SANTHIRAM ENGINEERING COLLEGE :: NANDYAL

Department of Electronics & Communication Engineering

PROGRAM OUTCOMES (POs)

Program Name: B.Tech – ECE

Engineering Graduates will be able to:

PO1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
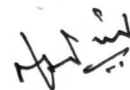
PO8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

HECED

SANTHIRAM ENGINEERING COLLEGE:: NANDYAL

Department of Computer Science & Engineering

PROGRAM OUTCOMES (POs)

Program Name: B.Tech –CSE

Engineering Graduates will be able to:

PO1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

HCSED

SANTHIRAM ENGINEERING COLLEGE:: NANDYAL

Department of Computer Science & Engineering

PROGRAM OUTCOMES (POs)

Program Name: B.Tech –CSD

Engineering Graduates will be able to:

PO1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

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PO9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

HCSED

SANTHIRAM ENGINEERING COLLEGE:: NANDYAL

Department of Electrical & Electronics Engineering

PROGRAM OUTCOMES (POs)

Program Name: B.Tech –EEE

Engineering Graduates will be able to:

PO1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

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SANTHIRAM ENGINEERING COLLEGE:: NANDYAL

Department of Mechanical Engineering

PROGRAM OUTCOMES (POs)

Program Name: B.Tech – ME

Engineering Graduates will be able to:

PO1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

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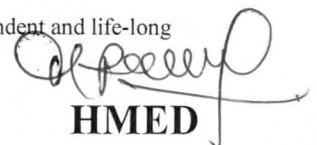
SANTHIRAM ENGINEERING COLLEGE:: NANDYAL

Department of Master of Business Administration

PROGRAM OUTCOMES (POs)

Program Name: MBA

PO1: Apply knowledge of management theories and practices to solve business problems.

PO2: Foster analytical and critical thinking abilities for data-based decision making.

PO3: Ability to develop value based leadership ability.

PO4: Ability to understand, analyze and communicate global, economic, legal, and ethical aspects of business.

PO5: Ability to lead themselves and others in the achievement of organizational contributing effectively to a team environment.

PO6: Apply ethical principles and understand the impact of the professional management solutions in societal and environmental contexts.

PO7: To identify business opportunities and acquire entrepreneurial traits to evaluate and manage their own business successfully.

HOD-MBA

SANTHIRAM ENGINEERING COLLEGE:: NANDYAL

Department of Electronics & Communication Engineering

PROGRAM OUTCOMES (POs)

Program Name: M.Tech –VLSISD

PO1: An ability to independently carry out research /investigation and development work to solve practical problems.

PO2: An ability to write and present a substantial technical report/document

PO3: Students should be able to demonstrate a degree of mastery over the area as per the Specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor program

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SANTHIRAM ENGINEERING COLLEGE:: NANDYAL

Approved by AICTE, New Delhi: Permenantely Affiliated to JNT University, Ananthapuramu.
An ISO 9001:2015 certified college, 2(f) & 12(B) Recognition by UGC Act, 1956
NH-40, Nandyal – 518501 :: Kurnool Dist. A.P.

DEPARTMENT:- ELECTRONICS & COMMUNICATION ENGINEERING

				COURSE OUTCOMES		REGULATION : R15

Year/Sem.	S.No.	Subject Name	SUB CODE		COURSE OUTCOMES	
	1	MATHEMATICS-III	15A54301	CO1	Explain the concepts of matrices and its applications	
				CO2	Able to solve the algaebraic and transcendental equations using numerical methods	
				CO3	Able to understand inter polation and extra polation and apply the appropriate methods to solve the problems	
				CO4	Construct the different types of curves by using the different numerical techniques.	
				CO5	Solve the ordinary differential equations by applying the various numerical techniques	
	2	ELECTRONIC DEVICES AND CIRCUITS	15A04301	CO1	Analyze the Junction Diode Characteristics, Special Semiconductor Diodes characteristics and applications.	
				CO2	To understand the concept of Rectifiers and analyze using Filters	
				CO3	Design and analyze the DC bias circuitry of BJT and FET.	
				CO4	To understand and analyze Transistor Biasing and Thermal Stabilization for BJT and FET.	
				CO5	To understand and apply Small Signal Low Frequency Transistor Amplifier Models	
	3	SWITCHING THEORY AND LOGIC	15A04302	CO1	To understand and analyze the different types of number systems and the Boolean algebra and its simplification.	
				CO2	To understand and analyze the K – map and tabular simplification techniques	
				CO3	To understand the concepts and study the procedures for the analysis and design of combinational circuits	

II YEAR-I SEM		DESIGN		CO4	To understand the concepts and study the procedures for the analysis and design of synchronous and asynchronous sequential circuits
				CO5	To understand the concepts different memory systems and study the procedures for the analysis and design of Programmable logic devices
	4	SIGNALS AND SYSTEMS	15A04303	CO1	To Understand Signals and systems and make use of Integer & differential equations.
				CO2	Analysis of signals using Continuous time Fourier Transform and Fourier series
				CO3	To Understand concept of convolution for Signal Transmission Through linear Sytems
				CO4	Analysis of signals using Discrete Fourier Transform
				CO5	To Understand and anlalyze discrete time signals using Z-transform.
	5	PROBABILITY THEORY & STOCHASTICP ROCESSES	15A04304	CO1	To understand the concept of a Random Variable and operations that may be performed on a single Random variable
				CO2	To understand the concept of a Multiple Random Variable and operations that may be performed on a single Multiple Random variable
				CO3	To determine the temporal characteristics of random signal response of a given linear system.
				CO4	To determine the spectral characteristics of random signal response of a given linear system
				CO5	To understand Linear Systems with Random inputs
	6	ELECTRICAL TECHNOLOGY	15A02306	CO1	To Understand DC Generators and its operation
				CO2	To Understand D.C. Motors, and its operation
				CO3	To Understand Single Phase transformers.
				CO4	To Understand3-Phase Induction Motors
				CO5	To Understand Synchronous Machines
	7	ELECTRICAL TECHNOLOGY AND BASIC SIMULATION LABORATORY	15A02307	CO1	perform the Characteristics of D.C.Shunt Generator
				CO2	Perform various operations on signals
				CO3	Verify the properties of LTI system and its response for different inputs.
				CO4	Analyze the signals using various transforms

				CO5	Analyze the characteristics of signals in noisy environment.
	8	ELECTRONIC DEVICES AND CIRCUITS LABORATORY	15A04305	CO1	Get knowledge about Semiconductor devices and also learn the current and voltage characteristics of various devices.
				CO2	Get knowledge about different types rectifiers and filters along with their efficiency and ripple factors.
				CO3	Learn about different types of BJT Transistor configurations along with current and voltage characteristics
				CO4	Learn about different types of FET Transistor configurations along with current and voltage characteristics
				CO5	Get knowledge about small signal low frequency BJT Transistor amplifiers along with their h-parameters.
	1	COMPUTER ORGANIZATION	15A05402	CO1	Describe fundamental organization and functional components of computer.
				CO2	Explain addressing modes, Instruction formats and program control statements.
				CO3	To understand basic concepts of Micro programmed control, and Binary arithmetic operations.
				CO4	Describe the organization of Various parts of Memory Hierarchy.
				CO5	To understand the fundamentals of pipelining and vector processing.
	2	SOCIAL VALUES & ETHICS	15A99501	CO1	Able recall family,and human values and compare his family with others and analyse the
				CO2	Classify the fundamental Rights and fundamental duties of citizen Influence the factors affecting youth crime..
				CO3	Explain the Environmental issues and Justify the objectives of civil defense.
				CO4	Demonstrate Gender inequality, Domestic violence and Appraise the government schemes ,laws.
				CO5	Importance the games ,sports,and benefits of exercise, Recommend the yoga asanas ,mudras and pranayama .
				CO1	To Approximateparametricequationsforthecalculationinthefarfieldregion.

III YEAR I-SEM	3	ANTENNA &WAVE PROPAGATION	15A04501	**CO2**	Remember and apply parametric integral expressions for a given current source.
				CO3	Understand and Evaluate electromagnetic fields for a given vector potential.
				CO4	Analyze and create pattern multiplication principle for array antennas.
				CO5	To understand and analyze Wave Propagation
	4	LINEAR INTEGRATED CIRCUITS AND APPLICATIONS	15A04503	**CO1**	To Understand the basic building blocks of linear integrated circuits and its characteristics.
				CO2	To Analyzethelinear,non-linearandspecializedapplicationsofoperational amplifiers.
				CO3	To Realize the importance of Operational Amplifier.
				CO4	To Analyze and Understand the importance of Oscillators
				CO5	To Understand the concept of ADC and DAC
	5	DIGITAL COMMUNICATION SYSTEM	15A04502	**CO1**	To Understand the elements of DCS & the fundamentals concepts of sampling theorem along with different coding and modulation techniques
				CO2	To Understand the basic principles of baseband and pass band digital modulation schemes
				CO3	To Analyze probability of error performance of digital systems and are able to design digital communication systems.
				CO4	To Analyze and Understand Pass band Data Transmission.
				CO5	To understand and apply Channel Coding
	6	MEMS & MICRO SYSTEMS	15A04506	**CO1**	Describe about introduction to mems and Microsystems and properties and materials for MEMS devices
				CO2	Explain about different micro maching technique and fabrication of Mems devices
				CO3	Explain about different micro sensors and applications of Mems Sensors.
				CO4	Describe different Mems accelerometer and case study on Mems applications.
				CO5	Explain about Mems applications
		DIGITAL		**CO1**	Capable of using Computer-aided design tools to model, simulate, verify, analyze, and synthesize complex digital logic circuits.
				CO2	To Efficiently design any Digital System using basic structure ICs

7	SYSTEM DESIGN	15A04504	CO3	To Able to design and prototype with standard cell technology and programmable logic	
			CO4	To Apply design test for digital logic circuits, and design fortest ability.	
			CO5	To Design examples using VHDL	
8	IC Applications Laboratory	15A04507	CO1	Classify different storage devices and indexing methods.	
			CO2	Design analog circuits for practical applications using Op Amp IC-741	
			CO3	Design waveform generators and PLL circuits using ICs	
			CO4	Design multi vibrators using IC555 and Schmitt trigger using IC741	
			CO5	Analyze the practical applications of Voltage Regulator using various ICs.	
9	Digital Communication Systems Laboratory	15A04508	CO1	The students will be able to experience real time behavior of different digital modulation schemes	
			CO2	Experiment with the principle of PCM, DPCM, DM, ADM and TDM	
			CO3	Analyze different digital modulation and demodulation schemes.	
			CO4	Analyze Spectral characteristics of PAM, PWM and QAM	
			CO5	Experiment with OFDM generation and detection	
1	EMBEDDED SYSTEMS	15A04702	CO1	To Design & Understanding of embedded systems leading to 32-bit application development.	
			CO2	Analyze and implement the protocols used by microcontroller to communicate with external sensors and actuators in real world.	
			CO3	Understand hardware-interfacing concepts to connect digital as well as analog sensors while ensuring low power considerations.	
			CO4	Analyze and Create Microcontroller to communicate with external sensors and actuators in real world.	
			CO5	Understand Embedded Networking and IoT concepts based upon connected MCUs and Apply it in RTOS	
2	OPTICAL FIBER COMMUNICA TION	15A04701	CO1	Understand basic fundamental theory of fiber optics.	
			CO2	Discuss the channel impairments like attenuation, scattering losses, bending losses and dispersion.	
			CO3	Demonstrate basic mechanism of light generation.	
			CO4	Analyze the detection of light.	

				CO5	Design architectures of optical fiber communication systems
IV YEAR I SEM	3	MICROWAVE ENGINEERING	15A04703	**CO1**	Ability to analyze micro-wave circuits incorporating hollow, dielectric and planar waveguides, transmission lines, filters and other passive components, active devices.
				CO2	Ability to Use S-parameter terminology to describe circuits and to explain how microwave devices and circuits are characterized in terms of their "S"-Parameters.
				CO3	Ability to understanding of microwave transmission lines and how to Use microwave components such as isolators, Couplers, Circulators, Tees, Gyrators etc.
				CO4	Ability to understanding of microwave solid state devices
				CO5	Ability to understanding of microwave measurements
	4	RADAR SYSTEMS	15A04705	**CO1**	To understand the basic concepts of RADAR and Derive the Basic Radar Range equation.
				CO2	To understand the basic concepts of CW RADAR and FM-CW Radar.
				CO3	Understanding the various radars like MTI, Pulse Doppler radars.
				CO4	Describe the Basic concepts of Tracking in Radar and different types of Tracking techniques..
				CO5	Understanding the detection of radar signals in noise and Different types of Radar displays ,Duplexers.
	5	DATA COMMUNICA TIONS AND NETWORKING	15A04704	**CO1**	Understand and explain the concept of Data Communication and networks, layered architecture and their applications.
				CO2	Analyze and Set up protocol designing issues for Communication networks.
				CO3	Evaluate data communication link considering elementary concepts of data link layer protocols for error detection and correction.
				CO4	Apply various network layer techniques for designing subnets and super nets and analyze packet flow on basis of routing protocols.
				CO5	Understand and design application layer protocols and internet applications such as network security, Email and DNS,
				CO1	Able to apply the Image processing concept for various fields of engineering and real life to process as per needs &specifications.

	6	DIGITAL IMAGE PROCESSING	15A04708	CO2	Get the skills to Heuristically develop new techniques to process images of any context
				CO3	Can experiment, analyze & interpret image data /processing data.
				CO4	Can Categorize various compression techniques.
				CO5	Learnt different techniques employed for the enhancement of images
	7	Microwave and Optical Communication Laboratory	15A04711	CO1	Capable of Applying microwave Concepts/ Microwave components and test them
				CO2	Able to design and analyse an optical fiber communications link
				CO3	Measure different parameters of various microwave devices.
				CO4	Measure the Scattering Parameters of various Tee Junctions
				CO5	Measure the Antenna Patterns
	8	VLSI & Embedded Systems Laboratory	15A04711	CO1	Design and draw the internal structure of the various digital integrated circuits
				CO2	Develop VHDL/Verilog HDL source code, perform simulation using relevant simulator andanalyze the obtained simulation results using necessary synthesizer.
				CO3	Verify the logical operations of the digital IC"s (Hardware) in the laboratory
				CO4	Design and Implement Combinational Logic Circuits on FPGAs
				CO5	Design and Implement Sequential Logic Circuits on FPGAs.
	1	MATHEMATICS-IV	15A54402	CO1	Able to get knowledge inbeta and gamma functionsand Techniques of Beta andGamma functions to improper integrals, Expressing complex functions in power series, Conformal mappings and bilinear transformations
				CO2	Develop skills in Analyzing the properties exhibited by complex functions in Argand plane, Properties of real integrals through complex variable techniques, The properties of improper integrals through residue theory, Conformal transformations of complex valued functions for inferences.
				CO3	Develop skills in designing mathematical models involvingIntegrals of complex variable functions, Improper integrals using beta and gamma functions, Residue theory of complex functions

				CO4	Develop analytical skills in providing solutions for problems involving Integration of complex functions, Improper real integrals
				CO5	Use relevant Complex variable techniques for Residues and integrals of complex functions, Improper real integrals through complex functions
	2	ELECTRONIC CIRCUIT ANALYSIS	15A04401	CO1	Demonstrate different feedback amplifiers including Voltage series, Voltage shunt, Current series and Current shunt Feedback amplifiers
				CO2	Analyze the frequency response of the BJT amplifiers at high frequencies
				CO3	Illustrate the parameters of Single stage and multistage amplifiers.
				CO4	Design and analyze different types of power amplifiers including Class-A, Class-B, Class-AB & Class –D power amplifiers and compare them in terms of Efficiency
				CO5	Design and analyze different types of Tuned Amplifiers
	3	DATA STRUCTURES	15A05201	CO1	Ability to analyze algorithms and algorithm correctness.
				CO2	Ability to summarize searching and sorting techniques
				CO3	Ability to describe stack, queue and linked list operation.
				CO4	Ability to have knowledge of tree and graphs concepts
				CO5	Ability to have knowledge of algorithms
II YEAR II SEM	4	ANALOG COMMUNICA TION SYSTEMS	15A04402	CO1	Understand the basic concepts of the Analog communication systems.
				CO2	Identify and Evaluate characteristics of various analog modulation schemes including AM,FM and PM such as modulation index, bandwidth and power requirements.
				CO3	List and Analyze various analog continuous wave and analog pulse modulation and demodulation techniques including AM FM and PM and radio receiver characteristics.
				CO4	Evaluate the performance of the communication system in the presence of noise.
				CO5	Discuss about Information and Channel Capacity
				CO1	Understand basic laws of static electric fields, Maxwell's equations for electrostatic fields, problems applying laws of electrostatics.
				CO2	Understand basic laws of static magnetic fields, Maxwell's equations for static magnetic fields, problems applying laws of magneto statics.

5	ELECTROMAGNETIC THEORY AND TRANSMISSION LINES	15A04403	CO3	Analyze electric and magnetic fields at the interface of different media, Understand concept of wave propagation through the Maxwell's equations.
			CO4	Understand principles of reflections and refraction for different incidences, concept of power flow using Poynting vector, Brewster angle, and surface impedance.
			CO5	Describes the transmission lines with equivalent circuit and explain their characteristic with various lengths.
6	CONTROL SYSTEMS ENGINEERING	15A02303	CO1	Understand & Evaluate the transfer function of physical systems, block diagrams and signal flow graphs
			CO2	Remember and Analyze the transient & Steady state responses and its specifications their characteristics
			CO3	Determine the absolute and relative stability of a system using RH and Root loci concepts.
			CO4	Analyse& Evaluate the stability of the system and design of Bode, polar, Nyquist and compensation networks
			CO5	Describe the state variable representation of physical system and solve the state equation
7	Analog Communication Systems Laboratory	15A04404	CO1	Design analog modulation circuits as amplitude and frequency modulation.
			CO2	Understand the operations of analog and pulse modulation & demodulation techniques
			CO3	Design the circuit to sample an analog signal.
			CO4	Design of communication circuits such as AM, SSB-SC, DSB-SC, FM.
			CO5	Design various pulse modulation techniques as PAM, PPM, PWM.
8	Electronic Circuit Analysis Laboratory	15A04405	CO1	The ability to analyze and design single and multistage amplifiers at low, mid and high frequencies.
			CO2	Designing and analyzing the transistor at high frequencies.
			CO3	Design, simulate and verify feedback amplifiers and oscillators.
			CO4	Design, simulate and verify power amplifier circuits.
			CO5	Design, simulate and verify Multivibrators and Sweep Circuits.

				CO1	To understand the basic Concepts and Architecture of 8086 Microprocessor.
1	MICROPROCESSORS AND MICRO CONTROLLERS	15A04601		CO2	To understand various 8086 Instruction set, Assembler directives and able to programming with 8086.
				CO3	To understand the basic concepts of MSP 430 microcontroller and embedded systems on it.
				CO4	To understand the concepts of low power aspects of MSP 430, RTC, PWM control, DC and comparator in MSP 430.
				CO5	To understand the concepts of serial, synchronous, Asynchronous communications and different inter facing using MSP 430
2	ELECTRONIC MEASUREMENT & INSTRUMENTATION	15A04602		CO1	Explains about static & dynamic char's and different types of meters for measurement of voltage, current and resistance
				CO2	Explains and analysis about functionality of Cathode Ray Oscilloscope and sampling oscilloscope and storage oscilloscope
				CO3	Explains about different types of signal generators and signal analyzers
				CO4	Explains about ac &dc bridges for measurement of resistance, capacitance, inductance.
				CO5	Understand different types of transducers for the measurement of displacement, R,L,C, velocity and pressure
3	VLSI DESIGN	15A04604		CO1	To acquire Complete Knowledge about Fabrication process of ICs and To understand electrical properties of MOS circuits
				CO2	To understand the basic circuits concepts and to understand the VLSI circuit design processes
				CO3	To understand and able to design VLSI circuits as per specifications given, at gate level and to understand the physical design
				CO4	Capable of optimizing the design of Arithmetic / logic building Blocks at all levels of Design/Fabrication and to understand the VLSI design styles
				CO5	To understand the synthesis, simulation and verification tools and process of testing
	MANAGERIAL ECONOMICS			CO1	The student will able to understand various aspects of Managerial Economics
				CO2	To Analyze the financial statements and inputs.

III YEAR II SEM	4	ECONOMICS AND FINANCIAL ANALYSIS	15A52301	CO3	To Understand the sound and effective decisions under different economic environment and market situations
				CO4	To Remember and Apply the Profitability, and Activity Ratios (simple problems).
				CO5	Methods and Evaluation of Capital Budgeting Projects
	5	DIGITAL SIGNAL PROCESSING	15A04603	CO1	Formulate engineering problems in terms of DSP tasks.
				CO2	Apply engineering problems solving strategies to DSP problems.
				CO3	Design and test DSP algorithms.
				CO4	Analyze digital and analog signals and systems.
				CO5	Analyze and compare different signal processing strategies
	6	MATLAB PROGRAMMI NG	15A04605	CO1	To able to familiarize the MATLAB Windows, syntaxes for basic computing.
				CO2	To understand and familiarize of Numeric, Cell and structure arrays and their operations
				CO3	To apply built-in and user defined functions concepts in writing MATLAB scripts in developing the solutions
				CO4	To use various data operators, flow controls and advanced plotting commands in writing MATLAB scripts.
				CO5	To differentiate underdetermined and overdetermined systems and use appropriate MATLAB commands to provide the solutions of each.
	7	Microprocessors & Microcontrollers Laboratory	15A04607	CO1	Can Ensure the completely use of MASM programming environment.
				CO2	Debug assembly language programs using 8086 assembler.
				CO3	Analyze the interfacing between external peripherals and 8086 microprocessor using development kit.
				CO4	Debug msp430 assembly language programs using CCS
				CO5	Analyze the interfacing between external peripherals and MSP 430 microcontroller using development kit.
				CO1	Find the response of a Linear time invariant discrete time system.
				CO2	Analyze the frequency spectrum of a discrete time signal

	8	Digital Signal Processing Laboratory	15A04608	CO3	Determine the spectrum of a real world signal using Fast Fourier Transform algorithm
				CO4	Design real time DSP systems and real world applications.
				CO5	Implement DSP algorithms using both fixed and floating point processors
IV YEAR II SEM	1	ADVANCED DIGITAL SIGNAL PROCESSING-MULTIRATE & WAVELET	15A04801	CO1	To Get complete knowledge regarding various algorithms associated with Digital signal processing and multirate signal processing.
				CO2	To Verify & Analyze the power spectral estimation by using Barlett, Welch & Blackman & Turkey methods.
				CO3	To Understand the effects of finite word length in fixed-point DSP systems by using ADC and FFT algorithms
				CO4	To Understand the JourneyfromtheCWTtotheDWT.
				CO5	To Understand Efficient signal design and realization of signals
	2	PATTERN RECOGNITION & APPLICATIONS	15A04803	CO1	To Understand the concept of a pattern and the basic approach to the development of pattern recognition and machine intelligence algorithms
				CO2	To Understand the basic methods of feature extraction, feature evaluation, and data mining
				CO3	To Understand and apply both supervised and unsupervised classification methods to detect and characterize patterns in real-world data
				CO4	To Develop prototype pattern recognition algorithms that can be used to study algorithm behavior and performance against real-world multivariate data
				CO5	To Understand the Time Varying pattern Recognitions & applications.
	3	Technical Seminar	15A04806	CO1	Identify emerging topic specific to the programme.
				CO3	Deliver the knowledge using multimedia.
				CO4	Answer the queries with appropriate explanation and elaboration.
				CO5	Compile an effective technical report, providing conclusions and proposing an appropriate future scope.
				CO1	Indentify problem, conduct relevant literature survey and formalize it.

				CO2	Analyze & design efficient, cost-effective and eco-friendly solutions using relevant tools(if necessary) and processes
4	Project Work	15A04807		CO3	Implement the design and demonstrate the functionality of developed model
				CO4	Evaluate the results to derive the conclusion and provide scope for future enhancement.
				CO5	Exhibit good interpersonal and leadership skills in meeting project deadlines with individual contribution towards progress of the project.

HECE

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DEPARTMENT : COMPUTER SCIENCE & ENGINEERING					
				COURSE OUTCOMES	**REGULATION : R15**
Year/Sem.	**S.No.**	**Subject Name**	**SUB CODE**		**COURSE OUT COMES**
1	1	BASIC ELECTRICAL & ELECTRONICS ENGINEERING	15A99301	CO1	Understand basic concepts of the currents and voltage by using theorems and two-port networks.
				CO2	Analyze the performance of AC & DC Machines.
				CO3	Analyze the operating principles of major electronic devices, its characteristics and Explain different rectifiers and filters used in power supply section
				CO4	Explain and analyze basic transistor amplifier circuits using BJT and FET.
				CO5	Design and analyze the application of BJT.
	2	MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS	15A52301	CO1	To Remember the concept of Economics and its relation with other subjects and understand the demand, its forecasting methods and measurement of elasticity of demand
				CO2	Understand the theory of production, laws of production, applying the methodology of cost analysis and breakeven point.
				CO3	Analyze the types of markets, perfect and imperfect competitions and Evaluating the forms of business organizations and LPG.
				CO4	Analyze financial accounting importance, preparation and Evaluate the Ratios with the supporting of Ratio analysis.
				CO5	Evaluate the capitalization, sources and measures of capital and creating the capital budgeting with different types.
				CO1	List &Understandnumerical and character representations in digital logic including ASCII and error detecting and correcting codes and Evaluate and simplify logical functions using Boolean algebra

				CO2	Explain about the Gate–Level Minimization Techniques.
II YEAR I-SEM	3	DIGITAL LOGIC DESIGN	15A04402	CO3	Analyze and design modular combinatorial logic circuits containing decoders, multiplexers, demultiplexersand adders.
				CO4	Analyze and design of sequential circuits by applying the functionality of flip-flops.
				CO5	Discussabout Memory and Programmable Logic & Digital Logic Circuits
	4	DISCRETE MATHEMATICS	15A05302	CO1	Write an argument using logical notation and determine if the argument is or is not valid. able to express a logic sentence in terms of predicates, quantifiers, and logical connectives.
				CO2	Demonstrate an understanding of relations and functions and be able to determine their properties. Determine when a function is 1-1 and "onto"
				CO3	Able to apply algebraic structures such as group theory and group codes to solve the real world problems. able to evaluate Boolean functions and simplify expressions using the properties of Boolean algebra.
				CO4	Demonstrate different traversal methods for trees and graphs. Model problems in Computer Science using graphs and trees..
				CO5	Apply counting principles to determine probabilities
	5	MATHEMATICS-III	15A54301	CO1	Understand the existenc of linear equations with rank knowledge
				CO2	able to apply numerical techniques to solve algebraic and transcendental equations
				CO3	able to shoot the solutions by Interpolation techniques
				CO4	able to understand how to fit a curve for the set of tabulated values
				CO5	able to find solutions Laplace equations using Finite difference approximation
				CO1	Explain the features of database management systems and Relational database. Demonstrate the basic elements of a relational database management system.

				CO2	Ability to identify the data models for relevant problems.
	6	DATABASE MANAGEMENT SYSTEMS	15A05301	CO3	Ability to design entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries on the respect data.
				CO4	Analyze the existing design of a database schema and apply concepts of normalization to design an optimal database.
				CO5	Apply normalization for the development of application software & Build The indexing mechanisms for efficient retrieval of information from a database.
	7	DATABASE MANAGEMENT SYSTEMS LABORATORY	15A05303	CO1	Understand the appropriate DBMS software Installation and Transform an information model into a relational database schema and to use a data definition language and/or utilities to implement the schema using a DBMS.
				CO2	use an SQL interface of a multi-user relational DBMS package to create, secure, populate, maintain, and query a database.
				CO3	Formulate query, using SQL, solutions to a broad range of query and data update problems.
	8	BASIC ELECTRICAL & ELECTRONICS LABORATORY	15A99302	CO1	Understand and compare basic electric circuit theorems with actual working circuits.
				CO2	Apply and Conduct experiments to obtain the load characteristics of D.C. Generators
				CO3	Apply and Conduct tests on D.C. motors for predetermination of efficiency
				CO4	Understand electrical model for various semiconductor devices.
				CO5	Create the practical applications of the semiconductor devices.
	1	COMPUTER NETWORKS	15A05502	CO1	Able to discuss standards, administration and Network models.
				CO2	Able to calculate the properties of physical media and Error detection and Correction methods during data transmission.
				CO3	Able to calculate the performance at Transport Layer protocols.

			CO4	Able to implement Application Layer protocols such as HTTP, DNS and SMTP.
			CO5	Able to examine the various Routing protocols, Internet Control protocols and Quality of Service.
2	OBJECT ORIENTED ANALYSIS AND DESIGN	15A05503	CO1	Illustrate the fundamentals of Object Modeling
			CO2	Explain about Classes, Objects and Relationships
			CO3	Construct object models for complex system.
			CO4	Construct class and Object diagrams using conceptual model of UML.
			CO5	Design Package, Composite structure, component and Deployment diagrams using Structural modeling
			CO6	Design Use case, Interaction, Communication and Timing diagrams using Behavioral modeling
3	OPERATING SYSTEMS	15A05501	CO1	Understand the difference between different types of modern operating systems, virtual machines and their structure of implementation and applications
			CO2	Understand the difference between process & thread, issues of scheduling of user-level processes/ threads and their issues Produce customized algorithmic solutions for given synchronization problems
			CO3	Identify the rationale behind various memory management techniques along with issues and challenges of main memory, virtual memory and file system
			CO4	Infer the performance of page replacement algorithms in various scenarios
			CO5	Understand the concepts of deadlock in operating systems and how they can be managed / avoided and implement them in multiprogramming system.
	PRINCIPLES OF PROGRAMMING LANGUAGES		CO1	Discuss software development environment, design models for programminglanguages and their syntax and semantics..
			CO2	Discuss structure of data types and implementation models

III YEAR I SEM	4		15A05504	CO3	Explain language constructs, pattern matching, Non determinism andbacktracking, Event driven computations, concurrent computations Describe Software Design methods for modularity and generic
				CO4	Discuss the basic concepts of Object-oriented Programming languages
				CO5	Discuss the functional, logic and rule based languages.
	5	R PROGRAMMING	15A05507	CO1	To understand the fundamentals of 'R' programming and working with Objects
				CO2	Describe the data statistical test and tabulation and Analyze simple hypothesis testing
				CO3	Design graphical analysis and formulate Notation And Complex Statistics
				CO4	Describe the analysis of variance and linear regression.
				CO5	Design the adding elements to existing plots and Describe writing your own scripts
	6	SOFTWARE TESTING	15A05505	CO1	To understand the basic Concepts & Purpose of testing.
				CO2	Classify two different types of testing and applying those methods to evaluate the testing.
				CO3	Extend the type of testing and applying those methods to evaluate the testing.
				CO4	Classify two different types of testing and applying those methods to analyze & evaluate the testing.
				CO5	Relating the previous methods to perform testing and applying those methods to evaluate the testing.
		SOCIAL VALUES AND		CO1	Able recall family,and human values and compare his family with others and analyse the
				CO2	Classify the fundamental Rights and fundamental duties of citizen Influence the factors affecting youth crime..

				CO3	Explain the Environmental issues and Justify the objectives of civil defense.
7	VALUES AND ETHICS (AUDIT COURSE)	15A99501		CO4	Demonstrate Gender inequality, Domestic violence and Appraise the government schemes ,laws.
				CO5	Importance the games ,sports,and benefits of exercise, Recommend the yoga asanas ,mudras and pranayama .
8	OBJECT ORIENTED ANALYSIS & DESIGN AND SOFTWARE TESTING LAB	15A05509		CO1	Demonstrate fundamentals of UML Tools.
				CO2	Develop Structural diagrams for modeling complex systems
				CO3	Develop Behavioral diagrams for modeling complex systems.
				CO4	Execute the working of control statements in C programming.
				CO5	Describe SRS and test cases for Banking applications and Library management system reporting bugs.
9	OPERATING SYSTEMS LABORATORY	15A05510		CO1	Simulate the following CPU scheduling algorithms a) Round Robin b) SJF c) FCFS d) Priority
				CO2	Simulate all file allocation strategies a) Sequential b) Indexed c) Linked
				CO3	Simulate MVT and MFT
				CO4	Simulate all File Organization Techniques a) Single level directory b) Two level c) Hierarchical d) DAG
				CO5	Simulate Bankers Algorithm for Dead Lock Avoidance
				CO1	To define the use of Computer graphics and various technologies involved in it
				CO2	Able to construct 2D transformations, viewing techniques on a given area.

1	COMPUTER GRAPHICS	15A05705	CO3	Analyzethe concept of 3D object surfaces, variouscurve representations on a system.
			CO4	To apply 3D geometric transformations, clippings on a given surface.
			CO5	Able to solve the various visible surface detection methods and their implementation
2	INFORMATION SECURITY	151A05702	CO1	Describe principles and practices of cryptography
			CO2	Apply the number theory in public key cryptography
			CO3	Apply hash functions, message authentication codes and digital signature schemes in user authentication and security techniques to personal computer
			CO4	Analyze remote user authentication using symmetric encryption and asymmetric encryption
			CO5	Analyze symmetric and asymmetric cryptographic techniques
3	MOBILE APPLICATION DEVELOPMENT	15A05703	CO1	To understand the fundamentals of android operating systems and its components
			CO2	Illustrate the various components, layouts and creating views in android applications
			CO3	Design and Analyze building blocks for android application design and Utilizing Resources
			CO4	Build android applications with widgets and Debugging application
			CO5	Illustrate Menus and Create data sharing with different applications and sending SMS.
			CO1	To understand the concepts of management its functions, theories of Motivation, Leadership and organization Structures
			CO2	To know about plant location and layout, inventory Management, PLC, channels and ASPM strategies.

IV YEAR I SEM	4	MANAGEMENT SCIENCE	15A52601	CO3	To tell about the HRM concepts like HRP, Performance appraisal, Employee grievances, Recruitment strategies, Training and Development.
				CO4	To know about the Corporate Planning process, Environmental scanning, SWOT analysis, Program Evaluation, Review Technique and Critical Path method
				CO5	To describe the contemporary management practices like BPR, BPO, Balance score card, six-sigma, Total Quality Management.
	5	SOFTWARE PROJECT MANAGEMENT	15A05704	CO1	Demonstrate conventional models and software cost estimation.
				CO2	Differentiate the principles of conventional software engineering with modern software management and software economics.
				CO3	Explain project organization, artifacts, of software process and workflow of software project management.
				CO4	Apply metrics for software project control, process instrumentation future software project management.
				CO5	Compare the software life cycle phases in software project management.
	6	GRID AND CLOUD COMPUTING	15A05701	CO1	Understand the basic concepts of traditional computing technologies and modern technologies.
				CO2	Understand and elaborate the open standard services for Grid Architecture. Understand and how data intensive grid service models works.
				CO3	Understand the basic concepts of virtualization and apply in grid and cloud computing environment and it gives optimum resource utilization.
				CO4	Understand the Grid and Cloud Tool Kit to program on it and also understand Hadoop concept and map reduce functions.
				CO5	Understand and apply the security model in Grid and Cloud Environment. The cloud supports SaaS, PaaS and IaaS.
		MOBILE APPLICATION DEVELOPMENT LABORATORY		CO1	Illustrate Download, Install and Configure Eclipse and SDK Platform for creating Android Applications
				CO2	Build a basic Android Applications using Activity class.

	7	LABORATORY	15A05711	CO3	Develop and Test the Android Application by using Text Edit control.
				CO4	Create an Android Application to choose options, play the Audio and Video clips.
				CO5	Design the Android Application for Menus and Action Bar and display Drop-Down List Action Bar
	8	GRID AND CLOUD COMPUTING LABORATORY	15A05710	CO1	Understand and use the GridSim in grid computing environment.
				CO2	Understand the basic concept of Globus Toolkit and apply grid computing programs.
				CO3	Understand the SaaS and use in cloud computing programs.
				CO4	Understand how PaaS work and apply to programs.
	1	FORMAL LANGUAGES & AUTOMATA THEORY	15A05404	CO1	Prove properties of languages, grammars and automata with formal mathematical methods. Construct Finite Automata and its types
				CO2	Construct automata to recognize whether the given language is accepted or rejected.
				CO3	Build the given grammar into Chomsky normal form and griebach normal forms.
				CO4	Analyze whether the given grammar is in well structured or not using context-free grammar
				CO5	Design Push Down Automata for a given language.
	2	COMPUTER ORGANIZATION	15A05402	CO1	Able to illustrate fundamentals of computer components. Able to explain the design issues of machine instructions, input output systems, memory systems and processor systems
				CO2	Able to calculate arithmetic operations and logical operations of a Computer
				CO3	Able to calculate performance of primary and secondary storage systems

				CO4	Able to illustrate design issues of parallel systems
				CO5	Able to calculate performance of Parallel systems
II YEAR II SEM	3	PROBABILITY AND STATISTICS	15A54401	CO1	Understand and apply the basic axioms of Probability
				CO2	ables and rules the moments of discrete & Continuous random variables
				CO3	able to analyze the problem of engineering and industry using testing of hypothesis techniques
				CO4	Apply the knowledge of SQC in industry and engineering related areas
				CO5	Able to understand the queuing techniques
	4	SOFTWARE ENGINEERING	15A05401	CO1	Define and develop a software project from requirement gathering to implementation
				CO2	Ability to code and test the software
				CO3	Understanding and analyzing and applying the Design concepts with neat details
				CO4	Analyzing and applying and create a interfaces and designing webApps
				CO5	Analyzing and evaluating components and software's
	5	MICROPROCESSORS & INTERFACING	15A04407	CO1	Understand the architecture of 8085 and 8086 microprocessor
				CO2	Explains addressing modes, instructions of 8086 and programming in 8086
				CO3	Explains about Interrupts ,Memory and I/O interfacing

			CO4	Explains features and interfacing of programmable devices
			CO5	Understand and analyze the architecture ,instructions, registers ,instructions and interfacing devices with microcontroller 8051
6	MICROPROCESSORS &INTERFACING LABORATORY	15A04408	CO1	Introduction to MASM Programming
			CO2	Simulate Arithmetic operations
			CO3	Simulate Logic operations
			CO4	Simulate string operation
			CO5	Simulate 8259 – Interrupt Controller Interfacing with 8086
7	OBECT ORIENTED PROGRAMMING USING JAVA	15A05403	CO1	Able to understand the use of OOPs concepts.
			CO2	Able to solve real world problems using OOP techniques.
			CO3	Able to understand the use of abstraction. Able to understand the use of Packages and Interface in java.
			CO4	Able to develop and understand exception handling, multithreaded applications with synchronization
			CO5	Able to understand the use of Collection Framework. Able to design GUI based applications and develop applets for web applications. and receive clear instructions
8	JAVA PROGRAMMING LABORATORY	15A05405	CO1	Ability to solve problems using object oriented approach and implement them using Java
			CO2	Ability to write Efficient programs with multitasking ability and handle exceptions.
			CO3	Create user friendly interface

				CO4	Creating and Understanding the usage of user defined packages
				CO5	Ability to create GUI based applications using AWT and Swings
	1	COMPILER DESIGN	15A05601	CO1	To understand the basic Concepts of phases of compiler and its process (LEX & YACC Tools).
				CO2	Design and Analyze the parsers and learn to how different parsers are constructed and evaluated for the requirements of application fields.
				CO3	Construct the intermediate code representations and generation.
				CO4	Understand the runtime storage organization and symbol table organization
				CO5	Convert source code for a novel language into machine code for a novel computer
	2	DESIGN PATTERNS	15A05603	CO1	To understand the fundamentals of design patterns and organize the catalog of design patterns.
				CO2	Implement behavioral patterns to design a document editor supporting multiple look &and feel standards.
				CO3	Explain the structural patterns included by adapter, bridge, composite, decorator, façade, flyweight and proxy
				CO4	Examine the behavioral patterns to recognize the chain of responsibility, command, interpreter and observer
				CO5	Choose behavioral patterns with state, strategy and template method
	3	DATA WAREHOUSE AND MINING	15A05602	CO1	Able to describe the basic concepts of data warehouse, data mining systems, and application oriented database.
				CO2	Able to apply pre-processing techniques on data
				CO3	Able to implement data warehouse and OLAP techniques for data mining.

				CO4	Able to apply association methods for data mining.
III YEAR II SEM				CO5	Able to apply classification methods for data mining.
	4	DESIGN AND ANALYSIS OF ALGORITHMS	15A05604	CO1	Analyze the time and space complexity of a given algorithm and apply Divide-and-Conquer design approach to solve the problems
				CO2	Apply Greedy method and Dynamic Programming Techniques to solve the optimization problems.
				CO3	Able to apply Back tracking technique for solving constraint satisfaction problems.
				CO4	Able to understand basics of tree, graphs NP complete problem.
				CO5	Apply Branch and Bound design technique to solve combinatorial optimization problems
	5	WEB AND INTERNET TECHNOLOGIES	15A05605	CO1	Ability to create dynamic and interactive web sites
				CO2	Gain knowledge of client side scripting using javasript and DHTML
				CO3	To create dynamic and interactive web pages with PHP
				CO4	To Demonstrate understanding of XML and analyze how to parse and use XML data
				CO5	To design rich client presentation using AJAX and understand web services concept
	6	LINUX ENVIRONMENT SYSTEM	15A05607	CO1	Students will be able to understand the basic commands of Linux operating system and can write shell scripts
				CO2	Students will be able to create file systems and directories and operate them
				CO3	Students will be able to create processes background and fore ground etc..by fork() system calls

				CO4	Students will be create shared memory segments, pipes ,message queues and can exercise inter process communication
				CO5	Students can able to perform disk partition and able to apply core system services
7	DATA WAREHOUSIN G & MINING LABORATORY	15A05610		CO1	Able to demonstrate WEKA Tool. Able to Identify the attribute types of datasets using WEKA.
				CO2	Able to explore association rule mining on data sets.
				CO3	Able to explore Classification on data sets.
				CO4	Able to apply Clustering techniques on data sets
				CO5	Able to interpret Regression models on Data sets.
8	WEB AND INTERNET TECHNOLOGIE S LABORATORY	15A05609		CO1	To create basic web page using HTML5 and its Elements
				CO2	To Design and build a Web page using CSS3 embedded with HTML5
				CO3	To interpret and Develop interactive web page at client side using Javascript
				CO4	To Build a Web page with Server Programming using Java Servlet and JSP
				CO5	To Develop a PHP program and apply with the Database to server programming
				CO6	Illustrate and construct XML DTD and its Schema
1	ENABLING TECHNOLOGIE S FOR DATA SCIENCE ANALYTICS: IOT	15A05805		CO1	Understand the IoT concepts and Applications.
				CO2	Understand and analyze IoT system Management.
				CO3	Design and analysis of IoT system and its applications.
				CO4	Understand Hadoop concept and IEEE 802 committee family of protocols.
				CO5	Understand, analyze and design of Zigbee.
				CO1	To understand the basic Concepts of Wireless Sensor Networks.

IV YEAR II SEM	2	MOBILE COMPUTING	15A05802	CO2	Design and Analyze Wired and wireless sensor networks (Ad-Hoc Wireless Networks) and learn to how the MAC Protocols are suitable for wireless networks by assessing the requirements of application fields.
				CO3	Demonstrate basic skills for Routing Protocols and Transport Layer and Security Protocols.
				CO4	Understand the fundamentals of Quality of service and energy management in wireless sensor networks.
				CO5	Analyze security, energy efficiency, mobility, scalability, and their unique characteristics in wireless networks
	3	SEMINAR	15A05808	CO1	The students will be able to recall existing technologies in the area of computer science
				CO2	The students will be able to describe, compare and evaluate different technologies
				CO3	The students will be able to decide the area of interest
				CO4	The students will be able to develop their communication skills
				CO5	The students will be able to write technical reports.
	4	Project	15A05809	CO1	Graduates will be able to identify and define problems in the area of Computer science
				CO2	Graduates will be able to explain and illustrate their practical skills needed to understand and
				CO3	Graduates will get a chance to apply current technologies and develop applications for the problems.
				CO4	Graduates will get opportunities to practice as teams on multidisciplinary projects with effective writing and communication skills.
				CO5	Able to apply the engineering and management principles to achieve the goal of the project

HCSE

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DEPARTMENT: ELECTRICAL & ELECTRONICS ENGINEERING

		COURSE OUTCOMES			REGULATION: R-15
Year/Sem.	S.No.	Subject Name	SUB CODE		
	1	MATHEMATICS –III	15A54301	CO1	Explain the concepts of matrices and its applications
				CO2	Able to solve the algaebraic and transcendental equations using numerical methods
				CO3	Able to understand inter polation and extra polation and apply the appropriate methods to solve the problems
				CO4	Construct the different types of curves by using the different numerical techniques.
				CO5	Solve the ordinary differential equations by applying the various numerical techniques
	2	ELECTRICAL CIRCUITS – II	15A02301	CO1	To understandand determine the transient response of R-L, R-C, R-L-C series circuits for D.C. and A.C. excitations
				CO2	To analyze of three phase balanced and unbalanced circuits and to measure active and reactive power in three phase circuits
				CO3	To apply of Fourier transforms to electrical circuits excited by non-sinusoidal sources

				CO4	Study of Network topology, Analysis of Electrical Networks, Duality and Dual Networks
				CO5	To design and analyzeDifferent types of filters and equalizers
	3	ELECTRICAL MACHINES – I	15A02302	CO1	Able to analyze the energy balance equation of electro magnetic systems
				CO2	Understanding and analyzing of Construction, working, effect of armature reaction and commutation process of dc generators
				CO3	Understanding the classification of generators and analyzing the characteristics and parallelling the DC generators
				CO4	Understanding, analyzing the DC motors and starters
				CO5	Able ot perform the different tests on dc motors and and determine the performance
II YEAR	4	CONTROL SYSTEMS ENGINEERING	15A02303	CO1	Understand & Evaluate the transfer function of physical systems, block diagrams and signal flow graphs
				CO2	Remember and Analyze the transient & Steady state responses and its specifications their characteristics
				CO3	Determine the absolute and relative stability of a system using RH and Root loci concepts.
				CO4	Analyse& Evaluate the stability of the system and design of Bode, polar, Nyquist and compensation networks

ISEM					
			CO5	Describe the state variable representation of physical system and solve the state equation
	5	ELECTRONIC DEVICES & CIRCUITS	15A04301	**CO1**	Analyze the Junction Diode Characteristics, Special Semiconductor Diodes characteristics and applications.
				CO2	To understand the concept of Rectifiers and analyze using Filters
				CO3	Design and analyze the DC bias circuitry of BJT and FET.
				CO4	To understand and analyze Transistor Biasing and Thermal Stabilization for BJT and FET.
				CO5	To understand and apply Small Signal Low Frequency Transistor Amplifier Models
	6	DATA STRUCTURES	15A05201	**CO1**	Ability to analyze algorithms and algorithm concepts
				CO2	Ability to apply basic concepts about arrays,linkedlist,stacks,queues.
				CO3	Ability to design trees and graphs.
				CO4	Ability to solve the concepts about searching and sorting techniques
				CO5	Ability to build new data structures according to given problem
	7	ELECTRICAL CIRCUITS SIMULATION LABORATORY	15A02305	**CO1**	Explain Electric Circuit Concepts By Interpreting The Simulation Results
				CO2	Design And Analyze Electrical Circuits Experimentally Using Simulation Tools.
				CO3	Apply Network Theorems To Electrical Circuits To Simplify The Circuits

		LABORATORY		CO4	Design Rl, Rc And Rlc Circuits For Specified Transient Response And Design Rlc Series Circuit For Specified Frequency Response
				CO5	Analyse Three Phase Balanced And Unbalanced Circuits
	8	ELECTRONIC DEVICES & CIRCUITS LABORATORY	15A04305	CO1	Get Knowledge About P-N Junction Diode And Germanium Diode And Also Their Cut In Voltage, Diode Resistances Based On V-I Characteristics.
				CO2	Get Knowledge About Zener Diode And Also Their Cut In Voltage, Diode Resistances Based On V-I Characteristics.
				CO3	Learn About Functioning Of Rectifiers With And Without Load And Also Calculate Their Ripple Factor And Efficiency.
				CO4	Learn About Cb,Ce Configuration With Static And Dynamic Characteristics
				CO5	Learn About Fet Configuration With Static And Dynamic Characteristics
				CO1	Understand the concepts of various voltmeter and ammeter instruments and functional concepts of Cathode Ray Oscilloscope and its applications.
				CO2	Analyse the various methods of measurement of resistance, inductance and capacitance using bridge concepts.

1	ELECTRICAL MEASUREMENTS	15A02501	CO3	Understand and analyse the measurement of power, power factor and energy with functional descriptions.	
			CO4	Design and analyses of instrument transformers and precise measurement of electrical parameters with potentiometers.	
			CO5	Understand and analyse the magnetic parameters measurements with suitable functional instruments	
2	LINEAR & DIGITAL IC APPLICATIONS	15A04509	CO1	Understand the basic building blocks of linear integrated circuits and its characteristics.	
			CO2	Analyze the linear, non-linear and specialized applications of operational amplifiers.	
			CO3	Get the knowledge of various logic families and exposure to VHDL programming.	
			CO4	Design the digital circuits using VHDL Programming.	
			CO5	Design various combinational & sequential circuits using various digital integrated IC's.	
3	ELECTRICAL POWER TRANSMISSION SYSTEMS	15A02502	CO1	Able to determine the transmission line parameters	
			CO2	Able to detemine the performance of the transmission line	
			CO3	Determine the electrical and mechanical characteristics of transmission lines.	
			CO4	Analyze the effect of transients due to switching with different terminations at load side in transmission lines	

				CO5	Analyze the construction and characteristics of Underground cables
III YEAR I SEM	4	POWER ELECTRONICS	15A02503	CO1	To understand the basic Concepts of Power Semiconductor Devices
				CO2	Describe basic operation and compare performance of various power semiconductor devices
				CO3	Design and Analyze power converter circuits and learn to select suitable power electronic devices by assessing the requirements of application fields.
				CO4	Formulate and analyze a power electronic design at the system level and assess the performance.
				CO5	Identify the critical areas in application levels and execute typical alternative solutions, select suitable power converters to control Electrical Motors and other industry grade apparatus
	5	ELECTRICAL MACHINES – III	15A02504	CO1	ToExplain the Construction, Principle of operation of Synchronous Machines.
				CO2	To Predetermine the regulation of synchronous generators using different methods
				CO3	To Determine how several alternators running in parallel share the load on the system
				CO4	To Analyze the performance characteristics of synchronous motors.
				CO5	To Choose specific 1-phase motor and/or special motors for a given application.

6	DIGITAL CIRCUITS AND SYSTEMS	15A04510	CO1	Be able to manipulate numeric information in different forms, e.g. different bases, signed integers, various codes such as ASCII, Gray, and BCD.
			CO2	Be able to manipulate simple Boolean expressions using the theorems and postulates of Boolean algebra and to minimize combinational functions.
			CO3	Be able to design and analyze small combinational circuits and to use standard combinational functions/building blocks to build larger more complex circuits.
			CO4	Be able to understand classification of microprocessors and memories.
			CO5	Be able to design and analyze small sequential circuits and devices and to use standard sequential functions/building blocks to build larger more complex circuits
7	ELECTRICAL MACHINES LABORATORY – II	15A02506	CO1	To Acquires sufficiently good practical knowledge about the operation, testing, and characteristics of transformers, Induction Motors
			CO2	To Acquires sufficiently good practical knowledge about the operation, testing, and characteristics of Alternators and Synchronous Motors
			CO3	To Acquire the knowledge about the fixation of the rating of transformers

				CO4	To Acquire the knowledge about the fixation of the rating of induction motors and synchronous machines..
				CO5	To determine the performance the electrical machines
8	ELECTRICAL MEASUREMENTS LABORATORY	15A02507		CO1	Calibrate various electrical measuring/recording instruments.
				CO2	Accurately determine the values of inductance and capacitance using a.c bridges
				CO3	Accurately determine the values of very low resistances
				CO4	Measure reactive power in 3-phase circuit using single wattmeter
				CO5	Determine ratio error and phase angle error of CT
9	SOCIAL VALUES AND ETHICS (AUDIT COURSE)	15A99501		CO1	Able recall family,and human values and compare his family with others and analyse the importance of family in the society.
				CO2	Classify the fundamental Rights and fundamental duties of citizen Influence the factors affecting youth crime..
				CO3	Explain the Environmental issues and Justify the objectives of civil defense.
				CO4	Demonstrate Gender inequality, Domestic violence and Appraise the government schemes ,laws.
				CO5	Importance the games ,sports,and benefits of exercise, Recommend the yoga asanas ,mudras and pranayama
				CO1	Compute the various factors associated with power distribution

1	ELECTRICAL DISTRIBUTION SYSTEMS	15A02701	CO2	Make voltage drop calculations in given distribution networks	
			CO3	Learn principles of substation Layouts	
			CO4	Compute power factor improvement for a given system and load	
			CO5	Understand implementation of SCADA for distribution automation	
2	DIGITAL SIGNAL PROCESSING	15A04603	CO1	Formulate engineering problems in terms of DSP tasks.	
			CO2	Apply engineering problems solving strategies to DSP problems.	
			CO3	Design and test DSP algorithms.	
			CO4	Analyze digital and analog signals and systems.	
			CO5	Analyze and compare different signal processing strategies	
3	POWER SYSTEM OPERATION AND CONTROL	15A02702	CO1	To Evaluate the economic operation of power system	
			CO2	To Develop the mathematical models of turbines and governors	
			CO3	To Discuss the Load Frequency Control methods	
			CO4	To Explain how shunt and series compensation helps in reactive power control	
			CO5	To Explain the issues concerned with power system operation in competitive Environment	
4	UTILIZATION OF ELECTRICAL ENERGY	15A02703	CO1	Understand & Analyze the laws of illumination and their application for various lighting schemes& Lamps.	
			CO2	Understand & Apply the Principles and methods of electric heating, electric welding and Electrolysis.	
			CO3	Describe the Systems of electric traction and study of traction equipment.	

IV YEAR I SEM				CO4	Analyze the mechanics of Train movement and Evaluate the speed time curves for different services.
		ENERGY		CO5	Ability to choose the better equipment with consideration of economic aspects and Evaluate the losses& efficiency of the electrical equipments used in various industries
	5	ENERGY AUDITING & DEMAND SIDE MANAGEMENT	15A02706	CO1	Elaborate energy auditing and evaluate energy audit results
				CO2	Determine motor energy audit
				CO3	Analyze Lighting energy instruments for audit
				CO4	Analyze demand side management concepts through case study
				CO5	Analyze economics and cost effectiveness tests of DSM Programs
	6	FLEXIBLE AC TRANSMISSION SYSTEMS	15A02708	CO1	Understand the need, significance and types of FACTS controllers
				CO2	Understand, analyse the level of significance and concepts of voltage source and current source converters
				CO3	Understand, analyse and evaluate the objectives and various types of shunt controllers.
				CO4	Understand, analyse and evaluate the objectives and various types of series controllers.
				CO5	Understand and analyse the power flow controllers in single and multi transmission lines.
				CO1	Find the response of a Linear time invariant discrete time system.
				CO2	Analyze the frequency spectrum of a discrete time signal

	7	DIGITAL SIGNAL PROCESSING LABORATORY	15A04608	CO3	Determine the spectrum of a real world signal using Fast Fourier Transform algorithm
				CO4	Design real time DSP systems and real world applications.
				CO5	Implement DSP algorithms using both fixed and floating point processors
	8	POWER SYSTEMS & SIMULATION LABORATORY	15A02710	CO1	To Experimental determination (in machines lab) of sequence impedance and subtrasient reactance of synchronous machine
				CO2	To Conducting experiments to analyze LG, LL, LLG, LLLG faults
				CO3	To The equivalent circuit of three winding transformer by conducting a suitable experiment
				CO4	To Developing MATLAB program for formation of Y,Z buses and gauss-seidel and fast decoupled load flow studies.
				CO5	To Developing the SIMULINK model for single area load frequency control problem.
				CO1	Able to get knowledge inbeta and gamma functionsand Techniques of Beta andGamma functions to improper integrals, Expressing complex functions in power series, Conformal mappings and bilinear transformations

1	MATHEMATICS – IV	15A54402	**CO2**	Develop skills in Analyzing the properties exhibited by complex functions in Argand plane, Properties of real integrals through complex variable techniques, The properties of improper integrals through residue theory, Conformal transformations of complex valued functions for inferences.	
			CO3	Develop skills in designing mathematical models involvingIntegrals of complex variable functions, Improper integrals using beta and gamma functions, Residue theory of complex functions	
			CO4	Develop analytical skills in providing solutions for problems involving Integration of complex functions, Improper real integrals	
			CO5	Use relevant Complex variable techniques for Residues and integrals of complex functions, Improper real integrals through complex functions	
2	MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS	15A52301	**CO1**	Capable of analyzing fundamentals such as Demand, Elasticity & Forecasting methods	
			CO2	To apply production , pricing & Supply concepts for effective business organization	
			CO3	Students can able to identify the influence of various markets , the forms of business organisation	
			CO4	Analyze Accounting statements like balance sheet and to understand financial performance	

				CO5	To analyze how to invest the amount of Capital in order to get maximum return from selected business activity
II YEAR II SEM	3	ELECTRICAL MACHINES – II	15A02401	CO1	Conduct O.C, S.C tests and predetermine the regulation and efficiency of transformer
				CO2	Compute the load shared by each transformer when several transformers operate in parallel
				CO3	Understand The concept of a three phase Induction motor
				CO4	Draw the circle diagram of a three phase Induction motor and predetermine the performance
				CO5	characteristics Determine the starting torque, maximum torque, slip at maximum torque using given data
	4	ELECTRICAL POWER GENERATING SYSTEMS	15A02402	CO1	Estimate the coal requirement, cost per kWh generation and number of units generated for thermal power station
				CO2	Estimate the required flow of river water, cost of generation and number of units generated in hydel power generation and Nuclear power generation
				CO3	Identify Solar and Winds energy as alternate form of energy and to know how it can be tapped
				CO4	Identify bio gas generation and its impact on environment and Understand the Geothermal &Tidal energy, its mechanism of production and its applications.

			CO5	Evaluate various factors like load factor, plant factor and the tariffs to be charged for the consumers,Plot the load curve, load duration curve and hence determine the load capacity of the plant.
5	ANALOG ELECTRONIC CIRCUITS	15A04409	CO1	Analyzing the Methods of biasing transistors & Design of simple amplifier circuits.
			CO2	Understanding the Mid – band analysis of amplifier circuits using small - signal equivalent circuits to determine gain, input impedance and output impedance.
			CO3	Method of Apply & calculating cutoff frequencies and to determine bandwidth.
			CO4	Design and analyze different Oscillator circuits.
			CO5	Design and creating the circuits for linear wave shaping and Multi-vibrators
6	ELECTROMAGNETIC FIELDS	15A02403	CO1	The knowledge to understand the concepts of electrostatic charges and its field's analysis.
			CO2	To analyze the behavior of conductors and dielectrics under the influence of electrostatic fields.
			CO3	Capable to understand the concepts of magnetostatic charges and its field's analysis.
			CO4	Able to analyse the and design various types of inductors and concept of magnetic potential.

				CO5	To understand the knowledge of time varying electromagnetic fields by maxwell's equations and uniform plane & wave equations
7	ELECTRICAL MACHINES LABORATORY – I	15A02404		CO1	To Conduct experiments to obtain the no-load and load characteristics of D.C. Generators
				CO2	To Conduct tests on D.C. Generators for predetermination of efficiency
				CO3	To Conduct tests on D.C. motors for predetermination of efficiency
				CO4	To Control the speed of D.C. motor in a given range using appropriate method
				CO5	To Identify the reason as to why D.C. Generator is not building up voltage
8	CONTROL SYSTEMS & SIMULATION LABORATORY	15A02405		CO1	Evaluate the transfer function model for physical systems and control system components
				CO2	Compute the time response of systems and steady state errors
				CO3	Determine the absolute and relative stability of a system using RH and root loci concepts.
				CO4	Analyse the stability of the system and design compensation networks
				CO5	Describe the state variable representation of physical system and solve the state equation
				CO1	To understand the concepts of management its functions, theories of Motivation, Leadership and organization Structures

1	MANAGEMENT SCIENCE	15A52601	**CO2**	To know about plant location and layout, inventory Management,PLC, channels and ASPM strategies.	
			CO3	To tell about the HRM concepts like HRP, Performance appraisal, Employee grievances, Recruitment strategies , Training and Development.	
			CO4	To know about the Corporate Planning process, Environmental scanning, SWOT analysis, Program Evaluation, Review Technique and Critical Path method.	
			CO5	To describe the contemporary management practices like BPR, BPO, Balance score card, six-sigma, Total Quality Management	
2	POWER SEMICONDUCTOR DRIVES	15A02601	**CO1**	To choose the suitable drive system for particular application and analyze the single phase and three phase rectifiers fed DC motors.	
			CO2	To understand the multi quadrant operation of dc motor and analyze the various electrical braking schemes with suitable dual converters.	
			CO3	Able to control and analyse the drive operation in single, two and multi quadrants with suitable chopper circuits.	
			CO4	Understand and apply the concept of control of induction motor by various control strategies and suitable converters.	

			CO5	Understand and apply the concept of control of induction motor by various control strategies and suitable converters.
3	POWER SYSTEM PROTECTION	15A02602	CO1	Explain the principles of operation of various types of electromagnetic relays, Static relays as well as Microprocessor based relays
			CO2	Apply the basic relays for the protection of generators and Transformers.
			CO3	Apply various types of protective schemes used for feeders and bus bar protection.
			CO4	Solve numerical problems concerning the arc interruption and recovery in circuit breakers and Understand the principles of operation of various types of circuit breakers
			CO5	Explain the different types of over voltages appearing in the system, including existing protective schemes required for insulation co–ordination
4	MICROPROCESSORS & MICROCONTROLLER	15A04601	CO1	To understand the basic Concepts and Architecture of 8086 Microprocessor .
			CO2	To understand various 8086 Instruction set,Assembler directives and able to programming with 8086.
			CO3	To understand the basic concepts of MSP 430 microcontroller and embedded systems on it.

III YEAR II SEM		S		CO4	To under stand the concepts of low power aspects of MSP 430 ,RTC,PWM control,ADC and comparator in MSP 430.
				CO5	To understand the concepts of serial,synchronous,Asynchronous communications and different inter facing using MSP 430.
	5	POWER SYSTEM ANALYSIS	15A02603	CO1	To Explain the basics and form of Zbus and Ybus of a given power system network..
				CO2	To Apply computational models for symmetrical and unsymmetrical fault conditions in Electrical power systems
				CO3	To Distinguish between different types of buses used in load flow solution.
				CO4	To Evaluate load flow studies on a given power system
				CO5	To Determine the transient stability by equal area criterion and steady state stability limit
	6	PROGRAMMABLE LOGIC CONTROLLER & ITS	15A02605	CO1	Program a PLC for a given application
				CO2	Implement Ladder logic for various Industrial applications
				CO3	Design control circuits for various applications
				CO4	PLC logic and arithmetic operations
				CO5	PLC Installation, Troubleshooting and Maintenance
		MICROPROCESSORS		CO1	Can Ensure the completely use of MASM programming environment.
				CO2	Debug assembly language programs using 8086 assembler.

7	MICROPROCESSORS & MICROCONTROLLERS LABORATORY	5A04607	CO3	Analyze the interfacing between external peripherals and 8086 microprocessor using development kit.
			CO4	Debug msp430 assembly language programs using CCS
			CO5	Analyze the interfacing between external peripherals and MSP 430 microcontroller using development kit.
8	POWER ELECTRONICS & SIMULATION LABORATORY	15A02607	CO1	The study of various power electronic devices and their commutation circuits
			CO2	The voltage and current characteristics of various converters and inverters at different
			CO3	
			CO4	firing angles
			CO5	The study of different types converters and inverters with different types of loads
			CO-4	Analyze the TPS7A4901, TPS7A8300 and TPS54160 buck regulators,
			CO-5	The PSPICE/PSIM programming for various power electronic devices
9	ADVANCED ENGLISH LANGUAGE & COMMUNICATION SKILLS	15A52602	CO1	Choose suitable vocabulary and use appropriately in day-to-day communication and Understand how reading enhances their communicative competency.
			CO2	Selectsuitable formats and formulate resumes, formal reports, official e-mails.
			CO3	Simplify the language and give Effective presentations and Justify the objective of presentations..

		SKILLS		**CO4**	Demonstrate their ideas effectively during GDs, Debates and maximize the chances of selection in job interviews.
				CO5	Develop all-round personalities with a mature outlook to function effectively in different circumstances.
	1	INSTRUMENTATION	15A02801	**CO1**	To Identify and explain the types of errors occurring in measurement systems.
				CO2	To Differentiate among types of data transmission and modulation techniques.
				CO3	To Explain the working principles of different signal analyzers and Digital meters
				CO4	To Apply digital techniques to measure voltage, frequency and speed
				CO5	To Choose suitable transducers for the measurement of non-electrical quantities.
	2	ENERGY RESOURCES & TECHNOLOGY	15A02805	**CO1**	Understand different types of sources of energy
				CO2	Estimate the coal requirement and number of units generated in Hydel power generation and Nuclear power generation.
				CO3	Identify Solar and Winds energy as alternate form of energy and to know how it can be tapped

IV YEAR II SEM				CO	
				CO4	Identify bio gas generation and its impact on environment and Understand the Geothermal &Tidal energy, its mechanism of production and its applications.
				CO5	Understand energy storage and economy
	3	Technical Seminar	15A02807	CO1	Spell for basic concepts of science and technology
				CO2	Contrast the understanding perceptive of techniques applicable to their
				CO3	Construct the solutions upon their own knowledge
				CO4	Improve their Presentation and Communication skills
				CO5	Make up them to pursue their placements and higher studies
	4	Project Work	15A02808	CO1	Apply knowledge to generate, develop, and evaluate ideas and information to solve the problem in the area of Electrical and Electronics Engineering
				CO2	Identify the basic requirements for the design of application and propose
				CO3	Apply appropriate techniques, resources, modern engineering and IT tools
				CO4	Develop the skills to communicate effectively
				CO5	Construct collaborative skills through working in a team to achieve common

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SANTHIRAM ENGINEERING COLLEGE:: NANDYAL

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NH-40, Nandyal – 518501 :: Kurnool Dist. A.P.

DEPARTMENT : MECHANICAL ENGINEERING

	COURSE OUTCOMES		REGULATION : R15	

Year/Sem	S.No.	Subject Name	SUB CODE		COURSE OUTCOMES
	1	**MATHEMATICS –III**	15A54301	CO1	To learn evaluation policy of Elementary row transformations-Rank – Echelon form, normal form – Consistency of System of Linear equations. Linear transformations. Hermitian, Skew-Hermitian and Unitary matrices and their properties. Eigen Values, Eigen vectors for both real and complex matrices. Cayley – Hamilton Theorem and its applications – Diagonolization of matrix. Calculation of powers of matrix and inverse of a matrix. Quadratic forms – Reduction of quadratic form to canonical form and their nature.
				CO2	To determined and calucated by Solution of Algebraic and Transcendental Equations: The Bisection Method – The Method of False Position– Newton-Raphson Method, Solution of linear simultaneous equation: Crout's triangularisation method, Gauss - Seidal iteration method.
				CO3	To determined and calucated by Newton's forward and backward interpolation formulae – Lagrange's formulae. Gauss forward and backward formula, Stirling's formula, Bessel's formula.
				CO4	To determined and calucated by Curve fitting: Fitting of a straight line – Second degree curve – Exponential curve-Power curve by method of least squares. Numerical Differentiation for Newton's interpolation formula. Numerical Integration: Trapezoidal rule – Simpson's 1/3 Rule – Simpson's 3/8 Rule
				CO5	To calculated by Numerical solution of Ordinary Differential equations: Solution by Taylor's series-Picard's Method of successive Approximations-Euler's Method-Runge-Kutta Methods. Numerical solutions of Laplace equation using finite difference approximation.
	2	**MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS**	15A52301	CO1	The aim of the unit to understand the Importance of managerial economics and analyzing of demand.
				CO2	To understand the Production function & Analyzing the cost concepts with the evaluating the BEP.
				CO3	To applying the market structure and creating the new economic environment.
				CO4	To understand the financial accounting and evaluate the ratio analysis.
				CO5	The student understand and Evaluating the capital and capital budgeting.
				CO1	Students will able to understand basic concepts of stress and strain in solids and learn concept stress strain curve for different materials. Students to Analyze the temperature stress in varying of bars and composite bars.

II YEAR I SEM	3	**MECHANICS OF SOLIDS**	15A01308	CO2	solving complex problems.
				CO3	Students can learn concept of simple bending and determination of stresses in different Sections.
				CO4	Estimate the torsional load over shaft and solve deflection of beams under various loading Conditions.
				CO5	To analyze the cylindrical shells under circumferential and radial loading.
	4	**ENGINEERING DRAWING FOR MECHANICAL ENGINEERS**	15A03301	CO1	To Analyze the problem to sections and develop the surfaces.
				CO2	To Developing the pictorial views of a given sectional solids.
				CO3	To Developing the orthographic views from pictorial views of a given engineering component.
				CO4	To Identify the views for interpenetration of right regular solids
				CO5	To Draw perspective views of an object/solid using different methods.
	5	**ENGINEERING MECAHNICS**	15A03302	CO1	To understand the basic Concepts of Forces ,and Newton Laws basics of mechanics.
				CO2	Describe basics of Friction and its types and problems on friction and screw jack problems.
				CO3	Describe basic Concepts of Center of Gravity and Movements of Inertia .
				CO4	Formulate and analyze a Kinetics and Kinematics of Mechanics.
				CO5	To understand the basic Concepts of Trusses and problems on Trusses.
	6	**THERMODYNAMICS**	15A03303	CO1	transfer in the form of Work and Heat with various applications.
				CO2	Understand the Energy transformation occurs from one form into another form in open and closed systems and applying steady flow energy equation and mass balance equation to various applications.
				CO3	Understand the Major difference in working of a heat engine, refrigerator and heat pump. Calculate the maximum efficiency of a cycle. Calculating entropy change for a process, maximum available energy.
				CO4	Understand the method drawing phase equilibrium diagrams like P-v, h-s, T-s and P-T of a pure substance. Usage of steam tables and mollier diagrams in solving problems. The cooling / heating effect of throttling process. Thermodynamic relations.
				CO5	To understand the basic Concepts the concept of ideal cycles for different engines and their working principle. Drawing P-V and T-S diagrams for various air standard cycles and calculating work output, efficiency, mean effective pressure of each cycle.
				CO1	To understand the introduction to Computer Aided Drafting soft ware packages
				CO2	To understand the practice on basic elements of a Computer Aided Drafting packages
				CO3	To understand the practice on features of a Computer Aided Drafting packages

	7	COMPUTER AIDED DRAFTING LAB	15A03304	CO4	To understand the Computer Aided Drafting soft ware Commands Easy to drafting of solids and intersection of solids
				CO5	To understand the Computer Aided Drafting soft ware Commands Easy to drafting of perfective views
				CO6	To understand the Computer Aided Drafting soft ware Commands Easy to drafting of orthographic views of simple parts
	8	MECHANICS OF SOLIDS	15A01309	CO1	Determine Young's Modulus of solids under tensile & compressive loads.
				CO2	Calculate the Young's Modulus of beams under bending loads.
				CO3	Determine the shear modulus of solids under torsional loads.
				CO4	Calculate the strength of solids under impact loads.
				CO5	Evaluate the behavior of helical springs under static loads.
				CO6	Estimate the hardness of solids under gradual loads.
	1	FLUID MECHANICS & HYDRAULIC MACHINES	15A01510	CO1	To understand the Basic concepts of fluid mechanics and, fluid statics, fluid kinematics, fluid dynamics.
				CO2	To understand and apply on major losses and minor losses to find the pressure, velocity from the flow measuring devices measuring devices.
				CO3	To understand and apply the concepts to find the impact in different positions of jets.
				CO4	To understand and create the velocity triangles accordingly the performance in turbines.
				CO5	To understand the basics of centrifugal pump and work done by it.
	2	THERMAL ENGNERRING-II	15A03501	CO1	To acquire knowledge of power cycles and improvement performance of power cycles.
				CO2	Students can able to understand the working of various steam boilers and distinguish mountings and accessories.
				CO3	To understand the working of steam nozzles and apply the principles for finding solutions to engineering problems.
				CO4	To understand the working of impulse and reaction turbines and apply the principles for finding solutions to engineering problems.
				CO5	To understand the working of gas turbines and jet propulsions and apply the principles for finding solutions to engineering problems.
	3	DYNAMICS OF MACHINERY	15A03502	CO1	Understand and explain the basic concepts of friction in pivots and collars with uniform pressure and uniform wear, and also to solve the numerical problems on brakes, clutches and dynamometers
				CO2	Apply gyroscopic principles on Aeroplane, ship, four wheel and two wheel vehicles. Students are able to design a flywheel for IC engine.
				CO3	Explain the basics and definitions related to governors and forces acting on various governors. After completion of this unit students are able to solve numerical problems on different governors.

				CO4	Solve numerical problems on balancing of rotating masses and reciprocating masses in V-engine and multi cylinder engines.
				CO5	Derive the response of one degree of freedom systems with free and forced vibrations, evaluate the critical speed of the shaft and simple vibration calculations of rotor systems.
`III YEAR I SEM	4	MACHINE TOOLS	15A03503	CO1	Explain the concepts of metal cutting and the mechanism of chip formation. Examine the interface in the machining zone between the tool and the work piece with cutting performance.
				CO2	Explain the concepts of turning. Distinguish various tooling accessories used in turning and understand different constructions of lathe depending on the nature of operation.
				CO3	Demonstrate the principle of drilling, shaping and planning operation, parts and tool holding devices, Compare operations performed on drilling, shaping and planning and machining calculations
				CO4	Demonstrate the principle of milling, grinding, Lapping, Honing and Broaching operation, Distinguish parts and types of milling and grinding machines.
				CO5	Design of Jigs and fixtures and uses, Classification of Jigs & Fixtures – Principles of location and clamping.
	5	DESIGN OF MACHINE MEMBERS-I	15A03504	CO1	To Remember the types of stresses and Apply the design procedure by using theories of failure for different elements.
				CO2	To Understand the types of Fluctuating stresses Design the simple components under cyclic loading by using Goodman's and Soderberg's criterions.
				CO3	To Understand the functions of Rivets and bolts. Design the Riveted joints with different configuration, boiler shell riveted joint and under eccentric loading design of riveted joints. To Design bolted joints with direct loading and eccentric loading condition.
				CO4	To Discuss the types of cotters and Design and Differentiate cotters and Knuckle joint. Understand the classifications of shafts and Design the shafts under different loading conditions.
				CO5	To Explain the function, classifications of keys & couplings and Design the various rigid and flexible shaft couplings.
	6	ENTREPRENEUR SHIP	15A02503	CO1	To understand the fundamentals of entrepreneurship-marketing, accounting and operations.
				CO2	To understand how to ideate for tangible product or service to think about how your business meets a human need.
				CO3	To analyse financing and managing new venture, venture capital, sources of capital
				CO4	To evaluate joint ventures, mergers,acquisitions, franchising and understand public issues
				CO5	To understand production and marketing management concepts and global aspects of entrepreneurship
	7	SOCIAL VALUES & ETHICS	15A09501	CO1	Explain the Environmental issues and Justify the objectives of civil defense.
				CO2	Demonstrate Gender inequality, Domestic violence and Appraise the government schemes ,laws.
				CO3	Explain the Environmental issues and Justify the objectives of civil defense.
				CO4	Demonstrate Gender inequality, Domestic violence and Appraise the government schemes ,laws.

				CO5	Importance the games ,sports,and benefits of exercise, Recommend the yoga asanas ,mudras and pranayama
8	**FLUID MECHANICS AND HYDRAULIC MACHINES LAB**	15A01511		CO1	To understand apply analyze Evaluate and Create the Calibration of Venturimeter.
				CO2	To understand apply analyze Evaluate and Create the Calibration of Orifice meter.
				CO3	
				CO4	To understand apply analyze Evaluate and Create the Coefficient of discharge for a small orifice by a constant head method.
				CO5	To understand apply analyze Evaluate and Create the Coefficient of discharge for an external mouth piece by variable head method.
				CO6	To understand apply analyze Evaluate and Create the Calibration of contracted Rectangular Notch and /or Triangular Notch.
				CO7	To understand apply analyze Evaluate and Create the Determination of Coefficient of loss of head in a sudden contraction and friction factor.
				CO8	To understand apply analyze Evaluate and Create the Impact of jet on vanes.
				CO9	To understand apply analyze Evaluate and Create the Study of Hydraulic jump.
				CO10	To understand apply analyze Evaluate and Create the Performance test on Pelton wheel turbine.
				CO11	To understand apply analyze Evaluate and Create the Performance test on Francis turbine.
				CO12	To understand apply analyze Evaluate and Create the Efficiency test on centrifugal pump.
9	**MACHINE TOOLS LABORATORY**	15A03508		CO1	Demonstrate the construction & operations of general purpose machines
				CO2	Demonstrate Step turning and taper turning, Thread cutting and knurling on lathe machine
				CO3	Demonstrate Drilling and Tapping operations
				CO4	Demonstrate Shaping and Planning operations
				CO5	Demonstrate Slotting Operations
				CO6	Demonstrate Milling for groove cutting/ gear cutting
				CO7	Demonstrate Cylindrical and Surface Grinding operations
				CO8	Demonstrate Grinding of Tool angles
1	**MANAGEMENT SCIENCE**	15A52601		CO1	Graduates will be able to understand the basics concepts of management and it will be practially applicable in all spheres through theories
				CO2	Graduates can learn the plant location process and different marketing the techniques to sell the product through advertising.
				CO3	To tell about HR concepts like HRP, Appraisal, recruitment, grievances and T &D
				CO4	To know about corporate planning process , environmental scanning, SWOT analysis, PERT and CPM
				CO5	To elucidate contemporary management practices like JIT, BPO, BSE, CMM TQM Etc,
2	**AUTOMOBILE ENGINEERING**	15A03702		CO1	To understand the Basic process of Automotive components and usage of type of wheel drives, supercharger & turbocharger.
				CO2	To understand the transmission systems like clutch and its types, gear box and its types, propeller shaft, and types of drives.

				ENGINEERING		CO3	To understand the Basic process of Steering system & steering mechanism.
						CO4	To understand the Basic process of suspension system & brake system.
						CO5	To understand the Basic process of emission from automobiles & electrical system.
IV YEAR I SEM	3	CAD/CAM	15A03702			CO1	To understand and the basic Concepts of CAD/CAM with industrial applications.
						CO2	Students able to learn how use Geometric modeling and solid modeling.
						CO3	Student able to learn to create CNC part programming and APT part programme
						CO4	Student able to get knowledge on Group Technology ,Part family, and coding techniques in Manufacturing
						CO5	Student able to get knowledge on CAQC ,CAPP, Integration of Design and Manufacturing
	4	METROLOGY & MEASUREMENTS	15A03703			CO1	To understand the Limits, Fits and Tolerance. Indian standard system – International Standard organization system and know the principles of working of the most commonly Applying instruments for measuring linear and angular distances.
						CO2	Define the Linear, angle, Taper and Flatness Measurement and study the working principles of different types of Linear measuring devices, Angle measuring devices are Sine bar , Bevel protractor and Analyze the flatness measurement methods.
						CO3	To understand the measuring methods of surface roughness. Comparing the Screw thread elements and measuring methods, Gear tooth profile measurement, CMM, Alignment tests on lathe, milling and drilling machine tools.
						CO4	Define the Displacement, Stress, Strain ,Acceleration & Vibration and to understand working of various instruments utilizing for measuring for displacement, Stress-strain and Acceleration and Vibration.
						CO5	To understand working of various instruments Used for measuring for Temperature, Pressure, Force, Torque and Power.
	5	MODERN MANUFACTURING METHODS	15A03706			CO1	Explain the need for Non-traditional machining methods and rapid prototyping methods, classification & their relevance for precision and lean manufacturing .
						CO2	Explain the fundamentals of Ultrasonic machining, Abrasive jet and Water jet processes, develop mechanics of material removal.
						CO3	Explain the fundamentals of ECM and Chemical machining processes, Demonstrate their applications and defects.
						CO4	Explain the EDM and Plasma machining working processes, Demonstrate their advantages and disadvantages.
						CO5	Explain the concept of EBM and LBM processes and Demonstrate their applications.
	6	PRODUCTION & OPERATIONS MANAGEMENT	15A03709			CO1	To understand Production Planning and Control, generating of new products and strategies of Aggregate Planning.
						CO2	To understand forecasting techniques and able to Analyze accuracy of Forecasting methods.
						CO3	To select the plant location and plant layout and design plant layout using Computerized techniques.
						CO4	To Develop scheduling and material operation using lean enterprise and other concepts.
						CO5	To understand inventory management and scheduling techniques/Policies

7	**CAD/CAM LAB**	15A03710	CO1	To develop 2D drafting using Auto CAD or any drafting package	
			CO2	To develop the modeling of components in 3D- V block, open bearing, angular block, Dovetail Guide, Dovetail bracket , Tool post by using Auto CAD or PRO -E or CATIA or Solid works	
			CO3	To develop the Assembly modeling of screw jack parts, knuckle joint , Oldham" s coupling, foot step bearing, stuffing box, square tool post by using Auto CAD or PRO -E or CATIA or Solid works	
			CO4	To develop the machining of simple components on CNC lathe and CNC milling machine	
8	**METROLOGY & MEASUREMENT S LABORATORY**	15A03711	CO1	Demonstrate and measure the linear, angular and gear profiles.	
			CO2	Conduct the alignment test on machine tools.	
			CO3	Measure the flatness of the surface by using leveling tools.	
			CO4	Measure the temperature& displacement by using transducers.	
			CO5	Measure the speed, pressure, and strain by using transducers.	
			CO6	Measure the angular measurement &flow measurement by using transducers.	
1	**PROBABILITY & STATISTICS**	15A54401	CO1	To help the students in getting a thorough understanding of the fundamentals of Basic concepts of Probability – Random variables – Expectation – Discrete and continuous Distributions – Distribution	
			CO2	To help the students in getting a thorough understanding of the fundamentals of Test of Hypothesis: Population and Sample - Confidence interval of mean from Normal distribution - Statistical hypothesis - Null and Alternative hypothesis - Level of significance. Test of significance - Test based on normal distribution - Z test for means and proportions.	
			CO3	To help the students in getting a thorough understanding of the Small samples - t- test for one sample and two sample problem and paired t-test, F-test and Chi-square test (testing of goodness of fit and independence).	
			CO4	To help the students in getting a thorough understanding and calculating of Statistical Quality Control: Concept of quality of a manufactured product -Defects and Defectives - Causes of variations - Random and assignable - The principle of Shewhart Control Chart-Charts for attribute and variable quality	
			CO5	To help the students in getting a thorough understanding and calculating of Queuing Theory: Pure Birth and Death process, M/M/1 & M/M/S & their related simple problems	
2	**BASIC ELECTRICAL & ELECTRONICS ENGINEERING**	15A99301	CO1	Understand & Apply The basic concepts of the currents and voltage by using theorems and two-port networks.	
			CO2	Understand& Analyze the performance of DC Machines.	
			CO3	Understand &Analyze the performance of AC Machines.	
			CO4	Analyze the operating principles of major electronic devices, its characteristics and Explain different rectifiers and filters used in power supply section.	
			CO5	Explain and analyze basic transistor amplifier circuits using BJT and FET.	
3	**MACHINE DRAWING**	15A03401	CO1	To understand the basic Concepts Drawing tools and Dimensioning.	
			CO2	To understand and sketch the screws joints ,nut ,bolts,keys and threads.	
			CO3	To Understand the functions of engine parts ,machine parts and valves and assembly of these parts	

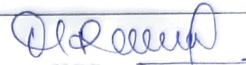|					
II YEAR II SEM	4	**KINEMATICS OF MACHINES**	15A03402	CO1	To Understand and identify the different mechanisms, inversions of different kinematic chains and also find the Mobility of Mechanisms.
				CO2	To Understand the mechanism of Hooke's joint, steering mechanisms and belt friction. And are also able to solve numerical problems on Hooke's joint, belt and rope drives.
				CO3	To Understand and Design draw the velocity and acceleration diagrams of simple plane mechanisms by using relative velocity method and instantaneous center method.
				CO4	To Explain gears terminology, types of gears, length of path of contact, contact ratio and interference in gears. Further students are also able to design the gears to avoid interference and to calculate train value for gear Trains.
				CO5	To Design and draw displacement diagram and cam profile for different types of motions of the follower. And also to find the displacement, velocity and acceleration of the follower at different positions of cam with specified contours.
	5	**THERMAL ENGINEERING - I**	15A03403	CO1	Gain the knowledge about Working principle of two stroke and four stroke SI and CI Engines.
				CO2	Gain the knowledge about engine associated systems such as lubricating system, cooling system, fuel feed system, ignition system , their necessity, requirements, construction details, different types and their working.
				CO3	The concept of combustion in Spark ignition engine; Pressure Vs crank angle diagrams, and pre-ignition. the concept of combustion in Compression ignition engine, Pressure Vs crank angle diagrams, Knocking, Detonation.
				CO4	The knowledge about performance calculations in I.C.Engine. The knowledge about engine pollution and working of catalytic converter.
				CO5	About working principle of reciprocating compressors and its efficiencies. Mechanical details of axial flow compressors and its efficiencies
	6	**MANUFACTURING TECHNOLOGY**	15A03404	CO1	To understand the general casting process for making product and elements used in casting.
				CO2	To understand the various special casting processes with its merits and demerits and associated defects with possible cause and cure.
				CO3	To understand the different types of Welding Processes, weld joints and cutting of Ferrous and Non Ferrous metals.
				CO4	To understand Advanced welding Process, Heat Affected Zone, Defects and various testing method of welds.
				CO5	To understand various surface treatment processes, characteristics and their Applications.
	7	**THERMAL ENGINEERING LABORATORY**	15A03405	CO1	Sketch the valve and port timing diagrams for single cylinder Petrol and diesel engines.
				CO2	Asses the fuels characterization through experimentation
				CO3	Predict the performance characteristics of 2-stroke and 4-stroke internalcombustion engines.

		LABORATORY		CO4	Predict the 2-stage air compressor performance characteristics.
				CO5	Evaluate the energy distribution in IC engines by conducting heat balance test.
				CO6	Differentiate the water tube and fire tube boilers.
	8	MANUFACTURING TECHNOLOGYL ABORATORY	15A03406	CO1	Develop a wooden pattern for a given casting
				CO2	Determine the sand properties used in foundry.
				CO3	Demonstrate the Injection moulding process to produce bottle caps.
				CO4	Demonstrate the Blow moulding process to produce a bottle.
				CO5	Demonstrate Bending operations using hydraulic press.
				CO6	Prepare simple joints using arc, spot and gas welding.
	1	OPERATIONS RESEARCH	15A03601	CO1	Understand and apply simplex method
				CO2	Understand any apply assignment and transportation concepts to real life situations.
				CO3	Get the knowledge of choosing the best strategy out of the available strategies.
				CO4	Represent any project in the form of a network and estimate the parameters like project time ,project cost.
				CO5	Apply the dynamic programming technique to solve the complex problems by breaking them into a series of sub problems.
	2	DESIGN OF MACHINE MEMBERS-II	15A03602	CO1	To understand and able to design crane hooks, C-clamps and various belt, rope and chain drives.
				CO2	Design and Analyze the helical sprigs for two wheeler vehicle and laminated springs for trucks and Also design & Analyze power screws subjected to loading.
				CO3	Describe basic operation and Design of various types of Bearings.
				CO4	Formulate and analyze a Mechanical Gears and compare the Performance of Spur and Helical Gears.
				CO5	To understand the basic Concepts of IC Engine parts and apply the design parameter for energy storage element and engine components, piston, connecting and crank shaft
	3	HEAT TRANSFER	15A03603	CO1	Understand the basic concept of conduction, convection and radiation heat transfer.
				CO2	Understand how to formulate and be able to solve simple conduction heat transfer problems. Solutions techniques will include both closed form and numerical methods.
				CO3	Will apply empirical correlations for both forced and natural convection to determine values for the convection heat transfer co-efficient.
				CO4	Understand black body and gray surface radiation and evaluate radiation exchange between surfaces.
				CO5	Some students will like to use the knowledge obtained in classes to understand the nature.
		FINITE		CO1	Explain basic principles and approaches for solving FEM problems in different fields.
				CO2	Solve bars, trusses, beams and heat transfer problems using FEM and also to apply boundary conditions in realistic problems.

III YEAR II SEM	4	**ELEMENT METHODS**	15A03604	CO3	Formulate the FEM model for simple problems.
				CO4	Explain the interpolation functions to higher order Iso-parametric elements.
				CO5	Explain and determine element matrices for applying the principles to find stresses in beams and trusses and temperature distribution in composite walls and fins
	5	**METAL FORMING PROCESSES**	15A03605	CO1	To Understand the basic concept on one, two and three dimensional stress Analysis, theory of plasticity, strain hardening, hot and cold working process.
				CO2	To Understand the principles of rolling and forging processes, their applications and defects.
				CO3	To Understand the fundamentals of extrusion process and wire drawing processes and their industrial applications.
				CO4	To Understand the various press working processes and compare their advantages and disadvantages.
				CO5	To Understand the concept of plastic manufacturing process, rapid manufacturing process and its applications.
	6	**NON-CONVENTIONAL SOURCES OF ENERGY**	15A03606	CO1	To create awareness about basic concepts of non-conventional source of energy-Solar energy
				CO2	Identify Solar energy as alternate form of energy and to know how it can be tapped.
				CO3	Identify Solar and Winds energy as alternate form of energy and to know how it can be tapped
				CO4	Identify bio gas generation and its impact on environment and Understand the Geothermal &Tidal energy, its mechanism of production and its applications.
				CO5	Understand energy storage and economy.
	7	**HEAT TRANSFER LAB**	15A03609	CO1	To understand apply analyze Evaluate and Create the Thermal conductivity of insulating powder material through Concentric Sphere apparatus.
				CO2	To understand apply analyze Evaluate and Create the Thermal conductivity of insulating material through lagged pipe apparatus
				CO3	To understand apply analyze Evaluate and Create the Overall heat transfer co-efficient through Composite Slab Apparatus
				CO4	To understand apply analyze Evaluate and Create the Thermal Conductivity of metal.
				CO5	To understand apply analyze Evaluate and Create the Heat transfer in pin-fin.
				CO6	To understand apply analyze Evaluate and Create the Heat transfer coefficient in forced convection.
				CO7	To understand apply analyze Evaluate and Create the Heat transfer coefficient in natural convection.
				CO8	To understand apply analyze Evaluate and Create the Experiment on Parallel and counter flow heat exchanger.
				CO9	To understand apply analyze Evaluate and Create the Emissivity of a gray body through Emissivity apparatus.

				CO10	To understand apply analyze Evaluate and Create the Experiment on Stefan Boltzman Apparatus.
	8	COMPUTER AIDED ENGINEERING LABORATORY	15A03610	CO1	Demonstrate the knowledge on various simulation software's
				CO2	Analysis the structural components of various bars and beams
				CO3	Illustrate the thermal analysis of 2D components and composite wall
				CO4	Solve the fluid flow problems by using computational fluid dynamics
				CO5	Evaluate the various research problems in all the fields of engineering by using FEA.
IV YEAR II SEM	1	INDUSTRIAL ENGINEERING	15A03801	CO1	To understand the basic Concepts of management, organization structure and Apply the principles of management.
				CO2	Define the plant location, Classify the plant layouts and material handling equipment objectives learned and remembered.
				CO3	To understand the work study and work measurement objectives learned implement operation management functions, and work sampling Applications.
				CO4	To understand the Inventory control systems and Discuss the different types Inventory models.
				CO5	To understand and explain the applied quality control techniques and Total quality management
	2	POWER PLANT ENGINEERING	15A03804	CO1	Discuss environmental and safety aspects of power plant operation. Classify Different types of Power Plants, site selection criteria of each one of them.
				CO2	Summarise Thermal Power Plant operation, Examine different types of high pressure boilers including supercritical and supercharged boilers, Fluidized bed combustion systems.
				CO3	Summarise Diesel Power Plant operation, - Classify the Construction and Layout With Auxiliaries.
				CO4	Demonstration of Hydro-electric Power Plant Economics, Energy Storage pumped hydro etc., Classify the Construction and Layout With Auxiliaries.
				CO5	Summarise Different types of Non-Conventional power plants. Classify Nuclear power plants including Pressurized water reactor, Boiling water reactor, gas cooled reactor, liquid metal fast breeder reactor
	3	TECHNICAL SEMINAR	15A03808	CO1	Define the various existing technological developments currently in use
				CO2	Select the specialized topic of the existing or proposed technology
				CO3	Summarize the information gathered from various resources
				CO4	Prepare a technical report on the selected specialized topic
				CO5	Explain the topic using appropriate presentation tools
				CO6	Show the inert personal, Professional and work with team skills
				CO1	Prepare the abstract represents the outline of the project
				CO2	Understand the literature collected in relevant to the project

				CO3	Design the required components of the prototype as per the specifications
1	PROJECT WORK	15A03809		CO4	Develop a prototype of the project with the distribution of tasks among the team
				CO5	Analyze the movements and functioning of the developed module
				CO6	Prepare the project report as per guidelines and the present before the panel of experts

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NH-40, Nandyal – 518501 :: Kurnool Dist. A.P.

DEPARTMENT: BASIC SCIENCE

		COURSE OUTCOMES			REGULATION : R15
Year/Sem.	S.No.	Subject Name	SUB CODE		COURSE OUTCOMES
	1	FUNCTIONAL ENGLISH	15A52101	CO1	Have improved communication in listening, speaking, reading and writing skills in general.
				CO2	Have developed their oral communication and fluency in group discussions and interviews.
				CO3	Have improved awareness of English in science and technology context
				CO4	Have achieved familiarity with a variety of technical reports
				CO5	Able to listen attentively and communicate effectively.
	2	ENGINEERING PHYSICS	15A56101	CO1	The different realms of physics and their applications in both scientific and technological systems are achieved through the study of physical optics, lasers and fiber optics.
				CO2	The important properties of crystals like the presence of long-range order and periodicity, structure determination using X-ray diffraction are focused along with defects in crystals and ultrasonic non-destructive techniques
				CO3	The discrepancies between the classical estimates and laboratory observations of physical properties exhibited by materials would be lifted through the understanding of quantum picture of subatomic world.
				CO4	The electronic and magnetic properties of materials were successfully explained by free electron theory and the bases for the band theory are focused.

				CO5	The properties and device applications of semiconducting and magnetic materials are illustrated.
I YEAR I SEM	3	COMPUTER PROGRAMMI NG	15A05101	CO1	Apply problem solving techniques in designing solutions for a wide range of problems
				CO2	.Choose appropriate control structure depending on the problem to be solved
				CO3	Modularize the problem and also solution
				CO4	Understanding problem solving techniques
				CO5	Learn features of C language.
	4	ENGINEERIN G DRAWING	15A03101	CO1	Drawing 2D and 3D diagrams of various objects.
				CO2	Learning conventions of Drawing, which is an Universal Language of Engineers
				CO3	Drafting projections of points, planes and solids.
				CO4	To gain and understanding of the basics of geometrical constructions of various planes and solids, understanding system of graphical representation of various objects and various views to draft and read the products to be designed and eventually for manufacturing applications.
				CO5	.To learn about various projections, to understand complete dimensions and details of object.
	5	MATHEMATI CS-1	15A54101	CO1	To become familiar with the application of differential and integral calculus
				CO2	To become familiar with the application of ODE and Vector calculus
				CO3	To attain abilities to use mathematical knowledge to analyze, formulate and solve problems in engineering applications.
				CO4	To develop the skill pertinent to practice of mathematical concept

				CO5	To develop the mathematical concepts of ODEs and their applications.
	1	ENGISH FOR PROFESSIONAL COMMUNICATION	15A52201	CO1	Have acquired ability to participate effectively in group discussions.
				CO2	Have developed ability in writing in various contexts.
				CO3	Have acquired a proper level of competence for employability.
				CO4	To develop confidence in the students to use English in everyday situations.
				CO5	To enable the students to read different discourses so that they appreciate English for science and technologies.
	2	MATHEMAICS-II	15A54201	CO1	To gain the knowledge to tackle the engineering problems using the concepts of Fourier series.
				CO2	The students gains the knowledge to tackle the engineering problems using the concepts of Laplace transforms.
				CO3	To Understand the concepts of PDEs.
				CO4	To Understand the concepts of Fourier sine and cosine integrals, Fourier transforms.
				CO5	To understand the applications of Z-transforms.
	3	ENGINEERING CHEMISTRY	15A51101	CO1	Differentiate between hard and soft water. Understand the disadvantages of using hard water domestically and industrially. Select and apply suitable treatments domestically and industrially.
				CO2	Understand the electrochemical sources of energy
				CO3	Understand industrially based polymers, various engineering materials.
				CO4	The extension of fundamentals of electrochemistry to energy storage devices such as commercial batteries and fuel cells is one such example.

				CO5	
I YEAR II SEM	4	MATERIAL SCIENCE AND ENGINEERING	15A03201	CO1	To gain and understanding of the relationship between the structure, properties, processing, testing, heat treatment and applications of metallic , non metallic, ceramic and composite materials so as to identify and select suitable materials for various engineering applications.
				CO2	Get knowledge on bonds of solids and knowing the crystallization of metals. By knowing the grain size and shape through the crystallization.
				CO3	Able to construct the equilibrium diagrams by experimental methods and knowing all types of equilibrium diagrams isomorphs alloy systems , electric systems, pertectic systems solid-state transformations etc. while studying all these diagrams he may able to know about lever rule and phase rule.
				CO4	Able to learn the structure and properties of all cast irons, steels and Non-ferrous metal alloys of copper, Al and Titanium. Students are advised to visit any Machine shop in the industries like SAIL, Visakhapatnam steel plant etc.,Students are advised to visit the following website.www.buzzle.com, www.mhprofessional.comwww.eng.sut.ac for better understanding of this topic.
				CO5	Able to learn the methods of different heat treatments i.e. annealing, normalizing and hardening.
				CO1	Get the sufficient information that will clarify modern environmental concepts like equitable use of natural resources, more sustainable life styles etc.
				CO2	Realize the need to change their approach so as to perceive our own environmental issues correctly, using practical approach based on observation and self learning.

5	ENVIRONME NTAL STUDIES	15A01101	CO3	To become conversant with the fact that there is a need to create a concern for our environment that will trigger pro-environmental action; including simple activities we can do in our daily life to protect it.
			CO4	By studying environmental sciences, students is exposed to the environment that enables one to find out solution of various environmental problems encountered on and often.
			CO5	To make the students to get awareness on environment, to understand the importance of protecting natural resources, ecosystems for future generations and pollution causes due to the day to day activities of human life to save earth from the inventions by the engineers.
6	ELECTRICAL CIRCUITS-1	15A02201	CO1	Given a network, find the equivalent impedance by using network reduction techniques
			CO2	Given a circuit and the excitation, determine the real power, reactive power, power factor etc,.
			CO3	Determine the current through any element and voltage across any element
			CO4	Apply the network theorems suitably
			CO5	To Understand Basic characteristics of R,L,C parameters
7	NETWORK ANALYSIS	15A04201	CO1	Apply the knowledge of basic circuital law and simplify the network using reduction techniques
			CO2	Analyze the circuit using Kirchhoff's law and Network simplification theorems
			CO3	Infer and evaluate transient response, Steady state response, network functions
			CO4	Obtain the maximum power transfer to the load , and Analyze the series resonant and parallel resonant circuit

				CO5	. Evaluate two-port network parameters , design attenuators and equalizers
8	DATA STRUCTURES	15A05201		CO1	Describe how arrays, records, linked structures, stacks, queues, trees, and graphs are represented in memory and used by algorithms.
				CO2	Describe common applications for arrays, records, linked structures, stacks, queues, trees, and graphs.
				CO3	Write programs that use arrays, records, linked structures, stacks, queues, trees, and graphs.
				CO4	Demonstrate different methods for traversing trees.
				CO5	Compare alternative implementations of data structures with respect to performance.

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NH-40, Nandyal – 518501 :: Kurnool Dist. A.P.

DEPARTMENT: MASTER OF BUSINESS ADMINISTRATION					
COURSE OUTCOMES				REGULATION : R17	
Year/Sem.	S.No.	Subject Name	SUB CODE	COURSE OUT COMES	
	1	MANAGEMENT & ORGANIZATIONAL BEHAVIOUR	17E00101	CO1	To make the students understand the concept, the history of management and the contribution of important management theories.
				CO2	To create the awareness on importance of decision making in the planning and
				CO3	Controlling functions of an organisation.
				CO4	To make the students to learn about the impact of personality, perception,
				CO5	learning and motivation in shaping the behaviour of an individual.
	2	BUSINESS ENVIRONMENT & LAW	17E00102	CO1	To understand the basic components and industrial policies.
				CO2	To understanding the basics of monitory and fiscal policies
				CO3	To know basic sources of law and contract act system
				CO4	To understand, and applications of companies act 1956
				CO5	To understanding basic concepts of IT Act, RIA and GST
	3	MANAGERIAL ECONOMI	17E00103	CO1	Understanding the basic concepts of managerial economics, the goals, the reasons for existence of firms and optimal decision making.
				CO2	To understand the basic concepts of Demand, Supply and Equilibrium and their determinants, to analyze various types of elasticity of demand
				CO3	To analyze production function, Law of DMR and its strategies, Isoquant and Isocost and finding out optimal combinations of inputs

		CS		CO4	To compare and contrast four basic market types, to evaluate price output decisions under various competitive situations in long run and short run and to evaluate various cost concepts and pricing methods.
				CO5	To understand inflation and Business cycle
I YEAR I SEM	4	FINANCIAL ACCOUNTING FOR MANAGERS	17E00104	CO1	Capable of understanding fundamentals.
				CO2	To analyze Accounting statements like balance sheet and to understand accounting principles.
				CO3	Valuation of assets and depreciation, inventory management and goodwill.
				CO4	Analyze the financial performance of business organaization.
				CO5	To analyze the funds flow statement and cash flow statement
	5	STATISTICS FOR MANAGERS	17E00105	CO1	To develop an understanding of the theory of probability, rules of probability and probability distributions.
				CO2	To comprehend the decision making process under uncertainty using statistical tools.
				CO3	To become aware of the concepts in sampling, sampling distributions and estimation.
				CO4	To understand the meaning and process of hypothesis testing including one-sample and two-sample tests.
				CO5	To appreciate the importance and application of non-parametric tests in hypothesis testing importance of correlation and regression analysis including both simple and multiple correlation and regression
		MANAGEMENT		CO1	Understand the basic concepts and technologies used in the field of management information systems;
				CO2	Apply the understanding of how various information systems like DBMS work together to accomplish the information objectives of an organization.

	6	~~MENT~~ INFORMA TION SYSTEMS	17E00106	CO3	Translate the role of information systems in organizations, the strategic management processes, with the implications for the management.
				CO4	Compare the processes of developing and implementing information systems.
				CO5	Analyze the role of the ethical, social, and security issues of information systems.
	7	INFORMA TION TECHNOL OGY FOR MANAGER S	17E00107	CO1	To understand the basic Concepts of Systems and Information System and Role of Information System
				CO2	Understand the Basics of DBMS and Types of DBMS
				CO3	Analyzing and Evaluating and Creating Files on MS-Excel
				CO4	Remembering and Understanding and Analyzing Data Communications and Connections
				CO5	Remembering and Understanding about Protocols and on Latest Technologies
	1	HUMAN RESOURC E MANAGE MENT	17E00201	CO1	To develop the understanding of the concept of human resource management, its functions, objectives, policies and to understand its relevance in organization.
				CO2	To gain the knowledge of job analysis concept, interviews and testing tools in the recruitment and selection process, and placement policy.
				CO3	To aware about the rational design of compensation policy and salary administration.
				CO4	~~To enable the students to understand the trends in training &~~ development, the concept of performance appraisal, and its role in ~~guiding the employees in terms of career~~
				CO5	Ability to handle employee issues and evaluate the new trends in HRM.
				CO1	Creating long term loyalty relationships, Marketing mix, PLC, Analyzing Competitors ,Conducting Marketing research

I YEAR II-SEM	2	MARKETI NG MANAGE MENT	17E00202	CO2	Identifying market segments and targets, Crafting Brand Positioning, Creating Brand Equity- Addressing Competition and driving growth
				CO3	Designing & Managing Integrated Marketing Communications, Advertising & Sales ,social media & mobile, Personal selling
				CO4	Managing retailing, wholesaling and logistics. Designing and Managing Integrated Marketing Channels
				CO5	Skills of sales manager, Sales objectives, Concepts of sales organization, Types of sales organization
	3	BUSINESS RESEARC H METHODS	17E00203	CO1	To Remember the concept of business research and understand the Technologies used in business research.
				CO2	Understand the Research process and applying the different kinds of designs samples and scales.
				CO3	Analyze the sources of data and Evaluating the data collection methods.
				CO4	Analyze the data analysis and Evaluate the statistical measures.
				CO5	Evaluate the components of Research report and creating the Good Research Report
	4	FINANCIA L MANAGE MENT	17E00204	CO1	To understand the basic Concepts of Financial Manager role in the organization and contemporary scenario
				CO2	It has to be effected to understand how to select the project for investing long term funds through applying techniques.
				CO3	Analyze EBIT-EPS analysis and to know the sources of fund available, cost of capital, dividend decision and its role in the financing decision.
				CO4	To understand, application and maintaining working capital, liquidity and balancing of receivables through budgets preparations.
				CO5	To understanding about corporate strategies, application of merging, takeover and its effects for growth and competing of the organization
				CO1	To Impart knowledge of OR- Origin, Nature, Definitions, Managerial Applications and Limitations of OR.

				CO2	To Develop LPP – Simplex Method- Solution to LP Problems, Maximization and Minimization Cases,
5	OPERATIO NS RESEARC H	17E00205		CO3	To become aware of the concepts in Transportation Problem (TP) - Mathematical Model, IBFS using Northwest Corner Rule,
				CO4	To understand the Network Fundamentals- Scheduling the Activities - Fulkerson's Rule –CPM- Earliest and Latest Times
				CO5	To appreciate the importance and application of Queuing Theory, Concepts of Queue/Waiting Line, General Structure of a Queuing S y s t e m
6	OPERATIO NS MANAGE MENT	17E00206		CO1	To understand the overview of production and operations management and Historical development of POM.
				CO2	To apply plant location, pant layout and aggregate planning, capacity utilization.
				CO3	To study scheduling, assignment and sequencing and world class production.
				CO4	To study the understand concepts of work study and quality management.
				CO5	To understand the importance of material management and functions, activities.
7	BUSINESS COMMUNI CATION	17E00207		CO1	To understand the Business communication concepts.
				CO2	To develop the students' competence in Business communication at an advanced level.
				CO3	To develop proficient in the basic communication skills of listening, speaking, reading and writing in English.
				CO4	To educate the students' competence in Business communication at an advanced level.
				CO5	To enlarge proficient in the basic communication skills of listening, speaking, reading and writing in English
				CO1	To know about the importance of ethics, unethical practices, Indian ethos and ethics in competition

1	BUSINESS ETHICS & CORPORATE GOVERNANCE	17E00301	CO2	Marketing ethics and consumer ethics, Ethical issues in organization, HR ethics and ethics in R&D	
			CO3	Insider trading, Ethical investments, how to fight with bank and insurance sector frauds and knowing about Intellectual property rights.	
			CO4	Corporate Governance Structures, philosophical and theories of corporate governance.	
			CO5	To know about cooperate governance structures, institutional investors and Corporate Social Responsibility(CSR)	
2	GREEN BUSINESS MANAGEMENT	17E00302	CO1	The aim of the unit to understand the Importance of Green Management with relevance in 21st Century.	
			CO2	To understand the Organisational environmental & Analyzing the corporate social responsibility.	
			CO3	To analyse and create the approaches from ecological economy.	
			CO4	To understand and Evaluation the Environmental Reporting & ISO 14001.	
			CO5	The student understand and Applying the Green Techniques and Methods	
3	ENTREPRENEURSHIP DEVELOPMENT	17E00303	CO1	Students will be able to sell themselves, their ideas and to master oral and visual presentation skills by that to establish a foundation of confidence in the skills necessary to cause other to act.	
			CO2	Students will be able to find themselves various institutions supporting enterprises, to find problems worth solving, by that student advance their skills in customer development, customer validation and to define competitive analysis, and iteration to evaluate projects in real world	
			CO3	Students will be able to mobilize people and resources to identify and secure customers, team members through networks by that to understand project planning feasibility studies and to familiarize with project proposal and report preparation	

				CO4	To create business plans that articulate and apply financial and operational skills and to provide value creation through company formation or venture creation.
				CO5	To develop and cultivate endurance among the students to foster self-efficiency and self-advocacy among Women entrepreneurs to give basic knowledge about EDP & Rural Entrepreneurs and NGOs
	4	PRODUCT AND BRAND MANAGE MENT	17E00305	CO1	The aim of the unit to understand the Concepts of Product decision with classification of goods.
				CO2	The student understand & analyzing the product Management with New Product Development.
				CO3	To analyzing the brand decisions with the evaluation of brand Methods.
				CO4	To Managing The Brand Concepts, Understand and Creating Brand Equity.
				CO5	To Understanding & Creating Branding Different Sectors.
II YEAR III SEM	5	HUMAN RESOURC E DEVELOP MENT	17E00306	CO1	To make aware of the basic concepts of Human Resource Development, Functions and the challenges faced by HRD Manager.
				CO2	To learn the skills of developing a detailed plan for need and the steps in the designing of HRD program in the organization.
				CO3	To develop knowledge on the importance of implementing and evaluating HRD techniques in organizations
				CO4	To understand the concept of Career Management, the stages and issues involved in it.
				CO5	To understand contemporary realities of HRD and its interface with demographic changes & and diversity
	6	FINANCIA L INSTITUTI	17E00308	CO1	To understand Economic development and role of RBI and monitory policies of INDIA
				CO2	To understanding private and public sectors and banking & non-banking systems in Indian economic market.

6	INSTITUTI ONS AND SERVICES	17E00508	CO3	To knowing the concept of financial &securities market and its applications.
			CO4	To understand, fund based services and its applications
			CO5	To understanding about fee based services and its sources
7	INVESTME NT AND PORTFOLI O MANAGE MENT	17E00312	CO1	Capable of understanding the fundamentals of stock markets, investment and speculation.
			CO2	To analyze stock markets price functions and investment decisions with the help of fundamental analysis and technical analysis.
			CO3	To evaluate risk & return and systematic and unsystematic risks in company.
			CO4	To evaluate securities with help of bond valuation, common stock valuation approaches.
			CO5	To understand portfolio management, Markowitz model and capital asset pricing methods.
8	PERFORM ANCE MANAGE MENT	17E00314	CO1	To Remember the concept of performance and understand the performance management and performance appraisal.
			CO2	Understand the mentoring, applying the methodology of mentoring and monitoring.
			CO3	Analyze coaching functioning and Evaluating the counseling process.
			CO4	Analyze annual stock taking and Evaluate stock potential. .
			CO5	Evaluate learning organization and creating compensation management in organization
	ADVERTIS ING AND		CO1	To outline the principles, practices, and the use of contemporary of advertising for persuasive communication
			CO2	To understand and examine the Advertising agency services, client agency relationship, creative process of designing of visual layout, art work and effective use of words, devices to get greater reader ship interrelations

		ING AND SALES PROMOTI ON MANAGE MENT	17E00317	CO3	To establish advertising and promotional strategies, goals and objectives within budget constraints and regulatory agencies with concerns to specialized aspects of advertising such as social effect, economic effects, and ethical considerations
				CO4	To analyze, examine the concepts, meaning, scope, need and objectives of Sales Promotion and to familiarize with types, timing, and measurement of impact of sales promotion.
				CO5	To analyze and evaluate the Scope, importance, methods, powers, process of publicity and to understand the overview scenario of PRO-role and functions
	1	STRATEGI C MANAGE MENT	17E00401	CO1	To understand the basic Concepts of strategic management its process and intents of strategic management.
				CO2	To Analyzing the corporations through using strategic techniques and application systems.
				CO3	To understanding strategic formulation process and choice of it. It useful for making plan.
				CO4	It usable to implementing the strategy after formulating and choice according to horizontal, vertical and to fit specific industry situation and allocation of planning system.
				CO5	Evaluating and controlling and role of the strategist, to understand bench mark and its importance for enhancing the strength of the organization and to know the auditing process
	2	E-BUSINESS	17E00402	CO1	To Remember and understand the basic Concepts of Electronic commerce and business.
				CO2	Understand the security threats ,applying the protocols for security .
				CO3	Analyze the electronic payment system and the transferring of electronic fund and Evaluating infrastructure issues.

		BUSINESS		**CO4**	Analyze E business applications and Evaluate the strategies for E business
				CO5	Evaluate E marketing and creating E marketing tactics ,hardware and software systems
II YEAR IV SEM	3	SERVICES MARKETI NG	17E00404	**CO1**	To understand and demonstrate the characteristics of service products differ from tangible goods, the challenges and opportunities and how this impacts on design and execution of marketing strategies for services.
				CO2	To distinguish different service types and draw implications for marketing strategy development, and to familiarize problems faced by services marketing professionals as well as tools and models managers might employ to increase customers' perceptions of satisfaction, and service quality and value.
				CO3	Students will be able to analyze and evaluate service pricing strategies, pricing objectives and foundations for services pricing and to identify and secure customers through networks for services.
				CO4	To analyze service promotion and communication strategies and to evaluate the expectations of customers and know to translate this knowledge into genuine value for customers
				CO5	To create and cultivate endurance among the students about marketing plans for services and practices to foster self – efficiency and self - advocacy among the students about marketing strategy formulation and resources allocation
				CO1	The aim of the unit to understand the Importance of International financial management, with comparative domestic FM & IFM with nature and scope of IFM

4	INTERNATIONAL FINANCIAL MANAGEMENT	17E00407	CO2	The students will be able to understand with a broad view of Forex Market system in the Global business setting. with function and structure of FX market.
			CO3	To understand the Management of Foreign exchange Exposures and Risk
			CO4	The Student Analyzing and Evaluation the cross Border Investment Decission.
			CO5	Understanding and Creating the working capital management and financing
5	GLOBAL HUMAN RESOURCE MANAGEMENT	17E00409	CO1	Enable the students to get an overview on foundation of IHRM, changes and challenges of global managers with respect to the global operations.
			CO2	To create the awareness on global market content, cultural issues and studies related to cross cultural dimensions in the global operations of a business.
			CO3	To make the students to know about the importance of global HR planning with respect to global staffing and the role of compensation structure in retaining the various categories of employees.
			CO4	To sharpen the view of the students regarding the global training and development strategies and the workforce performance management, its planning and implementation.
			CO5	To guide the students about the contemporary issues in managing the people in the global levels and people management with respect to various countries

HOD-MBA

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DEPARTMENT: ECE - VLSI SYSTEM DESIGN

		COURSE OUTCOMES			REGULATION: R17

Year/Sem.	S.No.	Subject Name	SUB CODE		COURSE OUTCOMES
	1	Advanced MOSFET Modelling	17D57101	CO1	Able to Derive mathematical models for modern MOS devices.
				CO2	To Provide solution to overcome short channel issues.
				CO3	Understand the physics of and design elements of silicon MOSFETs
				CO4	Explain the equations, approximations and techniques available for deriving a model with specified properties, for a general device characteristic with known qualitative theory
				CO5	Understand and analyze the inner working of semiconductor p-n diodes, Schottky barrier diodes and advanced MOSFET technology
	2	CMOS Analog IC Design	17D57102	CO1	Understand significance of different biasing styles and apply them for designing analog ICs.
				CO2	Analyze the functionality of Current Mirrors, Current Sinks.
				CO3	Analyze the Differential amplifiers and Current amplifiers.
				CO4	Design basic building blocks of analog ICs like, current mirrors, current sources, current sinks.
				CO5	Design basic building blocks of Two stage CMOS Power amplifiers and comparators.
				CO1	To determine MOS design with specifications

I M.TECH I SEM	3	CMOS digital IC design	17D5103	CO2	To design combinational MOS logic circuits by using boolean expressions.
				CO3	To realize and implement basic combinational and sequential circuits
				CO4	To design combinational and sequential elements using NMOS & CMOS.
				CO5	To analyze the dynamic Performance of CMOS circuits.
	4	CAD FOR VLSI	17D5105	CO1	Establish comprehensive understanding of the various phases design cycles of CAD for digital electronic systems, from digital logic simulation to physical design, including test and verification
				CO2	Establish comprehensive understanding of the various phases of floor planning and pin assignment algorithms
				CO3	Gain knowledge on the routing algorithms
				CO4	Gain knowledge on the methodologies involved in design, verification and implementation of digital esigns on reconfigurable hardware platform (FPGA)
				CO5	Gain knowledge on the methodologies involved in design, verification and implementation of digital designs on MCMs
	5	CPLD and FPGA Architectures and Applications	17D06202	CO1	Acquire knowledge about various architectures and device technologies of PLD''s
				CO2	Comprehend the FPGA Architectures
				CO3	Analyze System level Design and their application for Combinational and Sequential Circuits
				CO4	Get familiar with Anti-Fuse Programmed FPGAs
				CO5	Apply knowledge of this subject for various design applications
				CO1	Able to design and comprehend the structural functionality of various sequential and combinational digital blocks.

6	SDSD	17D06101	CO2	Capable of comprehending the notion of design approaches and representing and realizing their designs in ASM charts.	
			CO3	Able to build and implement Synchronous and Asynchronous ASM charts with their synthesis.	
			CO4	Understand the concept of Micro program and issues related to micro programming.	
			CO5	Able to build various applications and carry out their synthesis with test vectors.	
7	Structural Digital System Design Lab	17D38107	CO1	Different modeling styles available in VHDL and Verilog and difference between them	
			CO2	Difference between verilog and VHDL	
			CO3	Representation of different digital modules in different modelling styles available in VHDL and Verilog	
8	VLSI System Design Lab - I	17D57107	CO1	Understand syntax of various commands available with verilog and fundamental associated with design of digital systems	
			CO2	To design and simulate and implement various digital system like traffic light controller, UART.	
			CO3	Able develop problem solving skills and adapt them to solve real world problems	
			CO4	Write scripts using perl for building digital blocks	
	Low Power		CO1	Acquire the knowledge about various CMOS fabrication process and its modelling infer about the second order effects of MOS transistor characteristics.	
			CO2	Analyze and implement various CMOS low voltage and low power static logic circuits.	

1	VLSI Design	17D57201	CO3	learn the design of various CMOS low voltage and low power dynamic logic circuits
			CO4	learn the different types of memory circuits and their design.
			CO5	Design and implementation of various structures for low power applications
2	CMOS Mixed signal Design	17D57202	CO1	Demonstrate first order filter with least interference
			CO2	Extend the concept of phase locked loop for designing PLL application with minimum jitter by considering non ideal effects.
			CO3	Design different A/D, D/A, modulators, demodulators and different filter for real time applications
			CO4	Apply knowledge of mathematics, science, and engineering to design CMOS analog circuits to achieve performance specifications.
			CO5	Identify, formulates, and solves engineering problems in the area of mixed-signal design.
3	Embedded System Design	17D06201	CO1	Know the Basic Concept of Embedded Systems.
			CO2	Interpret the difference between Microcontrollers and Microprocessors.
			CO3	Apply the Software for Embedded System Design & concepts of Embedded OS
			CO4	Explain and apply the concept of Embedded Firmware, RTOS Based Embedded System Design and Task function
			CO5	Make significant contribution in the research in applications based on embedded system design
			CO1	Understand different types of faults associated with logic circuits and types of testing by employing fault models to the logic circuits.

				CO2	Study about different methods of simulation and algorithms associated with testing.
I M.TECH II-SEM	4	Test and Testability	17D06109	CO3	Get complete knowledge about different methods of simulation and algorithms associated with testing.
				CO4	Apply randomization concepts in designing testbench.
				CO5	Understand use of multi threading and inter process communication in testbench design.
	5	RF IC Design	17D57204	CO1	Demonstrate in-depth knowledge in Radio Frequency Integrated Circuits.
				CO2	Analyze complex engineering problems critically for conducting research in RF systems.
				CO3	Solve engineering problems with wide range of solutions in Radio Frequency Integrated circuits.
				CO4	Apply appropriate techniques to engineering activities in the field of RFIC Design.
	6	Internet of Things	17D38202	CO1	Able to understand the application areas of IOT
				CO2	Able to realize the revolution of Internet in Mobile Devices, Cloud &Sensor Networks
				CO3	Able to understand building blocks of Internet of Things and characteristics.
				CO4	Design and program IoT devices
				CO5	Design an IoT device to work with a Cloud Computing infrastructure
	7	Embedded System	17D38208	CO1	Design and Implement basic circuits that are used in Embedded systems.
				CO2	Develop code using appropriate tools.
				CO3	Test the circuit performance with standard benchmark circuits.

				CO4	Simulate appropriate application/distribution problems.
				CO5	Obtain the value of the point estimators using the method of moments and method of maximum likelihood.
	8	VLSI System Design Lab - II	17D57206	CO1	Design the RTL based digital circuits using HDL.
				CO2	Develop the hardware-software co-design using FPGA.
				CO3	Develop the custom IP using RTL design and/or high level synthesis with FPGA
				CO4	Design the digital system with low power and high throughput VLSI techniques
				CO5	Implement the fault tolerant hardware design and formal hardware verification using HDL & Design the digital circuits using CMOS transistor logic
II M.TECH I SEM	1	RESEARCH METHODOLOGY	17D20301	CO1	Demonstrate knowledge on research approaches, research process and data collection.
				CO2	Identify and analyze research problem.
				CO3	Solve the research problems using statistical methods.
				CO4	Carryout literature survey and apply good research methodologies for the development of scientific/ technological knowledge in one or more domains of engineering.
				CO5	Learn, select and apply modern engineering tools to complex engineering activities & Write effective research reports.
	2	Seminar	17D57303	CO1	Demonstrate capacity to identify an advanced topic for seminar in core and allied areas.
				CO2	Extract information pertinent to the topic through literature survey.
				CO3	Comprehend extracted information through analysis and synthesis critically.
				CO4	Plan, organize, prepare and present effective written and oral technical report on the topic.
				CO5	Adapt to independent and reflective learning for sustainable professional growth
				CO1	Demonstrate capacity to identify an advanced topic for project work in core and allied areas.
				CO2	Gather information related to the topic through literature survey.
				CO3	Comprehend gathered information through critical analysis and synthesis.

II- M.TECH II SEM	Project Work Phase 1 & II	17D57305 & 17D57401	CO4	Solve engineering problems pertinent to the chosen topic for feasible solutions.
			CO5	Use the techniques, skills and modern engineering tools necessary for project work.
			CO6	Do time and cost analysis on the project.
			CO7	Plan, prepare and present effective written and oral technical report on the topic.
			CO8	Adapt to independent and reflective learning for sustainable professional growth.

HECE