of services. • Developing quantitative ability for decision making. • Understanding Profitability in Service Industry. • Understanding Inventory in Service Industry. • Inventory control in Service industry.
Manufacturing Resource Planning & Control	• Achieving strategic fit between corporate strategy and operations strategy and global economy, Understanding the competitive priorities. • Understanding Value chain concept , core competence and distinctive capabilities. • Technology strategy, NPD, Importance of time as competitive priority Various process alternatives.

	• Understanding of trade offs, make or buy decisions, JIT. • Understanding application of Technology in operations strategy.
Materials Management	• Preparation for the course in respect Operations as well as Organization. • Planning with financial perspective and understanding impact of MRP on financial statements. • Overview of purchasing activities. • Detailed understanding of purchase process. • To understand how industry give selective importance to specific materials. • Understanding the controls over materials. • Understanding importance of standardization. • Understanding the processes & financial impacts. • Basic introduction to materials handling. • Subject: Strategic Operations Management
Strategic Operations Management	• Achieving strategic fit between corporate strategy and operations strategy and global economy, Understanding the competitive priorities. • Understanding Value chain concept , core competence and distinctive capabilities. • Technology strategy, NPD, Importance of time as competitive priority Various process alternatives. • Understanding of trade offs, make or buy decisions, JIT. • Understanding application of Technology in operations strategy.
MMS 3rd Semester (Marketing Specialization)	
Sales Management	• Familiarizing the student with the sales management function. • Deeper understanding about sales organizations across sectors. • The students will develop an appreciation of negotiations & sales of services and physical goods. • Familiarizing the students with techniques of sales process. • Identify right attitude and skills for sales force. Developing an understanding of Territory Management. • The student will learn how to motivated sales team and how compensation is linked to sales force performance and retention. To develop an understanding of the Art of positive evaluation.

Marketing Strategy	• To be able to develop marketing strategies based on product, price, place, promotion • To able to Identify role of strategies in process of New product development • To implement integrated plan of marketing to measure effectiveness from industry contest • To able to explain role of marketing towards appropriate decision making. • To able to create strategic awareness & conclude various alternatives of decisions to the industry.
Consumer Behavior	• To able to Identify measure determinants & influence of consumer decision process • To be able recognize ethical implications of marketing actions on consumer behavior • To be able to use most appropriate technique in consumer behavior apply to their relationship • To be able to understand appropriate combination of theories towards consumer behavior • To able to apply principles to the level of consumers for improvement of managerial decision making among students
Services Marketing	• Able to list, define and describe characteristics & types of services and service management, target market, segmentation, positioning & marketing mix, factors influencing demand, service management process and need of services marketing. • Able to compare, differentiate, discuss and explain societies from different living point of view, goods vs services, optimal vs maximal use of capacity, several positioning and marketing strategies, strategies of marketing mix and 7 P's of service marketing . • Able to prepare, select, apply and demonstrate marketing mix for Tata Nano, target market and positioning strategy, segmentation rules for targeted market, benefits of customer satisfaction and strategies of service marketing. • Able to analyze and test importance of service management, consumer behavior, market opportunities, need of service marketing and challenges in service marketing and marketing mix for fast food services. • Able to construct and conclude ratio and relationship between demand and capacity, customer satisfaction and behavior.

Product & Brand Management	• To be able Identify core benefits of Brand equity & its effective factors on industry context. • To able to understand knowledge of social, Legal & ethical issues in Brand & promotion decision • To able to understand key concepts of branding & ideas of brands • To able to understand & conduct measurement of brand equity, positioning & communication. • To able to provide appropriate tools, models to make better decision making.
Digital Marketing	• Able to list, define and describe benefits and limitations of digital marketing, disadvantages of SEO, digital marketing, e-commerce, models of e-commerce, advertising methods. • Able to compare, identify, discuss and explain different social media platforms, type of SEO, several social media platforms, several medias used in digital marketing. • Able to select, apply, demonstrate and practice best SMM practices, SEO strategies, internet marketing techniques, impact of digital marketing on consumer's decision making process, web page creation using HTML. • Able to analyze and test different approaches of e-marketing and suitable marketing media. • Able to design, create, construct and conclude basic HTML document structure, a marketing plan, documents using body attributes, header elements, text formatting tags, comments and lists and how digital marketing is more effective than traditional marketing.

Class: S. Y. MMS **SEM: IV**

Name of the course	Course Outcomes
MMS 4th Semester (Common subjects)	
Project Management	• Introduce concepts of basics of project management, Evaluate new project proposals, prepare detailed project report. • Understand network diagram, critical path, concepts of crashing network. • Define risks in project management, make resource charts, find probability of completion of project. • Understand organization structure, flow of authority and responsibility. • Understand concepts of earned value, prepare revised estimates of cost and

	time. • Evaluate project Financially, make projected statements of proposal. • Apply all above principles to cases, students Presentations.
MMS 4th Semester (Finance Specialization)	
Commercial Banking	• Knowledge & understanding of the history of Indian banking and related areas. • Understand basic schemes of deposit & credit, dangers of money laundering & usefulness of preventive vigilance. • Understand types of credits – term loan and working capital and how to appraise a credit proposal. • To understand important banking laws. • Understand measures taken towards financing priority sector schemes.
MMS 4th Semester (HRM Specialization)	
Strategic HRM	• Learning the basics of strategic HRM. • Introduction to HR strategies. • Introduction to talent management. • Learning basics of competencies & competency based HR practices. • Learning strategies for improving organizational effectiveness. • Introduction to HR strategies in international context.
MMS 4th Semester (Operations Specialization)	
Strategic Sourcing in Supply Management	• Basic understanding of Purchasing. • Development of Basic purchasing strategies. • Understanding about pattern of spending and costing. • Understanding of purchase cycle from requisition to payment. • Basic introduction to imports. • Understanding of types of purchase orders. • Understanding about classification about various types of items. • Understanding of Supplier evolution and selection. • Understanding of costing and reduction of cost.
MMS 4th Semester (Marketing Specialization)	
Trends in Marketing	• To be able to develop appropriate marketing plans of new trends & practices to ensure sustainability • To be able to demonstrate basic concepts to be apply for marketing

	products & services with reference different industry context. • To be able to utilize effective communication & problem solving skills through use of new technologies with understanding of business environment. • To be able to evaluate different marketing practices of business environment. • To be able to use, supervise management & marketing principles skills for any marketing occupation.