



JAIDEV EDUCATION SOCIETY'S
JD COLLEGE OF ENGINEERING AND MANAGEMENT
KATOL ROAD, NAGPUR
An Autonomous Institute, with NAAC "A" Grade
Department Of Electrical Engineering
"Igniting minds to illuminate the world"
2021-22



VISION	MISSION
"To develop competent and committed Electrical Engineers to serve the society"	<ol style="list-style-type: none">1. To impart quality education in the field of Electrical Engineering.2. To be excellent learning center through research and industry interaction.

Course Outcomes

Year/Semester : 3rd Semester (2nd Year)

Subject Code : EE3T002

Subject : Applied Mathematics III

Course Outcomes

1. Describe Matrices, properties of Laplace transform and Z Transform, partial differential equation, Function of Complex Variables.
2. Illustrate the examples using Matrices, Laplace and Z Transform, Partial differential equation, Function of Complex Variables.
3. Apply the knowledge of Matrices, Laplace transform, Z Transform, Partial differential equation, Function of Complex Variables to real world problems.
4. Analyze the question on Matrices, Laplace transform, Z Transform, Partial differential equation, Function of Complex Variables
5. Synthesize the knowledge of Matrices, Laplace transform, Z Transform, Partial differential equation, Function of Complex Variables to solve engineering problem.

Subject Code : EE3T003

Subject : Fundamental of Electrical Engineering

Course Outcomes

1. Remember the basic laws of electric and magnetic circuits also Define various A.C. and D.C Quantities
2. Understand and interpret the sinusoidal electrical quantities mathematically as well as graphically in the form of waveforms/phasors and illustrate the 1-phase/3-phase AC circuits.
3. Apply knowledge to calculate the power loss, voltage drop of electric and magnetic circuit also identify illumination required and the knowledge related with its need.
4. Analyze various electric, magnetic circuit and distinguish between properties.
5. Evaluate lighting system, recommend various lighting as per requirement also able to Explain A.C. fundamentals.
6. Design lighting system and also able to give solutions on single phase, poly phase and magnetic circuit unknown quantities

Subject Code : EE3T005

Subject : Electrical Machines-I

Course Outcomes

1. Remember basic principles, construction, of transformers, induction motors & dc machines.
2. Understand the operation, performance and characteristics of transformers, induction motors and dc motors.
3. To identify the different issues related to the speed control and torque improvement in ac & dc machines.



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4. Analyse the performance indices of ac & dc machines during motoring, generating and braking conditions.
5. Evaluate the operation of ac and dc machines along with the testing of machines.
6. Solve the different problems related to operation, supply conversion & performance indices of ac and dc machines.

Subject Code: EE3T006

Subject: Measurement & Instrumentation

Course Outcomes

- 1 Remember the different types of instruments used in electrical measurements.
- 2 Understand the operating principles of various electrical measuring instruments.
- 3 Apply knowledge of variety of instruments available for required parameter and identify the appropriate one.
- 4 Analyze and classify different electrical measuring instruments on basis of type of electrical/ physical quantity to be measured.
- 5 Evaluate different electrical measuring instruments

Year/Semester : 4th Semester (IInd Year)

SUBJECT CODE:-EE4T001

SUBJECT :- Numerical Method and Probability

Course Outcomes

1. Describe the concept of Trapezoidal Rule, Simpson's rule, Cramer's rule, approximate and true error, error propagation.
2. Illustrate the concept of various Numerical Techniques Bisection methods, Newton Raphson method, Gauss- Elimination Method, Modified Euler's Method, Runge-Kutta Method
3. Solve the given Engineering problem using the suitable Numerical Technique Bisection methods, Newton Raphson method, Gauss- Elimination Method, Modified Euler's Method, Runge-Kutta Method
4. Analyze the question on algebraic equation, root of equation, ODE, numerical integration, Interpolation, Curve Fitting
5. Evaluate given Engineering problem using the suitable Numerical Technique of algebraic equation, root of equation, ODE, numerical integration, Interpolation, Curve Fitting.
6. Develop the computer programming based on the Numerical Technique of algebraic equation, root of equation, ODE, numerical integration, Interpolation, Curve Fitting.



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SUBJECT CODE :EE4T003

SUBJECT : Power Station Practice

Course Outcomes

- 1 Remember the basic operations of various power plants
- 2 Understand and interpret the requirements and basics of power plant installation and site Selection
- 3 Apply knowledge to Economic Operation of Power Systems and the knowledge related with its need
- 4 Analyze various electric power plants operations and distinguish between properties.
- 5 Evaluate thermal, hydro, nuclear, gas power plant also able to Explain its fundamentals.
- 6 Design Economic Operation of Power Systems and also able to give solution simple of power plant on its basics.

SUBJECT CODE : EE4T005

SUBJECT : Power System-I

Course Outcomes

1. Define basic components power and structure of power system.
2. Understand the transmission and relate the different of system
3. To do Modelling in power system
4. select the parameter of determine value of inductance, of transmission line and transmission line. 5. The power with and improve the efficiency of MISSION impart quality in the field of Engineering.
- 6 To Analyze unit system of power system To proper power system and determine the capacitance, voltage regulation and efficiency explain the effect of sag and corona on To create structure of system suitable components power system

SUBJECT CODE : EE4T006

SUBJECT :Electrical Machine-II

Course Outcomes

1. Define voltage regulation, load torque angle and MMF of windings.
2. Classify reactances under transient conditions and effects of variable excitation.
3. Apply the method of synchronous impedance and Potier triangle to find voltage regulation.
4. Develop phasor diagram of three phase synchronous machine.
5. Analyze the V curves and effects of excitation and load on motor operation.
6. Compare various methods of cooling in synchronous machine



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Year/Semester : 5th Semester (IIIrd Year)

SUBJECT CODE :-BTEEC 503
SUBJECT :- Microprocessor and Microcontroller
Course Outcomes

- 1.To remember the architecture of 8085 and 8051
- 2.To understand interfacing and interrupt features of 8085 and 8051.
- 3.To develop program for basic applications
- 4.To distinguish and analyze the properties of Microprocessors & Microcontrollers
- 5.To explain programming logic and concepts of 8085 microprocessor and 8051 microcontroller
- 6.To build strong foundation for designing real world applications using microprocessors and microcontrollers.

SUBJECT CODE :- BTEEE 505
Subject :- Advances In Renewable Energy Systems
Course Outcomes

1. Remember various energy conversion technique from advance renewable energy systems
2. Understand the principle of energy conversion technique from biomass, geothermal and hybrid energy systems
3. Analysis the various factors which having impact on energy conversion technique and also
4. Analysis impact of Air, Thermal, Heavy metals and Nuclear pollutions on ecosystems.
5. Understand and evaluate Environment Impact Assessment Policies and Auditing
6. Create awareness about importance of renewable energy systems.

SUBJECT CODE :-BTEEOE 506
SUBJECT :- Electrical Mobility
Course Outcomes

- 1 To know the operating principle and the classification of electrical mobility.
- 2 To know various energy sources and storage devices for electrical mobility.
- 3 To know the principle of various machines used in electrical mobility.
- 4 To understand the operation of various convertors used in electrical mobility.
- 5 To understand modeling and application of electrical mobility
- 6 To understand Environment Impact of electrical mobility.



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Year/Semester : 6th Semester (IIIrd Year)

SUBJECT CODE : BTEEC601

SUBJECT : Control System

Course Outcomes

1. To know basic concepts and components of a control system
2. To derive transfer function of basic control system components
3. To perform stability analysis using time domain and frequency domain response on a given system
4. To design and analyze PID Controller
5. To understand and analyze state variable Technique

SUBJECT CODE : BTEEE604

SUBJECT : Industrial Automation and control

Course Outcomes

1. To define industrial automation and its various measurement systems
2. To illustrate different types of control techniques like PID,PLC,CNC and pneumatic etc.
3. To apply the knowledge of different control techniques
4. To analyze process control and examine process ,sequence and machine control structures
5. To evaluate and estimate different industrial automation measurement and control techniques
6. To develop and elaborate different automation control designing tools

SUBJECT CODE BTEEC602

SUBJECT Principles of Electrical Machine Design

Course Outcomes

1. Remember appropriate ratings, material, heating and cooling time constants.
2. Understand magnetic, electric materials, windings and transformers.
3. Apply concepts in design of electrical apparatus, devices and computer aided designing of transformer.
4. Analyze different materials, windings and modes of heat generation and heat dissipation in electrical machines.
5. Evaluate fault parameters in windings, voltage regulation and efficiency in transformer.
6. Design different types of transformers, heating coils and field coils.



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SUBJECT CODE :BTEEC603
SUBJECT :Power Electronics

Course Outcomes

1. Relate basic semiconductor physics to properties of power devices, and study the characteristics of linear and non-linear devices.
2. Compare performance of various power semiconductor devices, passive components and switching circuits
3. Develop power converter circuits and learn to select suitable power electronic devices by assessing the requirements of application fields.
4. Analyse a power electronic design at the system level and assess the performance.
5. Decide the critical areas in application levels and derive typical alternative solutions, select suitable power converters to control Electrical Motors
6. Discuss the role power electronics in the improvement of energy usage efficiency and the applications of power electronics in emerging areas.

SUBJECT CODE :- BTEEL606
SUBJECT :-PROJECT MANAGEMENT

Course Outcomes

1. To understand concepts of project management.
2. To develop a project plan.
3. To evaluate the project implementation strategy.
4. To analyze post project affects.

SUBJECT CODE :BTEEC602
SUBJECT :Principles of Electrical Machine Design

Course Outcomes

1. Remember appropriate ratings, material, heating and cooling time constants.
2. Understand magnetic, electric materials, windings and transformers.
3. Apply concepts in design of electrical apparatus, devices and computer aided designing of transformer.
4. Analyze different materials, windings and modes of heat generation and heat dissipation in electrical machines.
5. Evaluate fault parameters in windings, voltage regulation and efficiency in transformer.
6. Design different types of transformers, heating coils and field coils.



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Year/Semester: 7th Semester (4th Year)

SUBJECT CODE : BTEEC701

SUBJECT : Power System Operation and Control

Course Outcomes

1. To remember basic concepts of power system stability, operation and control
2. To understand concepts of power system stability, operation and control
3. To apply knowledge of active and reactive power control, synchronous machine modeling, excitation system in any power system
4. To examine power system stability and control its variables under different operating conditions.
5. To justify about system stability and its controlling operations
6. To modify any system for its stable operation

SUBJECT CODE: BTEEE705B

SUBJECT : Energy Audit And Conservation

Course Outcome

1. To outline the basics of energy conservation.
2. To classify various sources of energy, electrical and mechanical systems.
3. To interpret conservation of sources for betterment of energy audit.
4. To analyze Energy Conservation Proposals economically and prepare audit reports.
5. To estimate Energy efficiency opportunities in Thermal- Mechanical Systems and Electrical System.
6. To prepare energy audit reports with monitoring energy conservation

SUBJECT CODE : BTEEC703

SUBJECT : Electrical Drives

Course Outcome

1. Analyze the dynamics of Electrical Drives system.
2. Use various control techniques for controlling the speed of AC and DC motors.
3. Analyze the AC and DC drives.
4. To Select/recommend the appropriate Drive according to the particular applications.
5. State the recent technology of AC and DC drive



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SUBJECT CODE : BTEEC702

SUBJECT : High Voltage Engineering

Course Outcome

1. Illustrate the concept of electric field stresses, applications of insulating materials and methods for Non-destructive testing of equipment like transformers, insulators, isolators, bushings, lightning arrestors, cables, circuit breakers and surge diverters.
2. Explain the breakdown process in solid, liquid, and gaseous materials
3. Analyze methods for generation and measurement of High Voltages and Currents (both ac and dc)
4. Describe the phenomenon of over-voltage and choose appropriate insulation coordination levels based on IS & IEC Standards

SUBJECT CODE :BTEEE704A

SUBJECT :Special Purpose Electrical Machines

Course Outcomes

- 1.To outline the basics of energy conservation.
- 2.To classify various sources of energy, electrical and mechanical systems.
- 3.To interpret conservation of sources for betterment of energy audit.
- 4.To analyze Energy Conservation Proposals economically andprepare audit reports.
- 5.To estimate Energy efficiency opportunities in Thermal-Mechanical Systems and Electrical System.
- 6.To prepare energy audit reports with monitoring energy conservation.



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VISION	MISSION
"To be a Department providing high quality & globally competent knowledge of concurrent technologies in the field of Electronics and Telecommunication."	1.To provide quality teaching learning process through well-developed educational environment and dedicated faculties. 2.To produce competent technocrats of high standards satisfying the needs of all stakeholders.

1. BTETC701

Digital Communication

3 Credits

Course Outcomes:

1. Analyze the performance of a baseband and pass band digital communication system in terms of error rate and spectral efficiency.
2. Perform the time and frequency domain analysis of the signals in a digital communication system.
3. Select the blocks in a design of digital communication system.
4. Analyze Performance of spread spectrum communication system.

2. BTETPE702A

Microwave Theory and Techniques

3 Credits

Course Outcomes:

After successfully completing the course students will be able to

1. Formulate the wave equation in wave guide for analysis.
2. Identify the use of microwave components and devices in microwave applications.
3. Understand the working principles of all the microwave tubes.
4. Understand the working principles of all the solid state devices.
5. Choose a suitable microwave tube and solid state device for a particular application.
6. Carry out the microwave network analysis.
7. Choose a suitable microwave measurement instruments and carry out the required measurements.

3. BTETPE702B**RF Circuit Design****3 Credits**

After successfully completion of the course students will be able to

1. Understand behavior of passive components at high frequency and modeling of HF circuit.
2. Design HF amplifiers with gain bandwidth parameters.
3. Understand Mixer types and characteristics.
4. Gain the knowledge about PLLs and Oscillators with respect to their circuit topologies.

4. BTETPE702C**Satellite Communication****3 Credits****Course Outcomes:**

At the end of the course, the students will have:

1. Knowledge of theory and practice related to radar and Satellite communication.
2. Ability to identify, formulate and solve engineering problems related to radar and Satellite communication.
3. The student would be able to analyze the various aspects of establishing a geo-stationary satellite communication link.
4. Acquired knowledge about Satellite Navigation System.
5. Acquired knowledge about Radar and Radar Equations.

5. BTETPE702D**Fiber Optic Communication****3 Credits****Course Outcomes:**

At the end of the course, students will demonstrate the ability to:

1. Understand the principles fiber-optic communication, the components and the bandwidth advantages.
2. Understand the properties of the optical fibers and optical components.
3. Understand operation of lasers, LEDs, and detectors.
4. Analyze system performance of optical communication systems.
5. Design optical networks and understand non-linear effects in optical fibers

6. BTETPE702E**Wireless Sensor Networks****3 Credits****Course Outcomes:**

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

1. Design wireless sensor networks for a given application
2. Understand emerging research areas in the field of sensor networks
3. Understand MAC protocols used for different communication standards used in WSN
4. Explore new protocols for WSN.

7.BTETPE702F**Mobile Computing****3 Credits****Course Outcomes:**

1. At the end of the course, the student will be able to demonstrate:
2. A working understanding of the characteristics and limitations of mobile hardware devices including their user-interface modalities
3. The ability to develop applications that are mobile-device specific and demonstrate current practice in mobile computing contexts.
4. A comprehension and appreciation of the design and development of context-aware solutions for mobile devices.
5. An awareness of professional and ethical issues, in particular those relating to security and privacy of user data and user behavior.

8.BTETPE703A**Embedded System Design****3 Credits****Course Outcomes:**

At the end of the course, students will demonstrate the ability to:

1. Suggest design approach using advanced controllers to real-life situations.
2. Design interfacing of the systems with other data handling / processing systems.
3. Appreciate engineering constraints like energy dissipation, data exchange speeds etc.
4. Get to know the hardware – software co design issues and testing methodology for embedded system.

9.BTETPE703B**Artificial Intelligence Deep Learning****3 Credits****Course Outcomes:**

This course will enable students to

1. Identify the AI based problems.
2. Apply techniques to solve the AI problems.
3. Define learning and explain various logic inferences.
4. Discuss different learning techniques.

10.BTETPE703C**VLSI Design & Technology****3 Credits****Course Outcomes:**

After successfully completing the course, students will be able to

1. Model digital circuit with HDL, simulate, synthesis and prototype in PLDs.
2. Understand chip level issues and need of testability.
3. Design analog & digital CMOS circuits for specified applications

11.BTETPE703D**Data Compression & Encryption****3 Credits****Course Outcomes:**

At the end of this course

1. The student will have the knowledge of Plaintext, cipher text, RSA and other

cryptographic algorithm.

2. The student will have the knowledge of Key Distribution, Communication Model, Various models for data compression.

12.BTETPE703E

Big Data Analytics

3 Credits

Course Outcomes:

At the end of this course, Students will able to:

1. Explain the motivation for big data systems and identify the main sources of Big Data in the real world.
2. Demonstrate an ability to use frameworks like Hadoop, NOSQL to efficiently store retrieve and process Big Data for Analytics.
3. Implement several Data Intensive tasks using the Map Reduce Paradigm
4. Apply several newer algorithms for Clustering Classifying and finding associations in Big Data.

13.BTETPE703F

Cyber Security

3 Credits

Course Outcomes:

Students should be able to understand.

1. The difference between threat, risk, attack and vulnerability.
2. How threats materialize into attacks.
3. Where to find information about threats, vulnerabilities and attacks.
4. Typical threats, attacks and exploits and the motivations behind them.

14.BTETPE704A

Consumer Electronics

3 Credits

Course Outcomes:

Students will be able to:

1. List technical specification of electronics Audio system (microphone and speaker)
2. Trouble shoots consumer electronics products like TV, washing machine and AC.
3. Identify and explain working of various color TV transmission blocks.
4. Adjust various controls of color TV receiver and troubleshoot it.
5. Use various functions of Cam coder and shoot a video and take snapshots and save them in appropriate format.

15.BTETPE704B

Analog Integrated Circuit Design

3 Credits

Course Outcomes:

After the successful completion of this course, Students will be able to:

1. Describe the models for active devices in MOS and Bipolar IC technologies.
2. Describe layout considerations for active and passive devices in analog ICs.
3. Analyze and design IC current sources and voltage references.

4. Describe the noise sources and models applicable to ICs.
5. Understand and appreciate the importance of noise and distortion in analog circuits.
6. Analyze integrated circuit noise performance.
7. Analyze and design IC operational amplifiers.

16.BTETPE704C**Soft Computing****3 Credits****Course Outcomes:**

After the successful completion of this course, students will be able to:

1. Use a new tool /tools to solve a wide variety of real world problems.
2. Find an alternate solution, which may offer more adaptability, resilience and optimization.
3. Identify the suitable antenna for a given communication system.
4. Gain knowledge of soft computing domain which opens up a whole new career option.
5. Tackle real world research problems.

17.BTETPE704D**Advance Industrial Automation-1****3 Credits****Course Outcomes:**

After the successful completion of this course, the student will be able:

1. To identify suitable automation hardware for the given application.
2. To recommend appropriate modeling and simulation tool for the given manufacturing application.

18.BTETPE704E**Mechatronics****3 Credits****Course Outcomes:**

1. Identification of key elements of mechatronics system and its representation in terms of block diagram.
2. Understanding the concept of signal processing and use of interfacing systems such as ADC, DAC, digital I/O.
3. Interfacing of Sensors, Actuators using appropriate DAQ micro-controller.
4. Time and Frequency domain analysis of system model (for control application).
5. PID control implementation on real time systems.
6. Development of PLC ladder programming and implementation of real life system.

19.BTHM705**Financial Management****2 Credits****Course Outcomes:**

At the end of this course students will demonstrate the ability to

1. The students would be able to understand and define basic terminology used in finance and accounts
2. The students would be able to prepare & appraise Financial Statements and evaluate a company in the light of different measurement systems.

3. The students would be able to analyze the risk and return of alternative sources of financing.
4. Estimate cash flows from a project, including operating, net working capital, and capital spending.
5. To estimate the required return on projects of differing risk, to estimate the cash flows from an investment project, calculate the appropriate discount rate, determine the value added from the project, and make a recommendation to accept or reject the project
6. To describe and illustrate the important elements in project finance Using financial calculator and Excel in a variety of problems.



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Semester	Course Code	Name of the course	L	T	P	Credits
VI	ET6T001	Education, Technology and Society	2	0	0	2

Course Outcomes:

Sr.No	Course outcome number	CO statement
1	CO1	Integrate their technical education for betterment of society as well motivates them to lead a good
2	CO2	Plan, design, and assess effective learning environments and experiences
3	CO3	Develop technology-enabled assessment and evaluation strategies
4	CO4	Compare and contrast social, ethical, and legal issues surrounding technology
5	CO5	Compare and contrast social, ethical, and legal issues surrounding technology

Semester	Course Code	Name of the course	L	T	P	Credits
VI	ET6T002	Antennas and Wave Propagation	3	0	0	3

Course Outcomes:

Sr.No	Course outcome number	CO statement
1	CO1	Formulate the wave equation and solve it for uniform plane wave.
2	CO2	Describe transmission line characteristics
3	CO3	Analyze and design antenna arrays.
4	CO4	Analyze the given wire antenna and its radiation characteristics
5	CO5	Describe the operation of aperture and reflector antennas.
6	CO6	Identify the suitable antenna for a given communication system.

Semester	Course Code	Name of the course	L	T	P	Credits
VI	ET6T003	Computer Networks and Cloud Computing	3	0	0	3

Course Outcomes:

Sr. No	Course outcome number	CO statement
1	CO1	Know the terminology and concepts of the OSI reference model and the TCP-IP reference model.
2	CO2	Analyze the concepts of protocols, network interfaces, and design/performance issues in local area networks and wide area networks and Remember the wireless networking concepts
3	CO3	Understand the contemporary issues in networking technologies and Apply network tools and network programming
4	CO4	Analyze a given requirement of wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs) and design it based on the market available component
5	CO5	Apply the network programming for a given problem related TCP/IP protocol.
6	CO6	Create DNS DDNS, TELNET, EMAIL, File Transfer Protocol (FTP), WWW, HTTP, SNMP, Bluetooth, Firewalls using open source available software and tools.

Semester	Course Code	Name of the course	L	T	P	Credits
VI	ET6E004A	Professional Elective Course-II Embedded Processor & it's Interfacing with RTOS	3	0	0	3

Course Outcomes:

Sr. No	Course outcome number	CO statement
1	CO1	Define and Classify Embedded System and understand role of each element of embedded system. State special requirements and constraints (such as sustainability, reliability) that are imposed on embedded systems.
2	CO2	Design example for interfacing Keys, LED/LCD Displays, ADC and DAC.
3	CO3	Conversant with Assembly and C language programming for 8051. Formulate and Develop efficient assembly/C code for embedded system
4	CO4	Describe ARM processor, its modes, exception handling, instruction pipelining and basic programming.
5	CO5	Understand concepts of RTOS and its functionalities. Model system tasks using specification techniques such as FSM, State chart, UML
6	CO6	Build a typical cost-effective real-world embedded system in team with appropriate hardware components and software algorithms.

Semester	Course Code	Name of the course	L	T	P	Credits
VI	ET6E004B	Professional Elective Course-II AI: Knowledge Representation & Reasoning	3	0	0	3

Course Outcomes:

Sr.No	Course outcome number	CO statement
1	CO1	Understand the basic principles of Artificial Intelligence and challenges involved in designing intelligent systems by exploring human intelligence nature and its role in problem solving.
2	CO2	Represent given problem using state space representation and apply informed and uninformed search techniques on it.
3	CO3	Analyze the issues in the design of search programs and apply appropriate search algorithms.
4	CO4	Apply knowledge representation techniques and problem solving strategies to common AI applications.
5	CO5	Use Prolog Programming language using Predicate Logic.
6	CO6	Design Knowledge Based Systems.

Semester	Course Code	Name of the course	L	T	P	Credits
VI	ET6L003	Computer Networks and Cloud Computing Lab	0	0	2	1

Course Outcomes:

Sr. No	Course outcome number	CO statement
1	CO1	Know the terminology and concepts of Networking.
2	CO2	Analyze the concepts of network interfaces and design/performance issues in local area networks and wide area networks.
3	CO3	Understand the contemporary issues in networking technologies and Apply network tools.
4	CO4	Analyze a given requirement of wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs) and design it based on the market available component
5	CO5	Apply the network programming for a given problem related TCP/IP protocol.
6	CO6	Create DNS, File Transfer Protocol (FTP), WWW, HTTP, SNMP, Firewalls using open source available software and tools.

Semester	Course Code	Name of the course	L	T	P	Credits
VI	ET6L005	Electronic Design Engineering Lab	0	0	2	1

Course Outcomes:

Sr.No	Course outcome number	CO statement
1	CO1	Use DSO and Spectrum Analyzer.
2	CO2	Interface peripherals with computer
3	CO3	Design PCB using PCB designing software

4	CO4	Design & fabricate mini project.
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Semester	Course Code	Name of the course	L	T	P	Credits
VI	ET6P001	Campus Recruitment Training	0	0	2	1

Course Outcomes:

Sr.No	Course outcome number	CO statement
1	CO1	Solve the problems easily by using Short-cut method with time management which will be helpful to them to clear the competitive exams for better job opportunity.
2	CO2	Analyze the Problems logically and approach the problems in a different manner.
3	CO3	Apply mathematical analysis of data to make connections, draw conclusions and solve problems.
4	CO4	Learn a series of techniques through practical activities to develop presenting skills and enhance confidence to expand the potential of the individual.
5	CO5	Students can produce a resume that describes their education, skills, experiences and measurable achievements with proper grammar, format and brevity.
6	CO6	Ability to target the resume to the presenting purpose and Demonstrate professional behaviour(s) including preparedness, professional attire, and respectful presentation during interviews

Semester	Course Code	Name of the course	L	T	P	Credits
VI	ET6P003	Mini Project	0	0	2	1

Course Outcomes:

Sr.No	Course outcome number	CO statement
1	CO1	Identify problems based on societal /research needs.
2	CO2	Demonstrate capabilities of self-learning in a group, which leads to lifelong learning.
3	CO3	Demonstrate project management principles during project work.
4	CO4	Apply Knowledge and skill to solve societal problems in a group.
5	CO5	Analyze the impact of solutions in societal and environmental context for sustainable development.
6	CO6	Excel in written and oral communication.
7	CO7	Draw the proper inferences from available results through theoretical/experimental/simulations.

Semester	Course Code	Name of the course	L	T	P	Credits
VI	ET6T006	Research Methodology	2	0	0	Audit

Course Outcomes:

Sr.No	Course outcome number	CO statement
1	CO1	Student will learn the meaning, objective, motivation and type of research
2	CO2	Student will be able to formulate their research work with the help of literature review
3	CO3	Student will be able to develop an understanding of various research design and techniques
4	CO4	Student will have overview knowledge of modeling and simulation of research work
5	CO5	Student will be able to collect the statistical data with different methods related to research work
6	CO6	Student will be able to write their own research work with ethics and non-plagiarized way

Semester	Course Code	Name of the course	L	T	P	Credits
VI	ET6O002	OPEN Elective Course-II Introduction to Microprocessor, Microcontroller & Robotics	4	0	0	4

Course Outcomes:

Sr.No	Course outcome number	CO statement
1	CO1	Select a microprocessor or microcontroller suitable to the application.
2	CO2	Architect a microprocessor or microcontroller system and estimate the required hardware and software resources.
3	CO3	Perform the detailed hardware design of a microprocessor or microcontroller system.
4	CO4	Program the microprocessor or microcontroller using suitable techniques including use of allocation schemes and device drivers.
5	CO5	Program the microprocessor or microcontroller using suitable techniques including use of allocation schemes and device drivers.
6	CO6	Explain the fundamentals of robotics and its components

Semester	Course Code	Name of the course	L	T	P	Credits
VI	ET6O002B	OPEN Elective Course-II Broadband Communication	4	0	0	4

Course Outcomes:

Sr.No	Course Outcome number	CO statement
1	CO1	Recall Knowledge of theory and practice related to Broadband communication.
2	CO2	Understand knowledge about Elements of Optical Fiber Systems and knowledge about Computer networks

3	CO3	Analyze the various aspects of Computer networks and multimedia networks
4	CO4	Solve problems related to satellite and Ability to identify engineering problems related to satellite communication
5	CO5	Identify and solve engineering problems related to Mobile communication system



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Department of Electronics and Telecommunication Engineering

“Rectifying Ideas, Amplifying Knowledge”



VISION	MISSION
<p>“To be a Department providing high quality & globally competent knowledge of concurrent technologies in the field of Electronics and Telecommunication.”</p>	<p>1.To provide quality teaching learning process through well-developed educational environment and dedicated faculties. 2.To produce competent technocrats of high standards satisfying the needs of all stakeholders.</p>

Program: B.Tech in Electronics and Telecommunication Engineering

Semester	Course Code	Name of the course	L	T	P	Credits
V	ET5T001	Digital Signal Processing	2	1	0	3

Course Outcomes:

Sr. No	Course outcome number	Co statement
1	CO1	Represent discrete-time signals analytically and visualize them in the time domain.
2	CO2	Understand and meet the requirement of theoretical and practical aspects of DSP with regard to sampling and reconstruction.
3	CO3	Apply the concepts of different transforms and analyze the discrete time signals and systems.
4	CO4	Realize the use of LTI filters for filtering different real world signals.
5	CO5	Justify the use of Filter design to estimate the wavelet transform.
6	CO6	Discuss the use of multi rate signal processing to estimate the wavelet transform.

Semester	Course Code	Name of the course	L	T	P	Credits
V	ET5T002	Microcontroller and Application	3	0	0	3

Course Outcomes:

Sr.No	Course outcome number	Co statement
1	CO1	Know importance of microcontroller in designing embedded application and use of hardware and software tools.
2	CO2	Understand modern tools like Programmers, Debuggers, cross compilers and current IDE i.e. integrated development

		environment tools
3	CO3	Apply knowledge of microcontroller to interface mechanical system to function in multidisciplinary system like robotics, Automobiles
4	CO4	Analyze and formulate control and monitoring systems using microcontrollers.
5	CO5	Evaluate experiments based on interfacing of devices to real world applications.
6	CO6	Design real time cost effective controllers using microcontroller based system and develop interfacing to real world devices to serve engineering solution for Global, social and economic context.

Semester	Course Code	Name of the course	L	T	P	Credits
V	ET5T003	Control System Engineering	3	0	0	3

Course Outcomes:

Sr.No	Course outcome number	CO statement
1	CO1	Categorize different types of system and identify a set of algebraic equations to represent and model a complicated system into a more simplified form.
2	CO2	Characterize any system in Laplace domain to illustrate different specification of the system using transfer function concept.
3	CO3	Interpret different physical and mechanical systems in terms of electrical system to construct equivalent electrical models for analysis
4	CO4	Employ time domain analysis to predict and diagnose transient performance parameters of the system for standard input functions.
5	CO5	Formulate different types of analysis in frequency domain to explain the nature of stability of the system
6	CO6	Identify the needs of different types of controllers and compensator to ascertain the required dynamic response from the system.

Semester	Course Code	Name of the course	L	T	P	Credits
V	ET5E004A	Introduction to Robotics and Computer Programming	3	0	0	3

Course Outcomes:

Sr. No	Course outcome number	CO statement
1	CO1	Know the basic components of robots.
2	CO2	Differentiate types of robots and robot grippers.
3	CO3	Explain robot programming methods
4	CO4	Understand the components of robot programming

5	CO5	Design simple program to simulate robot movements
6	CO6	Develop robot program for specific application.

Semester	Course Code	Name of the course	L	T	P	Credits
V	ET5E004B	Telecommunication Switching System	3	0	0	3

Course Outcomes:

Sr.No	Course outcome number	CO statement
1	CO1	Know the main concepts of telecommunication network design.
2	CO2	Analyse and evaluate fundamental telecommunication traffic models.
3	CO3	Design basic modern signalling system.
4	CO4	Solve traditional interconnection switching system design problems.
5	CO5	Interpret concept of Network engineering.
6	CO6	Compare and Design telephone network, data network and integrated service digital network related to Cellular Telephone Concepts.

Semester	Course Code	Name of the course	L	T	P	Credits
V	ET5L001	Digital signal processing lab	0	0	2	3

Course Outcomes:

Sr.No	Course outcome number	CO statement
1	CO1	Acquire the basic concepts of various digital signals by plotting them.
2	CO2	Analyse and process the signals in the discrete domain.
3	CO3	Apply the techniques, skills, and modern engineering tools like MATLAB and digital processors.
4	CO4	Write and simulate the MATLAB/SCILAB program for various applications.
5	CO5	Design the filters to suit requirements of specific applications.

Semester	Course Code	Name of the course	L	T	P	Credits
V	ET5L002	Microcontroller and application lab	0	0	2	3

Course Outcomes:

Sr.No	Course outcome number	CO statement
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1	CO1	1. Design assembly languages structure and programming.
2	CO2	2. Interface various peripherals with 8051 microcontroller.
3	CO3	3. Simulate the programs on different software platforms.

Semester	Course Code	Name of the course	L	T	P	Credits
V	ET5L005	Software workshop lab	0	0	2	3

Course Outcomes:

Sr.No	Course outcome number	CO statement
1	CO1	Write MATLAB program for any given problem.
2	CO2	Plot various functions using different graphical techniques.
3	CO3	Make mathematical analysis for the given problem.
4	CO4	Get the complete expert hand on pSpice Software.
5	CO5	Draw, analyse and plot the electronic circuits using pSpice Software.

Semester	Course Code	Name of the course	L	T	P	Credits
V	ET5T006	Consumer Affairs	2	0	0	1

Course Outcomes:

Sr.No	Course outcome number	Co statement
1	CO1	Understand the genesis of consumer protection laws in India .
2	CO2	Identify and explain factors which influence consumer behaviour.
3	CO3	Demonstrate how knowledge of consumer behaviour can be applied to marketing.



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Program: B.Tech in Electronics and Telecommunication Engineering

Semester	Course Code	Name of the course	L	T	P	Credits
IV	ET4T001	Partial Differential Equation and Numerical Methods	2	1	0	3

Course Outcomes:

Sr.No	Course outcome number	CO statement
1	CO1	Understand calculation and interpretation of various errors in numerical methods and partial differential equations.
2	CO2	Familiar with finite precision computation.
3	CO3	Solve nonlinear equations in a single variable and find numerical solutions.
4	CO4	Apply Numerical analysis which has enormous application in the field of science and some fields of Engineering.
5	CO5	Analyze the numerical integration and differentiation, numerical solution of ordinary differential equation.

Semester	Course Code	Name of the course	L	T	P	Credits
IV	ET4T002	Basics of Python Programming	3	0	0	3

Course Outcomes:

Sr. No	Course outcome number	CO statement
1	CO1	Remember variables, types, operators, data structures, arguments, object oriented programming and libraries.
2	CO2	Understand assignment, keyword, expressions, lists, modules, exceptions and standard libraries.
3	CO3	Apply variables, types, operators, data structures, arguments, object oriented programming and Libraries.

4	CO4	Analyze modern updates in python for keyword, expressions, lists, modules, exceptions, standard libraries.
5	CO5	Evaluate storage space required to program python scripts, variables, types, operators and data structures.
6	CO6	Create python code to make functional Electronics hardware.

Semester	Course Code	Name of the course	L	T	P	Credits
IV	ET4T003	Electrical Machines and Instruments	2	1	0	3

Course Outcomes:

Sr.No	Course outcome number	CO statement
1	CO1	Remember basic principles & construction, of electrical instruments and ac & dc machines.
2	CO2	Understand the operation, performance and characteristics of electrical instruments and ac & dc machines.
3	CO3	To identify the different issues related to the electrical instruments, speed control and torque improvement in ac & dc machines.
4	CO4	Analyze the performance indices of electrical instruments and ac & dc machines. DC machines during various conditions..
5	CO5	Evaluate the operation of ac and dc machines along with the testing of electrical instruments.
6	CO6	Solve the different problems related to operation, & performance indices of electrical instruments ac and dc machines.

Semester	Course Code	Name of the course	L	T	P	Credits
IV	ET4T004	Electronic Devices and Circuits-II	2	1	0	3

Course Outcomes:

Sr.No	Course outcome number	CO statement
1	CO1	Explain the working principle, operation and characteristics of Semiconductor devices such as MOSFET
2	CO2	Apply Knowledge of semiconductor devices and concepts to implement various electronic circuits.
3	CO3	Analyze different amplifier configurations.
4	CO4	Evaluate the small signal model and performance parameters of the device.
5	CO5	Design different oscillator circuits for various frequencies
6	CO6	Build and test the performance of electronic circuits

Semester	Course Code	Name of the course	L	T	P	Credits
IV	ET4T005	Signal and System	3	0	0	3

Course Outcomes:

Sr.No	Course outcome number	CO statement
1	CO1	Understand different types of signals & systems.
2	CO2	Familiar with the properties of LTI (Linear Time Invariant System) system and process involved in analysis of signals before transmission.
3	CO3	Solve various complex mathematical problems for signal analysis and conversion of signals from one domain to another.
4	CO4	Apply knowledge of sampling and interpolation to sample and reconstruct signals during real time signal transmission and reception.
5	CO5	Analyze continuous and discrete systems in time and frequency domain.
6	CO6	Design Various Mathematical models to Investigate stability of the system.

Semester	Course Code	Name of the course	L	T	P	Credits
IV	ET4T006	Electromagnetic Fields	3	1	0	4

Course Outcomes:

Sr. No	Course outcome number	CO statement
1	CO1	Understand characteristics and wave propagation on high frequency transmission lines
2	CO2	Carryout impedance transformation on TL
3	CO3	Use sections of transmission line sections for realizing circuit elements
4	CO4	Characterize uniform plane wave
5	CO5	Calculate reflection and transmission of waves at media interface
6	CO6	Analyze wave propagation on metallic waveguides in modal form

Semester	Course Code	Name of the course	L	T	P	Credits
IV	ET4L003	Electrical Machines and Instruments Lab	0	0	2	1

Course Outcomes:

Sr.No	Course outcome number	CO statement
1	CO1	Remember basic principles & construction, of electrical instruments and ac & dc machines.
2	CO2	Understand the operation, performance and characteristics of electrical instruments and ac & dc machines.
3	CO3	To identify the different issues related to the electrical instruments, speed control and torque improvement in ac & dc machines.
4	CO4	Analyze the performance indices of electrical instruments and ac & dc machines.
5	CO5	Evaluate the operation of ac and dc machines along with the testing of electrical instruments.
6	CO6	Solve the different problems related to operation, & performance indices of electrical instruments ac and dc machines.

Semester	Course Code	Name of the course	L	T	P	Credits
IV	ET4L004	Electronic Devices and Circuits-II Lab	0	0	2	1

Course Outcomes:

Sr.No	Course outcome number	CO statement
1	CO1	Acquire the basic concepts of different semiconductor components and understand the use of semiconductor devices in different electronic circuits.
2	CO2	Plot and study the characteristics of semiconductor devices like MOSFET, UJT
3	CO3	Simulate Electronic circuits using SPICE.
4	CO4	Calculate different performance parameters of transistor.
5	CO5	Design, build, and test the performance of various circuits.

Semester	Course Code	Name of the course	L	T	P	Credits
IV	ET4L005	Signal and System Lab	0	0	2	1

Course Outcomes:

Sr.No	Course outcome number	CO statement
1	CO1	Understand basics of SCILAB syntax, functions and programming.
2	CO2	Familiar With characterization of various continuous and discrete time signals.
3	CO3	Solve the Problems on basic operations on the signals.
4	CO4	Apply Knowledge of linear time-invariant (LTI) systems for computing its response.
5	CO5	Analyze the spectral characteristics of signals using various transforms.
6	CO6	Design the Mathematical model of systems using various transforms.

Semester	Course Code	Name of the course	L	T	P	Credits
IV	ET4T007	Innovation and Entrepreneurship Development	2	0	0	Audit

Course Outcomes:

Sr.No	Course outcome number	CO statement
1	CO1	Identify and validate of ideas.
2	CO2	Remember Patent registration of Innovation.
3	CO3	Understand roles and responsibilities of Entrepreneurship.



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Program: B.Tech in Electronics and Telecommunication Engineering

Semester	Course Code	Name of the course	L	T	P	Credits
III	ET3T001	Multivariate Calculus	2	1	0	3

Course Outcomes:

Sr.No	Course outcome number	CO statement
1	CO1	Describe properties of Laplace transform, Convolution Theorem, Fourier integral theorem, Parseval’s identity, Cauchy’s integral theorem, Cauchy’s residue theorem.
2	CO2	Illustrate the examples using Laplace transform, Fourier Transform, Partial differential equation, Function of Complex Variables, Matrices.
3	CO3	Apply the knowledge of Laplace transform, Z-transform, function of complex variable, Advance partial differential equation.
4	CO4	Analyze the question on Laplace transform, Fourier Transform, Partial differential equation, Function of Complex Variables
5	CO5	Create a modal using Laplace transform, Fourier Transform, Theory of probability, Function of Complex Variables, Matrices.

Semester	Course Code	Name of the course	L	T	P	Credits
III	ET3T002	Electronics Devices and Circuits-I	3	1	0	4

Course Outcomes:

Sr.No	Course outcome number	CO statement
1	CO1	Explain the working principle, operation and characteristics of basic solid state devices such as PN junction diode, BJT and JFET.
2	CO2	Apply the concept of biasing techniques and feedback to improve stability of circuits.
3	CO3	Categorize amplifiers and oscillators based on feedback topology.
4	CO4	Analyse different amplifier configurations and DC bias circuitry of BJT.
5	CO5	Interpret BJT circuits for small signal at low and high frequencies.
6	CO6	Design Electronic circuits using diodes and transistors.

Semester	Course Code	Name of the course	L	T	P	Credits
III	ET3T003	Analog Communication System	2	1	0	3

Course Outcomes:

Sr.No	Course outcome number	CO statement
1	CO1	Explain signal to noise ratio, noise figure and noise temperature for single and cascaded stages in a communication system.
2	CO2	Distinguish between different types of analog modulation techniques based on bandwidth Occupied and power transmitted.
3	CO3	Analyze the performance of analog communications in the presence of noise by evaluating the figure of merit for different schemes of modulation
4	CO4	Evaluate different components of analog communication systems such as modulator, demodulator, mixer, receiver in time and frequency domain.
5	CO5	Design the modulators, demodulators for amplitude and frequency modulated systems.
6	CO6	Develop the ability to compare and contrast the strengths and weaknesses of various communication systems.

Semester	Course Code	Name of the course	L	T	P	Credits
III	ET3T004	Digital Circuits and Microprocessor	2	1	0	3

Course Outcomes:

Sr.No	Course outcome number	CO statement
1	CO1	Define Logic Families and Programmable Devices and understand the architecture of logic families and combinational digital circuits and describe the basic concept and interrupts in microprocessors.
2	CO2	Classify SOP and POS forms, combinational and sequential circuits, synchronous and asynchronous circuits.
3	CO3	Apply the principles of Boolean algebra to manipulate, minimize design logic circuits using logic gates and K-map and Use HDL & appropriate EDA tool for digital logic design and simulation.
4	CO4	Analyze combinational logic circuits and sequential circuits.
5	CO5	Recommend various combinational logic circuits like code converters, multiplexers, adders in the design of complex hierarchical combinational blocks like multipliers, fast adders etc and Validate sequential logic circuits elements like latches, flip-flops for counters, registers, simple finite state machine and similar circuits.
6	CO6	Design modular combinational circuits, synchronous sequential logic circuits and interface various devices with microprocessor.

Semester	Course Code	Name of the course	L	T	P	Credits
III	ET3T005	Integrated Circuit and Applications	3	1	0	4

Course Outcomes:

Sr. No	Course outcome number	CO statement
1	CO1	Understand and explain the basic concepts of OPAMP.
2	CO2	Demonstrate the working principle of various analog circuits.
3	CO3	Conduct experiments using analog electronic components, electronic instruments and modern tool.
4	CO4	Analyze analog circuits to evaluate various performance parameters.
5	CO5	Compare multivibrator circuits, Data converters.
6	CO6	Design and realize filters, Oscillators, linear and non-linear applications of Op-Amp

Semester	Course Code	Name of the course	L	T	P	Credits
III	ET3T006	Network Synthesis and Analog Filter	2	1	0	3

Course Outcomes:

Sr.No	Course outcome number	CO statement
1	CO1	Define various terminologies and network theorems.
2	CO2	Understand the basics of Network synthesis and analog filters.
3	CO3	Apply knowledge of mathematics to solve numerical based on network simplification and it will be used to analyze the same.
4	CO4	Analyze steady state and transient response of electrical circuits
5	CO5	Characterize the transfer function for two – port networks.
6	CO6	Design various electrical circuits using network theorems.

Semester	Course Code	Name of the course	L	T	P	Credits
III	ET3L002	Electronics Devices and Circuits-I Lab	0	0	2	1

Course Outcomes:

Sr.No	Course outcome number	CO statement
1	CO1	Acquire the basic concepts of different semiconductor components and understand the use of semiconductor devices in different electronic circuits.

2	CO2	Identify basic devices such as diodes, BJT and JFET from their package information by referring to manufacturer's data sheets.
3	CO3	Plot and study the characteristics of semiconductor devices.
4	CO4	Simulate Electronic circuits using SPICE.
5	CO5	Calculate different performance parameters of transistor.
6	CO6	Design, build and test the performance of various circuits.

Semester	Course Code	Name of the course	L	T	P	Credits
III	ET3L003	Analog Communication System Lab	0	0	2	1

Course Outcomes:

Sr.No	Course outcome number	CO statement
1	CO1	Observe SSB detection techniques.
2	CO2	Realize various modulation technique..
3	CO3	Generate signals using Scilab.
4	CO4	Identify and design different analog modulation techniques.
5	CO5	Analyze multiplexing systems such as FDM, TDM and QAM.
6	CO6	Compare different communication systems by analyzing in time and frequency domain

Semester	Course Code	Name of the course	L	T	P	Credits
III	ET3L004	Digital Circuits and Microprocessor Lab	0	0	2	1

Course Outcomes:

Sr.No	Course outcome number	CO statement
1	CO1	Find and prevent various hazards and timing problems in a digital design.
2	CO2	2. Understand the fundamental of basic gates and their use in combinational and sequential circuits Outline the use of digital components as a switching elements.
3	CO3	3. Develop ability to handle arithmetic operations using assembly language programming.
4	CO4	4. Analyze basic arithmetic and logical circuits required in microcomputer systems.
5	CO5	5. Examine the structure of various number systems and its application in digital design.
6	CO6	6. Design various combinational and sequential circuits and develop skill to build, and troubleshoot cost effective digital circuits.

Semester	Course Code	Name of the course	L	T	P	Credits
III	ET3T007	Universal Human Values	3	0	0	3

Course Outcomes:

Sr.No	Course outcome number	CO statement
1	CO1	Distinguish between self and body, and formulate the role of self in the day-today activities of a human being
2	CO2	Examine the role of a human being in ensuring harmony in society and nature.
3	CO3	Apply the understanding of ethical conduct to formulate the strategy for ethical life and profession.
4	CO4	Analyze the value of harmonious relationship based on trust and respect in their life and profession
5	CO5	Evaluate the significance of value inputs in formal education and start applying them in their life and profession
6	CO6	Develop more confidence and commitment for value-based living in family, society and nature



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DEPARTMENT OF MECHANICAL

COURSE OUTCOMES

SUBJECT : Engineering Mathematics III
SESSION : 2021-22

SUBJECT CODE :- BTBS301
SEM :- SEM III

CO1	Describe Convolution Theorem, Fourier integral theorem , Parseval's identity , Cauchy's integral theorem , Cauchy's residue theorem .
CO2	Illustrate the examples using Laplace transform, Fourier Transform, Partial differential equation, Function of Complex Variables.
CO3	Analyze the question on Laplace transform, Fourier Transform, Partial differential equation , Function of Complex Variables
CO4	Apply the knowledge of Laplace transform, Fourier Transform, Partial differential equation, Function of Complex Variables to real world problems.
CO5	Create a modal using Laplace transform, Fourier Transform, Partial differential equation, Function of Complex Variables.

Subject:-*Fluid Mechanics*
Session:-2021-22

Code:-*BTEMEC303*
Semester- *Third*

Student will be able to

1. Define fluid, various properties of fluid like viscosity, surface tension, vapor pressure, Compressibility,
2. Explain various types of flow, laminar and turbulent flows on flat plates and through Pipes, stability of floating bodies and immersed bodies
3. Calculate hydrostatic forces on the plane and curved surfaces and explain, Acceleration, velocity of fluid particles,
4. Analyze effect of fluid properties on static and dynamics of fluid flow
5. Derive appropriate formulae for specific and general fluid flow problems using the Principle of dimensional analysis.
6. Design simple flow circuits for desired application using the principles of losses in Pipes and fittings.

Subject: **Material Science & Metallurgy**

Subject Code: **BT-MEC 302**

Session: **2021-22**

Semester: **Third**

Students should be able to –

1. Acquire knowledge of various structure of materials, their properties, testing methodologies, equilibrium diagrams, heat treatment processes
2. Classify the various materials on the basis of characterization and behavior, heat treatment process with respect to property requirement, nondestructive testing methods
3. Construct and demonstration of the various phase transformation equilibrium diagrams, destructive and nondestructive testing, specimen preparation and metallography
4. Select and apply heat treatment process, strengthening mechanisms for required mechanical properties
5. Develop and categorized samples different materials for metallography
6. Evaluate mechanical properties, phase diagrams and metallographic samples

Subject: - ***Thermodynamics***

Subject Code:- ***BTMEC305***

Session: - ***2021-22***

Semesters:- ***Third***

Students will be able to

1. Describe the four basic laws viz. zeroth law, first law, second law and third law of thermodynamics and basic concepts of properties of substances.
2. Explain basic concepts, properties of substances and Laws of thermodynamics.
3. Apply the Laws of Thermodynamics for analyzing thermodynamic processes /cycles.
4. Analyze thermodynamic processes for heat and work transfer & their effect on properties of substances.
5. Design basic thermodynamic systems using basic laws of thermodynamics.
6. Assess the knowledge of thermodynamics to suggest solutions during thermodynamic analysis.

SUBJECT : Numerical Methods in Mechanical Engineering
SESSION : 2021-22

SUBJECT CODE :- BTMEC404
SEM :- SEM IV

At the end of the course students will be able to

CO1	Describe the concept of Trapezoidal Rule, Simpson's rule , Cramer's rule , approximate and true error, error propagation.
CO2	Illustrate the concept of various Numerical Techniques Bisection methods, Newton Raphson method, Gauss- Elimination Method, Modified Euler's Method, Runge–Kutta Method.
CO3	Solve the given Engineering problem using the suitable Numerical Technique Bisection methods, Newton Raphson method, Gauss- Elimination Method, Modified Euler's Method, Runge–Kutta Method.
CO4	Develop the computer programming based on the Numerical Technique Bisection methods, Newton Raphson method, Gauss- Elimination Method, Modified Euler's Method, Runge–Kutta Method.s

Subject: - Machine Drawing and CAD

Subject Code: - BTMEC304

Session: - 2021-22

Semester: - Fourth

Students will be able to

1. Identify Sectional view, machine elements, and symbols.
2. Discuss and explain different section view, machine elements, and assemblies.
3. Construct different sectional views, machine elements and assemblies.
4. Compare and apply different mechanisms, different machine elements and joints used.
5. Conclude the usage and application of different machine elements

Subject:- *Manufacturing Processes-I*

Subject Code:- *BTMEC401*

Session:- *2021-22*

Semesters:- *Fourth*

Students will be able to

1. Identify different castings, forming, joining & machining processes also it's working principles and applications.
2. Classify & describe different castings, forming, joining & machining processes.
3. Demonstrate working principles and applications of castings, forming, welding & machining processes including brazing and soldering.
4. Categorize different operation performed in castings, forming, joining & machining processes.
5. Create different job using different operation performed in castings, forming, joining & machining processes.
6. Assess different job prepared using different operation performed in castings, forming, joining & machining processes.

Subject: - *Physics of Engineering Materials*

Subject Code:- *BTBSE406A*

Session: - *2021-22*

Semesters:- *Fourth*

Students will be able to

1. Define the different types of structures of solid and also outline the various solid defects. Recognize the various types of dielectric material and their parameters.
2. Explain the origin of magnetism and summarize the significance of hysteresis loop in different magnetic materials. Discuss the principles of superconductivity and interpret the types of superconductors. Describe the method of preparation of single crystal.
3. Illustrate the domain theory of Ferromagnetism, Anti-ferromagnetism and ferrites. Apply the theory of band structure of solids to calculate conductivity of various solid materials. Utilize various characterization techniques for the analysis of Nano-materials.

4. Classify the different magnetic materials based on their properties. Analyze the superconducting material to use in modern technology. Categorize the Ferroelectrics, Pyro-electrics and Piezo-electrics materials.
5. Justify the importance of Fermi level in intrinsic and extrinsic semiconductors. Compare the superconducting materials. Judge the importance of Hall Effect for the study of materials.
6. Design the tools to study various crystal structure. Construct various types Photovoltaic cell. Develop various synthesis method for the preparation of Nano-materials.

Subject :-*Strength of Materials*
Session :-2021-22

Code :-*BTMEC403*
Semester- *Fourth*

Student will be able to

1. State the basic definitions of fundamental terms such as axial load, eccentric load, stress, strain, E , μ , etc.
2. Explain the stress state (tension, compression, bending, shear, etc.) and calculate the value of stress developed in the component in axial/eccentric static and impact load cases.
3. Solve problems on uniaxial, multiaxial stress situation, principal stresses, max. shear stress, their planes and max. normal and shear stresses on a given plane.
4. Analyze given beam for calculations of SF and BM, slope and deflection at a point on cantilever /simply supported beam using double integration, Macaulay's , Area-moment and superposition
5. Choose materials, sizes and sections for various applications such as beams, shafts, pressure vessels, columns, etc. and justify the selection
6. Design basic elements of structures like beams, shafts, key etc.

Subject:-*Theory of Machines-I*
Session:-2021-22

Subject Code: - BTMEC402
Semester- *Fourth*

Student will be able to

- 1.** Define and identify linkages, kinematic pairs, mechanisms, acceleration & velocity diagram, friction, lubrications system, clutches, brakes, dynamometers, cam and follower and balancing of rotating & reciprocating masses.
- 2.** Explain and discuss linkages, kinematic pairs, mechanisms, acceleration & velocity diagram, friction, lubrications system, clutches, brakes, dynamometers, cam and follower and balancing of rotating & reciprocating masses.
- 3.** Compute different forces acting in mechanisms, clutches, brakes, dynamometers, cam and follower and balancing of rotating & reciprocating masses and also able to construct velocity, acceleration.
- 4.** Analyze and demonstrate different mechanism, clutches, brakes, dynamometer, cam and followers, static and dynamic balancing of rotating and reciprocating masses.
- 5.** Compare and conclude different mechanism, acceleration and velocity diagram, clutches lubrication system, brakes, dynamometer balancing, cam and followers.

Subject:- Product Design I

Subject Code BTID405

Semester:-IV

Faculty:- Dr. B.R. Mahajan

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

CO1. Recognize simple commands for Mechanical designs

CO2. Categories and design documents for knowledge sharing

CO3. Apply different ICT tools to carry own work to meet design requirements

CO4. Work effectively with colleagues

Subject: - ***Industrial Economics & Entrepreneurship Development*** Subject Code: - ***BEME501T***
Session :-***2021-22*** Semester:- ***Fifth***

Student will be able to

1. Describe the concept of economic, demand, factor of production, effect of inflation, break even analysis, depreciation, monopoly, oligopoly, concept & overview of share market ,share market terminologies, intellectual property rights (IPR) ,concept of creativity, innovation, invention, discovery, concept of entrepreneurship, role of SSI, factors governing project selection and latest SSI, schemes of DIC.
2. Explain the law of demand, law of return, methods for depreciation, stagflation direct and indirect taxes, effect of share market on economy, methods for development of creativity, patent and laws related to patents, factors affecting growth of entrepreneurship, procedure to set up small scale industrial unit and role of consultancy organization.
3. Compute cost concept like fixed variable, average, marginal and total cost, depreciation direct and indirect tax.
4. Choose elasticity of demand, methods for depreciation, theory of achievement, motivation, policies governing small scale industries and SSI schemes
5. Collect the economic demand data , cost data, market survey data, price determination data, effect of share market data on economy, financial, technical & market analysis
6. Conclude the collected data to set up small scale industrial unit and project report preparation

Subject :-Advanced Production Processes
Session :-2021-22

Subject Code :- BEME503T
Semester- Fifth

Student will be able to

1. Identify various non-conventional and advanced machining process, joining process, supper finishing process, jigs and fixtures and die cutting operations.
2. Explain various machining and joining process, jigs and fixtures and die cutting operations.
3. Choose the various machining processes for the development of a product.
4. Compare various machining process and joining process.
5. To design jigs and fixtures for specific application.

Subject :- Design Of Machine Element

Subject Code :- BEME502T

Session :-2021-22

Semester- Fifth

Student will be able to

1. Describe various terminologies use for different machine components such as springs, clutches, pressure vessel, brakes etc and also to identify material properties used for design.
2. Explain basic principle of machine design, and design procedure of joints and components such as shaft, keys, brakes, clutches, power screw etc.
3. Compute and solve various dimensions of parts of mechanical components for specific application.
4. Apply concept of design, factors governing the selection of material to design machine components.
5. Design and develop the different mechanism using different joints and components
6. Justify and defend its design procedure for particular product

Subject :-Heat Transfer
Session :-2021-22

Subject Code :- BEME504T
Semester- Fifth

Student to be able to

1. State Fourier law, Newton's law of cooling, Stefan Boltzmann law & define Critical thickness, Boiling, Condensation, Extended Surface, Heat Exchanger, Radiation Shield, Shape Factor etc.
2. Classify heat transfer by conduction, convection, radiation and concept associated with it like heat transfer through Wall, Cylinder, Sphere, Internal heat generation, Critical thickness, Electrical Analogy, Natural & force convection, Lump theory, Boundary layer concept, Continuity Equation, Momentum Equation, Energy Equation black body concept, LMTD, NTU.
3. Apply concept of heat transfer in day today works and classify steady & unsteady process, 1D, 2D & 3D heat transfer processes, combined heat transfer processes.
4. Analyze problems associate with heat transfer through Wall, Cylinder, Sphere in various applications like Manufacturing Industries, Automobiles, Boilers, Hospitals, Space machineries, Refrigeration and Air Conditioning Units etc. and Investigate its effect on system which is associated with heat transfer process like human body etc.
5. Combine Knowledge of conduction, convection, radiation, heat exchanger, mass transfer, to design and prepare activity to form a solution of a problem.
6. Evaluate performance of an activity designed base on heat transfer knowledge, express own opinion based on expressed concept, idea, activity, test, result and recommend improvements.

Subject :-Mechanical Measurement and Metrology
Session :-2021-22

Subject Code :- BEME505T
Semester- Fifth

Student will be able to

1. Define the various mechanical measurement systems like pressure, temperature, load, sound, light Strain, Force, Torque, Power, angular and linear measurement.
2. Explain the static and dynamic characteristic of the instrument.
3. Compute the various technical parameters in the measuring instrument like least count, error, uncertainty etc.
4. Compare the suitability of the measuring instrument for various application like pressure, temperature, load, sound, light Strain, Force, Torque, Power, angular and linear measurement.
5. Design the limit gauges for the various shaft and hole fit.

Subject: Control System Engineering

Subject Code: BEME602

Session: 2021-22

Semester: Fifth

Students should be able to –

1. Acquire knowledge of various control systems, concept of transfer function, stability criteria, first order and second response system, components of control system, types of industrial controllers, Concepts of Controllability and observability
2. Classify the types of control system, industrial controllers, conversion of block diagram into signal flow graph
3. Construct and apply the stability criteria for control system, block reduction technique, signal flow graph method, root locus and bode plot technique specific type of control system
4. Select the steady state and transient response analysis methodology according to requirement of the control system
5. Develop the mathematical model for mechanical, electrical, electronics, electro-mechanical physical system

Subject:-Dynamics of Machines
Session:-2021-22

Subject Code: - BEME605T
Semester- Sixth

Student will be able to

1. Define and describe D' Alembert principle, gyroscopic effect on airplane, ship, dynamic force analysis of planner mechanisms, static and dynamic balancing of rotating and reciprocating mechanisms, governor and vibration.
2. Explain and discuss D' Alembert principle, gyroscopic effect on airplane, ship, dynamic force analysis of planner mechanisms, static and dynamic balancing of rotating and reciprocating mechanisms, governor and vibration.
3. Compute gyroscopic effect on airplane, ship, forces on mechanisms, static and dynamic balancing of rotating and reciprocating mechanisms, governor effort, power, critical speed of shaft, free and force vibration and torsional vibration
4. Analyze and demonstrate different mechanisms, gyroscopic effect, static and dynamic balancing of rotating and reciprocating mechanisms, performance characteristics of governor, whirling of shaft, free and forced vibration.
5. Compare and conclude different mechanisms, gyroscopic effect, static and dynamic balancing of rotating and reciprocating mechanisms, performance characteristics of governor, whirling of shaft, free and forced vibration.

Subject: Energy Conversion-I
Session: 2021-22

Subject Code: BEME601T
Semester: Sixth

Student to be able to:

1. Summarize the concepts of thermodynamics and their principal laws. Students must able to outline general layout of thermal power plant and also must able to explain principals steam generators. They must define, classify and describe the boiler, its accessories and mountings, fuel and water treatment in thermal power plant.
2. Categorize the various types of Draught system and also to solve calculations based on chimney height, diameter and efficiency. Student must able to apply derived formulas for calculating maximum discharge condition, evaporation capacity, equivalent evaporation, boiler efficiency.
3. Name and illustrate the various fluidized bed boilers. They must be able to describe coal and ash handling plant. Student must outline about cogeneration plant and must be able to compare topping and bottoming cycle.
4. Discuss and use about steam nozzles. Students must be able to analyze Adiabatic expansion in nozzles, maximum discharge, critical pressure ratio and effects of friction, calculation of throat and exit areas, supersaturated flow, Wilson Line. Students must also be able to define steam turbine and classify accordingly. They must be able to compare impulse and reaction turbine. They must apply the concept of compounding and governing of steam turbine.

5. Solve energy losses in steam turbines, flow of steam through turbine blades, reheat factors, velocity diagrams, graphical and analytical methods, work done, thrust and power, dimensions and proportioning of the blades, steam turbine efficiencies, condition for maximum efficiencies, reheat and regenerative cycles.
6. Identify various types of steam condensers and cooling towers, categorize different kind of condensers, compute quality and quantity of cooling water required, calculations for surface condenser, Dalton's law of partial pressure, sources of air leakages and air removal, air ejectors.

Subject :-*Operation Research*
Session :-*2021-22*

Subject Code :- *BEME603T*
Semester- *Sixth*

Student to be able to

1. Define basic OR models in details, like LPP, Assignment model, Transportation Model, Simulation for desired application.
2. Describe the various terminology use in OR models.
3. Compute the cost & profit by using OR models for specific application.
4. Apply transportation, assignment models and queuing theory for performance evaluation of engineering and management.
5. Develop the OR models for various application.
6. Justify & defend various OR models for particular model.

Subject:- Industrial Engineering
Session:- 2021-22

Sub. Code: - BEME701T
Semester:- Seventh

Students should be able to –

1. Label productivity criteria and discover a flow basis model for work study techniques.
2. Illustrate the maintenance action to appraise recovery purpose.
3. Employ reliability factor in series and parallel outsource.
4. Assess sustainable quality control tools in Industrial applications.
5. Compose quality controls tools through various techniques.

Subject :-Automobile engineering
Session :-2021-22

Code :- BEME702T3
Semester- Seventh

Student will be able to

1. Define and identify main components of an automobile like chasis, frame, gearbox, clutches, brakes, transmission systems etc.
2. Explain the basic working principles of gear box, transmission system, braking system, lubrication system and fuel supply system
3. Demonstrate the working of various automobile systems like clutches, gearbox, braking and lubrication system.
4. Compare the effectiveness of various types of Steering systems: viz center point steering, steering linkages, steering geometry and wheel alignment, power steering, Suspension systems
5. Choose various test parameters and methods to evaluate the performance of automobile.

Subject Name: Computer Aided Design (CAD))

Session: 2021-22

Subject Code: BEME703T

Semester: Seventh

The students must be able to:

1. Describe various types Rasterisation techniques, frame buffers, windowing, clipping and Fundamental concept of finite element method.
2. Explain the difference between design software's and modeling software's ,conventional design processes , algorithms for generation of line, circle, ellipse, Bezier curve and importance of precedence diagram.
3. Compute Plain stress and strain Temperature Effects, Torsion of a circular shaft mating conditions, generation of assembly.
4. Apply Johnson's Method of optimum design, Galerkin's Approach, Global Stiffness Matrix and Load Vector, Johnson's Method of optimum design, Fundamental concepts of finite element method.
5. Develop 2D transformations & 3D Transformations i.e. Translation, Scaling, Rotation, Reflection & Shear of basic shapes using modeling software.

Subject :-Design of Mechanical Drives

Session :-2021-22

Subject Code :- *BEME705T*

Semester- *Seventh*

Student will be able to

1. Describe the various types of Mechanical drives like Gears, Chain & belt drives, bearings etc.
2. Explain the failure of bearing & its selection of material and configuration of gears, belts, chain drive, I.C. engine components.
3. Compute the static and dynamic parameter of bearing, belts, chain drive, IC engine component
4. Analyze the varies mechanical drives like Gears, Chain & belt drives, bearings etc for various specific operating conditions
5. Design the various mechanical drives for specific application
6. Compare the suitability of mechanical drives for various application.

Subject :-Energy conversion-II
Session :-2021-22

Subject Code :- BEME704T
Semester- Seventh

Student to be able to

1. Describe Air compressor, IC Engine, Refrigeration and Air-conditioning system.
2. Classify Air compressor, IC Engine, Refrigeration and Air-conditioning system.
3. Demonstrate working principle of Air compressor, IC Engine, Refrigeration and Air-conditioning system.
4. Compute the performance of Air compressor, IC Engine, Refrigeration and Air-conditioning system.
5. Analyze problems associate with Air compressor, IC Engine, Refrigeration and Air-conditioning system.

Subject:-Power Plant Engineering
Session:-2021-22

Subject Code: - BEME702T4
Semester- Seventh

Student to be able to

1. Describe steam, hydro, nuclear, diesel, gas turbine power plant and alternative power plants.
2. Classify steam, hydro, nuclear, diesel and gas turbine power plant.
3. Compute the performance of steam, hydro, nuclear, diesel and gas turbine power plant.
4. Analyze the Economics of steam, hydro, nuclear, diesel and gas turbine power plant.
5. Design steam, hydro, nuclear, diesel and gas turbine power plant.

Subject:- *Automation In Production*
Session:- *2021-22*

Sub. Code: - *BEME804T*
Semester:- *Eighth*

Students should be able to –

1. Recognize automation and apply dramatize machines in Industry.
2. Describe Industrial Robot and paraphrase their applications in Industry.
3. Categorize Material Handling and safety with Industrial Approach.
4. Employ Integrated System of measurement, FMS and Machine Vision to justify goal of Business Functions.

Subject: - Advance Internal Combustion Engine

Subject Code: - BEME803T5

Session: - 2021-22

Semester: -Eight

Students will be able to

1. Define and identify engine components, different operation cycles, automobile fuels and injection systems, combustion in CI and SI engine, Air pollution and its control and performance parameter of engines.
2. Explain and discuss engine components, different operation cycles, automobile fuels and injection systems, combustion in CI and SI engine, Air pollution and its control and performance parameter of engines.
3. Demonstrate engine components, fuel system, supercharger, turbocharger, glow plug, catalytic convertor and engine parameters.
4. Analyse Carnot, Otto, Diesel and duel cycle, along with different parameters measuring processes as Brake, Torque, Power, Mechanical efficiency, etc.
5. Compare and Conclude different engine components, operation cycles fuels and injection systems, combustion in CI and SI engine and different performance parameter.

Subject :-Computer integrated manufacturing
Session :-2021-22

Code :- BEME802T2
Semester- Eighth

Student will be able to

1. Define Computer Aided Manufacturing (CAM), Computer Aided Process Planning (CAPP) Systems, Robotic Systems, Group Technology and Cellular Manufacturing Systems.
2. Explain the basic working principles of Computer Aided Manufacturing (CAM) systems. Computer Aided Process Planning (CAPP) Systems, Robotic Systems, Group Technology and Cellular Manufacturing Systems, Automated Material Handling Systems, Automated Inspection Systems, Flexible Manufacturing Systems (FMS).
3. Choose proper manufacturing system according to the process need
4. Compare the effectiveness of various types of manufacturing systems with the help of CIMS
5. Propose Suitable automation process to be used in place of the existing manual manufacturing systems using the principles of CIMS

Subject:-Energy Conversion-III
Session:-2021-22

Subject Code: - BEME805T
Semester- Eighth

Student to be able to

1. State Ideal cycle gas turbine, open & close cycle, intercooling, reheating, regeneration, turbo-jet, ram-jet, nuclear reactor & its components, solar systems, solar collector, fuel cell, solar dryer, solar cooker, MHD generator and its types, thermal storage system, hydraulic circuits, pressure control valves, direction control valves, flow control valves, circuits for crane, jacks, grinding machine, pneumatic systems, air preparatory unit, pneumatic valves, energy auditing and its procedure, instruments required to do energy auditing etc.
2. Recognize types of gas turbine cycles, jet engine, application of solar system, MHD System, Hydraulic-pneumatic Valves & Circuits and discuss importance of energy harvesting and energy auditing in domestic & industrial Sector.
3. Apply concept of gas turbine, jet engine, rocket engine, solar system, MHD, energy audit in day today works and classify potential sector for implementation of it.
4. Analyze problems associate with conventional energy system. Investigate how to use gas turbine, jet engine, solar system, renewable energy source, hydraulic-pneumatic circuits, energy audit and its effect on system which is associated with energy conversion system.
5. Combine Knowledge of gas turbine, jet engine, nuclear system, renewable energy source like MHD, Bio-Product, Wind energy, Solar etc., and hydraulic-pneumatic concept to design and prepare activity to improvise current energy conversion system.

6. Evaluate performance of an activity designed base on renewable energy resources, express own opinion based on expressed concept, idea, activity, test, result and recommend improvements.

Subject Name: Industrial Management (IM)

Session: 2021-22

Subject Code: BEME801T

Semester: Eighth

The students must be able to:

1. Describe various types and sources of finance, span of control, types of capital, replacement policy world class manufacturing, leadership styles and various types of organizations.
2. Explain functions such as planning, organizing, staffing, leading, motivating, communicating, controlling, decision making, labor legislation, product life cycle, sources of finance, Quality Circles, JIT, Poka yoke.
3. Compute replacement period, balance sheet, ratio analysis, profit & loss statement, direct - indirect expenses, break-even point.
4. Apply lean manufacturing, supply chain management, delegation of authority, value engineering, re-engineering, reverse engineering, principles of Fredric W. Taylor and principles of Henry Fayol, kaizen, manpower planning, selection, arbitration, collective bargaining, wages & salary administration.
5. Recommend personnel selection, proper material handling equipment, and appropriate source of finance, budgetary allocation, suitable plant location and plant layout, industrial safety measures.
6. Create market research, channels of distribution & advertising, plant layout, safety programs, replacement policy, budgets, profit & loss statements.

Subject:- REFRIGERATION AND AIR CONDITIONING
Session:-2021-22

Subject Code: - BEME802T5
Semester- Eighth

Student to be able to

1. Define Unit of refrigeration, VCRS-VARS system, compressor, evaporator, expansion device, condenser, air refrigeration cycle, refrigerant, cryogenics, psychometric process & chart, air condition unit, window & split AC, air transmission system, air washer etc.
2. Describe types of refrigeration system, compressor, condenser, expansion device, evaporator, air conditioning units, refrigerant, air transmission system and predict their importance for various applications.
3. Apply concept of refrigeration and air conditioning for desire application.
4. Analyze problems associate with conventional refrigeration and air condition system. Investigate how to utilize concept to improve existing system and its effect.

5. Combine Knowledge of refrigeration, air conditioning, cryogenics, psychometric process, air transmission system etc. and prepare activity to improvise current cooling system.
6. Evaluate performance of an activity designed base on refrigeration and air conditioning system, justify own opinion based on expressed concept, idea, activity, test, result and recommend improvements.

Program Outcomes

At the end of the program the student will be able to:

PO 1	Apply the knowledge of mathematics, basic sciences, and mechanical engineering to the solution of complex engineering problems.
PO 2	Identify, formulate, research literature, and analyze complex mechanical engineering problems reaching substantiated conclusions.
PO 3	Design solutions for complex engineering problems and design mechanical system components that meet the specified needs.
PO 4	Use mechanical engineering research-based knowledge related to interpretation of data and provide valid conclusions.
PO 5	Create, select, and apply modern mechanical engineering and IT tools to complex engineering activities with an understanding of the limitations.
PO 6	Apply reasoning acquired by the mechanical engineering knowledge to assess societal and safety issues.
PO 7	Understand the impact of engineering solutions on the environment, and demonstrate the knowledge for sustainable development.
PO 8	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	Communicate effectively on complex engineering activities with the engineering community and with society at large.
PO 11	Understand the engineering and management principles and apply these to the multidisciplinary environments.
PO 12	Recognize the need for life-long learning in the broadest context of technological change.



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VISION

To evolve as a center that provides excellent learning and research environment for nurturing future management professionals.

MISSION

1. To develop in the students strong domain knowledge and a passion for lifelong learning.
2. To develop managerial and leadership skills in the students along with a strong sense of ethics, social responsibilities and Professional values.

MBA 2021-22

Name of Courses according to Semester & their Co's

Semester	Name of Course	Co	
Ist	MANAGERIAL ECONOMICS	CO1	Given the details regarding price and quantity, the future manager will be able to calculate and interpret price elasticity, income elasticity and cross-price elasticity of demand and will also be able to examine the uses and abuses of demand forecasting techniques
		CO2	Given the information about scale of production, the future manager will be able to analyze various aspects of empirical production functions and also will be able to comprehend the difference sources of economies and diseconomies of scale.
		CO3	Given the information pertaining to market structure, the future manager will be able to determine the optimal price and output for firms under different market structures.
		CO4	Given the circular flow model of an economy, the future manager will be able to interpret the role and importance of each component with regard to factor market and product market and will also be able to comment on the implications and control of inflation.
		CO5	Given the information regarding expenses and income in an economy, the future manager will be able to calculate and explicate the gross domestic product using expenditure and income approaches and given the details about a phase of the business cycle, the future manager will be able to depict the symptoms, causes and effects on economic activities of a nation
Ist	MANAGEMENT INFORMATION SYSTEMS	CO1	The student will be able to describe different types of management information system from management activity point of view and will also be able to identify and work out KRAs, BOPs and BPPs for various organisations/systems.
		CO2	The student will be able to identify the master data, draw report format and interface matrix while making a model of DSS.
		CO3	The student will be able to suggest the conceptual model of PMS and will also be able to draw a system model of integrated system (PMS+SCM+Accounting and Billing)
		CO4	The student will be able to describe the key features of ERP, SCM and CRM and will also be able to draw functional flow and process flow diagrams for various transactions.
		CO5	The student will be able to enumerate the factors affecting system performance and will also be able to comment on the operational feasibility of IT system under consideration
	BUSINESS RESEARCH	CO1	In context of research, the student will be able to define business research problems and will also able to formulate an abbreviated version of research proposal.



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		CO2	The student will be able to describe and choose appropriate sampling design and will also be able to estimate appropriate sample size.
		CO3	The student will be able to develop measurement tools and construct appropriate scales therein.
		CO4	The student will be able to select suitable method of data collection and will be able to make questionnaire/e-questionnaire
		CO5	The student will be able to derive inferences by applying various techniques of interpretation and be and write various types of research reports.
Ist	ORGANIZATIONAL BEHAVIOUR	CO1	Students will be able to explain the concept of Organisation Design and determine the factors that affect Organisation Design.
		CO2	Students will be able to identify the components of Individual Behaviour and apply the concept of Learning, Perception, Attitudes and values.
		CO3	The student will be able to distinguish between the various theories of motivation and their application in organizations and also be able to apply these theories to practical problems in organizations. They will also be able to distinguish between a number of different leadership theories & styles and contribute to the effective performance of a team as the team leader or a group member.
		CO4	The future managers/ students will be able to analyse the behaviour of individuals and groups in organisations in terms of the key factors that influence organisational behaviour and demonstrate skills required for working in groups (team building).
		CO5	The students will be able to justify how organizational change and conflict affect working relationships within organizations and demonstrate how to apply relevant theories to solve problems of change and conflict within organizations
Ist	FINANCIAL REPORTING, STATEMENTS AND ANALYSIS	CO1	Given an accounting situation Students will be able to evaluate selected accounting standards and perform their application in actual practice
		CO2	Given the Trial Balance and accompanying financial adjustments the future manager shall be able to prepare the financial statements and calculate the profit or loss of a firm as at the end of the financial year.
		CO3	Given the financial statements a student will be able to Prepare Cash Flow statement to evaluate whether a firm is doing well financially and has sufficient cash to meet its obligations and support its growth or not.

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		CO4	Given the financial statements a student will be able to perform Ratio analysis and comment on the performance of the firm. Whether a firm is doing well or not. (As compared to its peers or year on year basis.)
		CO5	Given the financial statements a student will be able to formulate common size statement, trend analysis as well as inter-firm and intra firm comparison (As compared to its peers or year on year basis.)
	BUSINESS STATISTICS AND ANALYTICS FOR DECISION MAKING	CO1	For a given dataset, the student should be able estimate the dispersion / variance & symmetry of the data using various measures and draw inferences to facilitate decision making.
		CO2	For a given dataset, the student should be able assess the level of association between given variables in the data using various types of correlation analysis techniques. The students should also be able to predict the values of a variable using regression analysis techniques.
		CO3	For given situations a student should be able determine the various probabilities arising out of the situation and make use of probability theory and appropriate probability distributions for the purpose of decision making.
		CO4	For a given research problem, student should be able to construct appropriate hypotheses and draw conclusions by using a suitable hypothesis testing procedure so as to address the research problem in question.
		CO5	The student will be able to differentiate between various forms of analytics and will also be able to choose suitable analytics for decision making.
Ist	LEGAL AND BUSINESS ENVIRONMENT	CO1	Given the circumstances, the learner will be able to infer legal aspects of doing business & plan business activities. In a given situation, the learner will be able make use of provisions of the Contract Act to evaluate a contract used in commercial practice.
		CO2	In a given situation, learner will be able to distinguish between various types of Companies and explain their comparative advantages and disadvantages. The learner will be able to explain the legal process involved in formation of a company and understand the relationships amongst the various stakeholders of the company.
		CO3	In context of Intellectual Property Rights (IPR) the learner will understand various components of IPR and differentiate between them. The learner can also identify the uses of IPR in business
		CO4	Under the given scenario, the learner will be able to describe various provisions of IT Act and will be able to use various provisions of Consumer Protection Act.

VISION	MISSION
<p>To evolve as a center that provides excellent learning and research environment for nurturing future management professionals.</p>	<ol style="list-style-type: none"> 1. To develop in the students strong domain knowledge and a passion for lifelong learning. 2. To develop managerial and leadership skills in the students along with a strong sense of ethics, social responsibilities and Professional values.

		CO5	A learner will be able to analyze the elements of Social, political, economic environment around a firm.
	MANAGERIAL SKILLS FOR EFFECTIVENESS	CO1	The student will be able to make proper use of group of words, synonyms and antonyms, phrases, idioms, proverbs for effective verbal communication
		CO2	The student will be able to write essays and CV using Word Processor
		CO3	The student will be able to draft business letters for given situations using Word Processor
		CO4	The student will be able to apply basic functions of PowerPoint and will also be able to create effective PowerPoint Presentations using templates
		CO5	The student will be able to use various spreadsheet functions and will also be create useful spreadsheets
IInd	FINANCIAL MANAGEMENT	CO1	Given financial cost parameters, the future manager will be able to calculate specific cost of capital (i.e. Cost of debt, preference, equity and retained earnings) and the weighted average cost of capital for any specific given firm.
		CO2	Given different financing options, the future manager will be able to analyze the effect of operating and financial leverage on EPS and recommend a suitable long term financing mix for an organization by applying EBIT-EPS analysis, Indifference Level of EBIT and Financial Break-even Analysis for given financing options.
		CO3	Given the cash-flows pertaining to a project, the future manager will be able to estimate projects' cash flows to distinguish between value creating and value destroying investments using time-value intensive DCF techniques (viz. NPV, IRR, discounted payback period, profitability index) and Non-DCF techniques (i.e. Payback Period and Average rate of return approach)
		CO4	Given the details pertaining to elements of working capital for a given level of activity, the future manager will be able to ascertain the components of current assets and current liabilities and determine the gross and net operating working capital requirement.
		CO5	Given the expected dividends, future price of shares, investor expectations and funding requirements; the future manager will be able to compute the value of a share using various dividend discount models and illustrate whether dividend is relevant for firm valuation or not.
IInd	MARKETING MANAGEMENT	CO1	For a given marketing objective of a company the student manager will be able to develop a suitable marketing mix.



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		CO2	For a given product the student managers will be able to apply the three steps of target marketing: market segmentation, target marketing, and market positioning.
		CO3	For various stages in the life cycle of the product the student managers will be able to recommend a suitable pricing strategy.
		CO4	For a given company the student managers will be able to evaluate different distribution channel options and their suitability for the company's product.
		CO5	For a given promotional objective of a company the student manager should be able to develop a suitable promotion mix (advertising, sales promotion, public relations, personal selling, and direct marketing etc.) for the product.
IInd	HUMAN RESOURCE MANAGEMENT	CO1	Students should be able to explain the importance of Human Resource Management for an organisation and also distinguish between Personnel and HR Management.
		CO2	For a given job profile, students should be able to develop a job analysis and produce a job description and job specification.
		CO3	Students should be able to design a Human Resource Plan for an organisation and construct its Selection Process
		CO4	Students should be able to justify the applicability of various techniques of Training
		CO5	Students should be able to outline the performance appraisal process and identify and explain the utility of various modern and traditional methods of Performance Appraisal.
IInd	OPERATIONS MANAGEMENT	CO1	At the end of the course the students can apply the concept of operations management in manufacturing and service sector and will be able to plan and implement production and service related decisions.
		CO2	At the end of the course the student will be able to plan production schedules and plan resources (material and machine) required for production
		CO3	At the end of the course the students can design maintenance schedules in manufacturing units, identify and propose material handling equipments and implement industrial safety rules
		CO4	At the end of the course the students will be able to apply the concepts of purchase, stores and inventory management and analyze and evaluate material requirement decisions
		CO5	At the end of the course the students can measure performance related to productivity and will be able to conduct basic industrial engineering study on men and machines.
IInd	INTERNATIONAL BUSINESS	CO1	Students should be able to understand various concepts and terminologies involved in International Business and importance of international trade



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		CO2	Students should be able to evaluate various modes of entry in to International business and should be able to select the best mode of entry given a situation.
		CO3	Students should be able to relate and discuss the presence of macro factors (PESTEL) on international business environment
		CO4	Students should be able to examine and elaborate the role of various Government institutions in India which support International trade.
		CO5	Students should be able to perceive the concepts in recent EXIM policy of India and relate it to the flow of FDI as well as direction of Indian foreign trade.
IInd	CORPORATE SOCIAL RESPONSIBILITY AND SUSTAINABILITY	CO1	Given the concept of CSR, the future manager will be able to identify the various activities which can benefit the organization under the banner of CSR.
		CO2	Given a chance, the future manager will be able to frame and recommend the CSR policy according to sustainable development.
		CO3	Given the framework, the future manager will be able to plan the CSR activity according to the various laws and regulations.
		CO4	Given the details pertaining to government and non government organizations, the future manager will be able to ascertain the role of various stakeholders in CSR activities and incorporate the guidelines issued by regulatory guidelines in CSR policy.
		CO5	Given the task of CSR , the future manager will be able to plan and implement various activities to be taken under CSR activity and evaluate its effectiveness.
IInd	COST ACCOUNTING	CO1	Given an information about basic conceptual framework of cost, the student will be able of identify/ classify different elements/ classification of cost and will be able to prepare cost sheet and prepare quotations for various business proposals
		CO2	Given an information about cost, volume and profit for specific product for mention time period, a student will able to compute Break-even point, Marine of safety, Profit volume ratio, desired profit / desired sales as well as able to evaluate the decision making proposals(suitable product mix / dropping a product line / fixation of selling price / make or buy decisions/Key Factor Analysis)
		CO3	Given information about relevant expenses, a student will be able to classify the cost by nature and estimate cost of operating a service



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		CO4	Given an information about Expenses & Income / Receipt & Payment / Projected Sales, a student will be able to prepare relevant functional level budgets for an organisation
		CO5	Given information about standard and actual performance, the student will be able to determine Direct Material and Direct Labour Variances.
IInd	MANAGEMENT CASE ANALYSIS	CO1	Given a situation a student will be able to construct SWOT for a concerned organisation or situation as well as he/she will be able to identify key actors/stakeholders in the given situation
		CO2	A student will be able to evaluate the dilemma (Problem/ Issues/ Concerns) in the case.
		CO3	A student will be able to develop suitable alternatives for the dilemma identified.
		CO4	A student will be able to analyze and evaluate the alternatives using the theoretical framework.
		CO5	A Student will be able to discuss suggest suitable roadmaps to overcome the identified dilemma.
IIIrd	SUMMER INTERNSHIP PROJECT	CO1	Student is able to construct the company profile by compiling the brief history, management structure, products / services offered, key achievements and market performance for his / her organization of internship.
		CO2	For his / her organization of internship, the student is able to assess its Strengths, Weaknesses, Opportunities and Threats (SWOT). Student is able to determine the challenges and future potential for his / her internship organization in particular and the sector in general.
		CO3	Student is able to test the theoretical learning in practical situations by accomplishing the tasks assigned during the internship period.
		CO4	Student is able to apply various soft skills such as time management, positive attitude and communication skills during performance of the tasks assigned in internship organization.
		CO5	Student is able to analyze the functioning of internship organization and recommend changes for improvement in processes.
IIIrd	MM1: SALES AND DISTRIBUTION MANAGEMENT	CO1	Given a situation, student manager will be able to identify appropriate Sales Forecasting method to be adopted by a company.
		CO2	Given a situation of newly launched company, student manager will be able to design an effective Sales Compensation Plan for Sales Executive.
		CO3	Given a situation of distribution channel of a company, student manager will be able to outline different levels of Marketing channel used by the company.



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		CO4	Given a situation, student manager will be able to describe the process of Supply Chain and Reverse Logistics.
		CO5	Given a situation, student manager will be able to develop e-retailing strategy as a channel of distribution.
IIIrd	MM2: DIGITAL AND SOCIAL MEDIA MARKETING	CO1	On studying this module, the students will be able to understand the concept of marketing in digital environment. They will also be able to relate traditional marketing concepts with digital marketing and evaluate the use of various channel options available for digital marketing
		CO2	On completing this module, the students will develop the concept of digital marketing research. They will also be able to examine online consumer behaviour and imagine its utility in online/offline marketing strategies
		CO3	Upon studying this module, the students will be able to build an understanding of search engines and their utility in digital marketing area. They will also comprehend optimization and the keyword search methodology.
		CO4	On properly studying this module, the student will be able to examine the utility of different social media in digital marketing and evaluate their use, as future managers, in actual marketing campaigns.
		CO5	On studying this module, the student will be able to create favourable online reputation, later, as future managers, for organizations they serve. Students will also be able to form opinion on current trends in digital marketing area and estimate future trends therein.
IIIrd	MM3: INTEGRATED MARKETING COMMUNICATION AND BRAND MANAGEMENT	CO1	At the end of the course the student manager shall be able to Design the Integrated marketing communication Process for a company/product
		CO2	At the end of the course the student manager shall be able to develop a creative message strategy for a product and execute it.
		CO3	At the end of the course the student manager shall be able to implement and evaluate a IMC campaign.
		CO4	At the end of the course the student manager shall be able to Identify&Establish Brand Positioning for a given product



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		CO5	At the end of the course the student manager shall be able to design/develop branding strategies for a product/company, brand marketing program and shall be able to evaluate a branding program.
IIIrd	FM1: INVESTMENT ANALYSIS & PORTFOLIO MANAGEMENT	CO1	The student will be able to apply concept of time value of money in computing the value of fixed income securities. The student will also be able to understand the relationship between interest rates, yield and bond prices.
		CO2	The student will be able to compute and compare the value of a company's equity share with other company's equity by using various methods and tools of equity valuation
		CO3	The student will be able to build and evaluate the relationship between the concept of risk and return and will be able to relate its implication on creating portfolio.
		CO4	The student will be able to learn the theoretical concepts of underlying the portfolio creation
		CO5	The student will be able to assess the tools and strategies for portfolio creation and evaluation and will also be able to evaluate the portfolios of mutual funds by using the tools of portfolio evaluation
IIIrd	FM2: PROJECT APPRAISAL AND FINANCE	CO1	The student will be able to assess capital budgeting decisions under uncertain and risk bearing situation and will also be able to build and interpret the decision tree approach for decision making
		CO2	The student will be able to choose between acquisition of long term assets either through lease or financing methods and will also be able to learn process of Private Equity and Venture Capital
		CO3	The student will be able to compare the various theories of capital structure and will be able to determine the impact of debt equity mix on value of firm
		CO4	The student will be able to evaluate and compare the pre and post merger financial position of the firms.
		CO5	The student will be able to determine/ estimate the cash requirement in a firm and will also be able to evaluate the impact of trade receivable policy of a firm on its profitability.
IIIrd	FM3: FINANCIAL DERIVATIVES	CO1	The student will be able to describe the concepts of derivatives and its trading and settlement procedures
		CO2	The student will be able to calculate the value of Futures and apply it for risk managed trading strategies.
		CO3	The student will be able to compute the value of Options and plan various option strategies.

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		CO4	The student will be able to analyse and use the concept of Swaps and will also be able to make Swaps related decisions.
		CO5	The student will be able to relate concept of foreign exchange in currency conversion and apply currency forward rate agreements for hedging.
IIIrd	HRM1: MANPOWER PLANNING, RECRUITMENT AND SELECTION	CO1	Students should be able to explain the factors affecting HRP and HRP process of an organisation.
		CO2	Students should be able to determine the process of demand and supply forecasting while doing human resource planning.
		CO3	Students should be able to devise the manpower plan for an organisation.
		CO4	Students should be able to formulate Recruitment and Selection process on the basis of HRP.
		CO5	Students should be able to outline the Recent Trends in Manpower Development and Planning
IIIrd	HRM2: PERFORMANCE MEASUREMENT SYSTEM	CO1	Students should be able to distinguish the concept of Performance appraisal & Performance Management and also should be able to establish relationship of performance management with Strategic Planning.
		CO2	Students should be able to determine the Mechanism of Performance Management, and also explain the various steps in performance planning and performance execution.
		CO3	Students should be able to justify the use of various modern and traditional methods of Performance Appraisal under given situation.
		CO4	Students should be able to justify the use of various Performance Assessment Models under given situations; also the student should be able to determine the steps of giving a constructive feedback.
		CO5	Students should be able to discuss the importance and Principles of ethics in performance management.
IIIrd	HRM3: COMPENSATION AND BENEFITS MANAGEMENT	CO1	Students should be able to compare the applicability of various Job Evaluation methods under given situations.
		CO2	Students should be able to determine the importance of Wage Differentials and Differentiate between different types of wages



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		CO3	Students should be able to align the compensation strategy with business strategy
		CO4	Students should be able to design and develop the incentive and benefits plans
		CO5	Students should be able to outline the various Statutory Provisions related to Compensation
IIIrd	BA1: DATA VISUALIZATION FOR MANAGERS	CO1	The student will be able to identify and use Interactive data visualization software desktop tools and will also be able to create Interactive data visualization software desktop workspace
		CO2	The student will be able to connect data and will also be able to use Interactive data visualization software's File Types effectively.
		CO3	The student will be able to create analytics pane and will also be able to use Sort, Filters, Sets, Groups and Hierarchy functions
		CO4	The student will be able to create calculations to enhance the data visualisation
		CO5	The student will be able to build effective dashboard
IIIrd	BA2: DATA MINING	CO1	Given overview of Data Mining and Data pre-processing, the future manager will be able to outline major research challenges of data mining, Kinds of data and applications, Data Cleaning; Data Integration; Data Reduction; Data Transformation and Data Discretization.
		CO2	Given the overview of Data Warehousing, the future manager will be able to classify the Concept of Data Warehousing using Data Cube and OLAP and also able to identify the process of Data Generalisation
		CO3	Given the details pertaining to Pattern Mining, the future manager will be able to evaluate Patterns using colossal patterns, mining compressed or approximate patterns; explore patterns and its applications.
		CO4	Given the details pertaining to Pattern Mining, the future manager will be able to analyse clusters using partitioning method, hierarchical method, density based method and grid based method
		CO5	Given the details pertaining to Pattern Mining, the future manager will be able to correlate the use of data mining to the society and also will be able to explain the trend in data mining.
IIIrd	BA3: DATA SCIENCE USING R	CO1	Given overview of types of Data, the future manager will be able to read data from different files and create matrices and data frames using R
		CO2	Given the overview of functions, subset and loop; the future manager will be able to explain the character functions, date function, package, control statement and do loop.



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		CO3	Given the basic statistical data, the future manager will be able to draw charts, histogram and plots, and measure central tendencies.
		CO4	Given the data for testing of hypothesis, the future manager will be able to test the hypothesis by applying t-test, ANOVA and Chi-square test
		CO5	Given the data of variables, the future manager will be able to apply Linear Regression, Logistic regression, Cluster Analysis, Time Series, Decision Tree and Random Forest
IIIrd	STRATEGIC MANAGEMENT	CO1	The student will be able to evaluate alternative paradigms of strategy and their influence on strategic decision making.
		CO2	The student will be able to analyse and develop the vision and mission statement for given organisations and will also be able to differentiate between the external and internal components of environment while performing SWOT analysis.
		CO3	The student will be able to design and develop corporate level strategies for any organization.
		CO4	The student will be able to design/develop business level strategies for any organization.
		CO5	The student will be able to evaluate all levels strategies and will also be design/develop functional level strategies for any organization.
IV	MM4: RETAIL SALES MANAGEMENT AND SERVICES MARKETING	CO1	On completion of this module the students will be able to utilise the knowledge gained on Retail Industry and the existing retail environment. The student will also be able to plan their retail business as future manager by applying retail segmentation.
		CO2	On completing this module, the students will be able to take part in the decisions involved in running a retail firm. They will also be able to form their own opinion on various retail formats and recommend strategies for retail planning.
		CO3	On completing this module, the students will be able to draw relationship between retail merchandising, marketing communication, CRM and retail success. They will also be in a position to predict impact of changing trends in Indian market scenario on retail business.
		CO4	On completion of this module, the students will be able to analyse concepts, functions, and techniques of the craft of service marketing services and will also be able to identify critical issues in service design & delivery. As future managers they will also be able to adapt a particular model of service marketing to a firm they work with.



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		CO5	On completing this module, the students will be able to examine the application of integrated marketing communication (IMC) to retail business and develop an effective service marketing system for retail business. Students will also be in a position to recommend ethical rules for conduct of retail business in India.
IV	FM4: MANAGING BANKS AND FINANCIAL INSTITUTIONS	CO1	The student will be able to identify role of banking in economic development of country.
		CO2	The student will be able to assess the impact of monetary policy and its instruments on banking sector
		CO3	The student will be able to analyse the health and risk of bank balance sheet and will also be able to appraise credit management parameters of a bank
		CO4	The student will be able to identify the NPAs and will also be able to appraise the process of securitisation.
		CO5	The student will be able to distinguish the utility of various non banking institutions like insurance, housing finance and credit rating
IV	HRM4: TEAM DYNAMICS	CO1	Students should be able to justify the applicability of various theories of Motivation in given situation and appraise the role of motivation in Team Behavior
		CO2	Students should be able to determine the importance of Interpersonal Communication and application of FIRO-B and Johari Window.
		CO3	Student should be able to explain the various steps of Group Formation and types of team
		CO4	In a given situation, Students should be able to justify the Conflict resolution strategy.
		CO5	Students should be able to apply various OD Intervention tools under given situation.
IV	BA4: WEB AND SOCIAL MEDIA ANALYTICS	CO1	The student will be able to choose the right tools for website design for measured outcomes.
		CO2	The student will be able to construct a modern metrics of better performance from eight specific metrics for web performance.
		CO3	The student will be able to develop a model for moving quickly from data to actions on a particular website.
		CO4	The student will be able to develop the model for measuring the success of a Mobile & Social Media Campaign..



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		CO5	The student will be able to develop a model for the website Outcome.
IV	PROJECT WORK AND VIVA VOCE	CO1	In a specialization domain of his / her choice, student manager will be able to choose an appropriate topic for study and will be able to clearly formulate & state a research problem
		CO2	For a selected research topic, student manager will be able to compile the relevant literature and frame hypotheses for research as applicable
		CO3	For a selected research topic, student manager will be able to plan a research design including the sampling, observational, statistical and operational designs if any
		CO4	For a selected research topic, student manager will be able to compile relevant data, interpret & analyze it and test the hypotheses wherever applicable
		CO5	Based on the analysis and interpretation of the data collected, student manager will be able to arrive at logical conclusions and propose suitable recommendations on the research problem
		CO6	Student manager will be able to create a logically coherent project report and will be able to defend his / her work in front of a panel of examiners

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