COURSE OUTCOMES: ELECTRICAL ENGINEERING

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-201	COMPUTER CONCEPTS & C PROGRAMMING	SECOND

1. Illustrate the flowchart and design analgorithm for a given problem and to develop IC programs using operators
2. Develop conditional and iterativestatements to write C programs
3. Exercise user defined functions to solvereal time problems
4. Inscribe C programs that use Pointers toaccess arrays, strings and functions.
5. Exercise user defined data typesincluding structures and unions to solve problems
6. Inscribe C programs using pointers andto allocate memory using dynamic memory management functions.
7. Exercise files concept to show input andoutput of files in C

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-202	BASIC ELECTRICAL ENGINEERING	SECOND

1. Recall basic concepts of Electrical Engineering
2. Illustrate basics of AC circuits
3. Explain operative principle of transformer with background of magnetic circuits
4. Classify and compare different types of Electrical machines
5. Classify different electrical measuring equipment's and understanding their principles

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-301	BASIC ELECTRONICS	THIRD

1. **Understand** the characteristics of diodes, transistors, OP-amps and digital electronic components
2. **Understand** the concepts of Digital electronics and analog to digital conversion and vice versa.
3. **Analyze** various circuits viz. Rectifiers, Voltage Regulators, Amplifier circuits, Op-Amp based linear & non-linear circuits
4. **Apply** the knowledge of electronics devices and circuits to implement engineering applications
5. **Design** Combinational and Sequential logic circuits.

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-302	BASIC ELECTRONICS LAB	THIRD

1. **Verify** the theoretical characteristics of diodes, transistors, OP-amps and digital electronic components experimentally
2. **Implement and analyze** various circuits viz. Rectifiers, Voltage Regulators, Amplifier circuits, Op-Amp based linear & non-linear circuits
3. **Design** Op-amp based circuits and Combinational and Sequential logic circuits.

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-303	DATA STRUCTURES	THIRD

1. Understand various algorithms for searching and sorting
2. Design and implement data structures like arrays, stacks & queues
3. Learning to use singly/doubly linked lists for efficient implementation of data structures
4. Understanding the tree data structure, with focus on binary trees, binary search trees and height-balanced trees

Understand data structures such as minimum spanning trees and graphs and also their applications in real world scenarios		
COURSE NUMBER	**COURSE TITLE**	**SEMESTER**
EEM-304	**C PROGRAMMING LAB**	**THIRD**
1. Illustrate flowchart and algorithm to the given problem 2. Understand basic Structure of the C-PROGRAMMING, declaration and usage of variables 3. C programs using operators 4. Exercise conditional and iterative statements to Write C programs 5. Write C programs using Pointers to access arrays, strings and functions. 6. Write C programs using pointers and allocate memory using dynamic memory management functions. 7. Exercise user defined data types		
COURSE NUMBER	**COURSE TITLE**	**SEMESTER**
EEM-305	**SIGNALS AND SYSTEMS**	**THIRD**
1. Classify the signals as Continuous time and Discrete time 2. Classify systems based on their properties and determine the response of LTI system using convolution. 3. Analyze the spectral characteristics of signals using Fourier analysis. 4. Identify system properties based on impulse response and Fourier analysis. 5. Apply transform techniques to analyze continuous-time and discrete-time signals and systems		
COURSE NUMBER	**COURSE TITLE**	**SEMESTER**
EEM-401	**ELECTRICAL MEASUREMENTS**	**FOURTH**
1. Classify different Analog meters and explain the principles of each device 2. Explain the principles of wattmeters, energy meters and frequency meters. 3. Compare different bridges and understand the concept of potentiometers 4. Find and understand proper measuring methods in magnetic fields. 5. Explain the principles of Instrument transformers and electronic instruments		
COURSE NUMBER	**COURSE TITLE**	**SEMESTER**
EEM-402	**ELECTRICAL MEASUREMENTS LAB**	**FOURTH**
1. Calibrate - voltmeters, ammeters, single phase energy meter. 2. Analysis based on comparing true and actual value of potentiometer & Power factor meter. 3. To verify dielectric property of oil insulation, Analyze the measuring parameters of Anderson & Schering bridge. 4. To verify practically the concepts of displacement, force, strain, inductance, capacitance & resistance. 1. 5. Examine the output of turns ratio and ratio error of CT		
COURSE NUMBER	**COURSE TITLE**	**SEMESTER**
EEM-403	**NETWORK ANALYSIS AND SYNTHESIS**	**FOURTH**
1. Understand the concept of network topology and apply it for various formulations. 2. Apply basic circuital laws and simplify the network using reduction techniques and theorems. 3. Understand time domain analysis and evaluate transient response, Steady state response 4. Understand frequency domain analysis, use Fourier transform and Laplace transform for		

analyzing circuits.
5. Define network functions and Synthesize networks using Foster and Cauer Forms.

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-404	ELECTRONICS & SIGNAL PROCESSING LAB	FOURTH

1. Analyze transistor amplifier circuits for Gain, frequency
2. Study of Wien's bridge and phase shift oscillators
3. Design regulated supply using voltage regulator IC
4. Verify the concepts of difference amplifier experimentally
5. Design a class-B amplifier

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-405	ELECTRICAL MACHINES-I	FIFTH

1. Summarize the basics of Single and Three Phase transformers
2. Understand the concepts of D.C.Machines, construction, armature reaction and characteristics
3. Understand the basic concept of Three-phase induction motor and its torque slip characteristics
4. Explain the basic concepts of Synchronous Machines, construction, EMF equation and armature reaction
5. Understand the concept of two reaction theory and performance analysis of synchronous motor

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-406	ELECTRICAL MACHINES LAB	FOURTH

1. Select range of apparatus based on the ratings of D.C. Motor and 1-PhTransformers.
2. Determine the efficiency and Regulation of Transformer by various tests
3. Demonstrate No-load/magnetization characteristics of DC and AC motors
4. Determine the characteristics of Traction Motor
5. Perform speed test on D.C. Motor
6. Determine the performance of D.C. Machines both directly and indirectly

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-407	ELECTRONIC DEVICES & CIRCUITS	FOURTH

1. Examine the energy distribution in metals and semiconductors
2. Understand the charge transport phenomena in semiconductors
3. Analyze in depth structure and construction of P-N Junction diode
4. Explain operation and characteristics of FET and analyze simple circuits
5. Recall basic concepts of BJTs and other semiconductor devices.

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-501	LINEAR CONTROL ENGINEERING	FIFTH

1. Classify control systems architecture and define transfer function using mathematical modeling
2. List out control system components and define basic control actions
3. Analyze time response of 1^{st} and 2^{nd} order systems
4. Define stability and apply various techniques to find stability of a system
5. Analyze frequency response of systems using frequency domain techniques.
6. Design a control system and understand concept of state space modeling.

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-502	LINEAR CONTROL LAB	FIFTH

1. To verify the operation and function of magnetic amplifiers
2. To verify the stability criterion
3. To calculate the transfer function of D C Motor
4. Able to Plot the Bode Diagram
5. To Plot Nyquist Plot
6. To Plot Root Locus Diagram of second order system
7. Study and verify the synchro transmitter and receiver systems

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-503	ELECTRICAL MACHINES-II	FIFTH

1. Study stating methods and design starter of DC motor, 3-Ph induction motor and synchronous motor
2. Analyze the speed-torque characteristics, testing of DC motor, induction motor and alternator andalsodetermine their efficiency.
3. Study the concepts of single phase induction motor
4. Understand the working concept of different types of special machines.
5. Study about Insulators, temperature rise and cooling methods.

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-504	ELECTRICAL MACHINES LAB.-II	FIFTH

1. Select range of apparatus based on the ratings of 3ph Induction motor, synchronous motor and Transformers.
2. Determine equivalent circuit parameters of 3ph Induction motor
3. Evaluate the efficiency of the different machine by analyzing their test results
4. Determine regulation and perform synchronization of alternator
5. Demonstrate Scott connection on two single phase transformers

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-505	ANALOG ELECTRONICS	FIFTH

6. Analyze large signal and small signal models of BJT, current mirrors, power amplifiers
7. Review fundamentals of MOSFETs and analyze CMOS mirrors
8. Compare single and multiple transistor circuits specifically differential amplifier
9. Understand concepts of feedback and analyze various types of oscillators
10. Explain basic steps in BJT/MOS Fabrication

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-506	DIGITAL SYSTEMS	FIFTH

1. Describe how analog signals are used to represent digital values in different logic families, including characterization of the noise margins.
2. Create the appropriate truth table from a description of a combinational logic function.
3. Create a gate-level implementation of a combinational logic function described by a truth table using and/or/inv gates, muxes or ROMs, and analyze its timing behavior.
4. Create a state transition diagram from a description of a sequential logic function and then convert the diagram into an implementation of a finite-state machine with the appropriate combinational and sequential components.
5. Describe the operation and timing constraints for latches and registers.

6. Draw a circuit diagram for a sequential logic circuit and analyze its timing properties (input setup and hold times, minimum clock period, output propagation delays).
7. Evalute combinational and sequential logic designs using various metrics: switching speed, throughput/latency, gate count and area, energy dissipation and power
8. Properly incorporate synchronous and asynchronous memories into a circuit design.
9. Discuss how to interface digital circuits with analog components (ADC, DAC, sensors, etc.).
10. Describe and implement logic for digital audio and video subsystems.
11. Design and analyze circuits for digital arithmetic.
12. Perform and interpret measurements using oscilloscopes and logic analyzers.
13. Using Verilog, implement a substantial digital system on an FPGA.
14. Learn how to write test-benches and perform verification of the relatively complex digital system.

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-507	ELECTRICAL TECHNOLOGY	FIFTH

1. Classify various DC motors and demonstrate their characteristics
2. Compare distribution and power transformers
3. Understand concept of harmonics
4. Testing of induction motors, analyze methods of speed control
5. Understand concepts of fractional HP motors
6. Explain principle and characteristics of synchronous machines

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-508	ELECTRICAL TECHNOLOGY LAB	FIFTH

1. Select range of apparatus based on the ratings of 3ph Induction motor, synchronous motor and Transformers.
2. Determine equivalent circuit parameters of 3ph Induction motor
3. Evaluate the efficiency of the different machine by analyzing their test results
4. Determine regulation and perform synchronization of alternator
5. Demonstrate Scott connection on two single phase transformers

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-511	ANALOG ICs AND SYSTEMS	FIFTH

1. Analysis, design, and applications of modern analog circuits using integrated bipolar and field effect transistor technologies.
2. Introduce the principles of analog circuits and apply the techniques for the design of analog integrated circuit (Analog IC's).
3. Apply the methods learned in the class to design and implement practical projects
4. The class will have a lab (or projects for graduate students).
5. Implement a complete analog system. In each week's lab, the class will build parts of the system with an overall objective of completing the entire system by the end of the term.

COURSE NUMBER	COURSE TITLE	SEMESTER

EEM-512	ANALOG ICS & SYSTEMS LAB.	FIFTH
1. Design oscillators and amplifiers using operational amplifiers. 2. Design filters using Opamp and perform experiment on frequency response. 3. Analyse the working of PLL and use PLL as frequency multiplier. 4. Design DC power supply using ICs. 5. Analyse the performance of oscillators and multivibrators using SPICE		
COURSE NUMBER	**COURSE TITLE**	**SEMESTER**
EEM-513	**COMPUTER ARCHITECURE**	**FIFTH**
6. Understanding various metrics for comparing the performance of computing systems 7. Learning about the various aspects of a real-world instruction set architecture (MIPS) and writing simple programs using this ISA 8. Gaining a strong understanding of computer arithmetic, designing a functional ALU and multiplication and division circuitry 9. Understanding basic cache architectures and virtual memory principles 10. Learning how to design a single cycle CPU: datapath and control unit		
COURSE NUMBER	**COURSE TITLE**	**SEMESTER**
EEM-514	**ADVANCED PROGRAMMING LAB.**	**FIFTH**
1. Learning the basic programming elements of a specific Object Oriented language - Java 2. Understanding the key Object Oriented principles of Abstraction, Encapsulation, Inheritance and Polymorphism in the Java context 3. Learning to write multi-threaded application programs in Java 4. Understanding how to use readily available data structures in the Java Collections Framework 5. Learning how to build Graphical User Interfaces in Java		
COURSE NUMBER	**COURSE TITLE**	**SEMESTER**
ASM-601	**ELECTRICAL ENGINEERING MATERIALS**	**SIXTH**
1. Explain the architecture of 8085 with pin diagram and make use of timing diagram to understand memory interfacing 2. Develop assembly language programs using addressing modes and instruction set 3. Compare different peripheral interfacing devices like 8255, 8259, 8237, 8251. 4. Explain architecture of 8051, memory organization, interrupt structures 5. Develop simple programs using addressing modes and instruction set		
COURSE NUMBER	**COURSE TITLE**	**SEMESTER**
EEM-601	**MICROPROCESSORS & MICROCONTROLLERS**	**SIXTH**
1. Explain the architecture of 8085 with pin diagram and make use of timing diagram to understand memory interfacing 2. Develop assembly language programs using addressing modes and instruction set 3. Compare different peripheral interfacing devices like 8255, 8259, 8237, 8251. 4. Explain architecture of 8051, memory organization, interrupt structures 5. Develop simple programs using addressing modes and instruction set		
COURSE NUMBER	**COURSE TITLE**	**SEMESTER**
EEM-602	**MICROPROCESSORS LAB**	**SIXTH**
1. Learn Assembly language programming of 8085 2. Design programs using 8085 assembly language 3. Implement hand assembling codes of programs on SDK 85 kit		

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-603	POWER SYSTEMS-I	SIXTH

1. Classify different power generation systems and distribution systems
2. Compare different types of overhead line conductors and evaluate line inductance and capacitance
3. Explain overhead transmission line performance, compensation.
4. Design overhead lines economically by making use of SAG calculations and summarize types and concepts of insulators.
5. Categorize cables, their characteristics and understand insulation coordination
6. Demonstrate power angle diagram, equal area criterion and understand concept of power system stability.

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-604	APPLIED SYSTEMS ENGINEERING	SIXTH

1. Develop and implement models and tools to enhance and optimize complex system
2. Develop and manage processes relevant to complex systems development
3. Architect, design, implement, integrate, verify, validate, support and decommission complex systems
4. Use systems engineering tools and practices to identify and execute effective technical solutions
5. Manage system-intensive projects within cost and schedule constraints
6. Consider financial elements in all complex systems solutions

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-605	POWER ELECTRONICS	SIXTH

1. Learning of characteristics and comparative features of power semiconductor switches
2. Learning of operation of Rectifiers and their performance parameters
3. Learning of types and operation of dc choppers
4. Learning of speed control of ac and dc motors using power electronic circuits
5. Preparation of competitive examinations

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-606	POWER ELECTRONICS LAB.	SIXTH

1. To plot V-I characteristic of SCR
2. Realization of operation of uni-junction transistor by connecting its circuit
3. Realization of operation of rectifiers by connecting its circuit
4. Realization of operation of different types of choppers by connecting their circuit
5. Realization of PWM technique

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-608	CONTROL ENGINEERING	SIXTH

1. Model different Physical systems.
2. Understand Transient response of first and second order systems to standard inputs.
3. Draw the root loci, Nyquist criterion, bode plots to obtain Frequency Response.
4. Analyze stability of Linear system.
5. To obtain Preliminary ideas of compensation
6. To study various Control System Components.

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-609	STREAM SEMINAR	SIXTH

1. develop skills in presentation and discussion of research topics in a public forum.

2. Develop skills to do literature survey
3. Explore a variety of research projects and activities and enrich their academic experience.

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-611	DESIGN & ANALYSIS OF ALGORITHMS	SIXTH

1. Learn to prove the correctness and analyze the running times of basic algorithms for some classic problems in various domains.
2. Familiarity with an assortment of important algorithms.
3. Various algorithmic design techniques and reinforce basic design concepts (e.g., pseudo-code, specifications, top-down design)
4. Utilize data structures and/or algorithmic design techniques in solving new problems.
5. Understand the synergy between data structures and algorithms and their collective importance in design of efficient programs.
6. Analyze the complexities of various problems in different domains.
7. Understand basic computability concepts and the complexity classes P, NP, and NP-Complete.
8. Study some techniques for solving hard problems.

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-612	COMPUTER SCIENCE LAB	SIXTH

1. Design algorithmic strategy for Divide and conquer method
2. Design algorithmic strategy for greedy methods
3. Design algorithmic strategy for Dynamic programming
4. Design algorithmic strategy for back-tracking, sorting, searching and selection

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-701	POWER SYSTEMS-II	SENEVTH

1. Analyze Faults in Over Head transmission lines
2. Classify relaying system and explain construction and principles of relays
3. Classify switchgear and functions, testing and selection of circuit breakers
4. Explain protection of power system and its components
5. Classification of substations, concept of neutral grounding and voltage control method

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-702	POWER SYSTEMS Lb	SENEVTH

1. **Analyze** experimental results and effective documentation
2. **Exhibit** professional behaviour
3. **Study various relays**
4. **Calculations of various machine reactances**
5. Study of corona discharge
6. Calculation of breakdown voltage of oil and insulating material

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-703	COMMUNICATION ENGINEERING	SENEVTH

1. Will explore the ideas of incident and reflected signals on a transmission line
2. Will understand the of a standing wave on a line
3. Will study the effects of mismatched sources, lines and loads
4. Will understand and use the Smith Chart to determine the line voltages and currents
5. Will use Smith Chart to match impedances and eliminate standing waves
6. Will make single and double stud tuners to match lines

7. Will investigate satellite type communication systems
8. Will understand fibre optic data lines and concepts
9. Will discuss various formats of digital communication

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-704	DIGITAL DESIGN LAB	SEVENTH

1. Describe how analog signals are used to represent digital values in different logic families, including characterization of the noise margins.
2. Create the appropriate truth table from a description of a combinational logic function.
3. Create a gate-level implementation of a combinational logic function described by a truth table using and/or/inv gates, muxes or ROMs, and analyze its timing behavior.
4. Create a state transition diagram from a description of a sequential logic function and then convert the diagram into an implementation of a finite-state machine with the appropriate combinational and sequential components.
5. Describe the operation and timing constraints for latches and registers.
6. Draw a circuit diagram for a sequential logic circuit and analyze its timing properties (input setup and hold times, minimum clock period, output propagation delays).
7. Evalute combinational and sequential logic designs using various metrics: switching speed, throughput/latency, gate count and area, energy dissipation and power
8. Properly incorporate synchronous and asynchronous memories into a circuit design.
9. Discuss how to interface digital circuits with analog components (ADC, DAC, sensors, etc.).
10. Describe and implement logic for digital audio and video subsystems.
11. Design and analyze circuits for digital arithmetic.
12. Perform and interpret measurements using oscilloscopes and logic analyzers.
13. Using Verilog, implement a substantial digital system on an FPGA.
14. Learn how to write test-benches and perform verification of the relatively complex digital system.

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-705 & EEM 802	ELECTRICAL ENGINEERING PROJECT	SEVENTH

1. Identify the real world power system problems
2. Analyze, design and implement solution methodologies
3. Apply modern engineering tools for solution
4. Write technical reports following professional ethics
5. learn about different software development process models and software engineeringprinciples and develop an ability to a apply them to software design of real life problems.
6. plan, analyze, design and implement a software project using programming languages like Java, ASP, PHP etc.
7. gain confidence at having conceptualized, designed and implemented a working major project with their team.
8.

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-706	ELECTROMAGNETIC FIELD THEORY	SEVENTH

1. Apply vector calculus to understand the behavior of static electric fields in standard configurations

2. Apply vector calculus to understand the behavior of static magnetic fields in standard configurations
3. Describe and analyze electromagnetic wave propagation in free-space
4. Describe and analyze transmission lines
5. Work in a small team using a cooperative learning rules
6. Communicate electromagnetic concepts both orally and in writing

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-708	COMMUNICATION LAB.	SEVENTH

1. Able to understand basic theories of Digital communication system in practical.
2. Able to design and implement different modulation and demodulation techniques
3. Able to analyze digital modulation techniques by using various tools.
4. Able to identify and describe different techniques in modern digital communications, in particular in source coding using various tools.
5. Able to perform channel coding.

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-710	SOFTWARE DESIGN	SEVENTH

1. Acquire strong fundamental knowledge in science, mathematics, fundamentals of computer science, software engineering and multidisciplinary engineering to begin in practice as a software engineer.
2. Design applicable solutions in one or more application domains using software engineering approaches that integrate ethical, social, legal and economic concerns.
3. Deliver quality software products by possessing the leadership skills as an individual or contributing to the team development and demonstrating effective and modern working strategies by applying both communication and negotiation management skill.
4. Apply new software models, techniques and technologies to bring out innovative and novelistic solutions for the growth of the society in all aspects and evolving into their continuous professional development.

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-711	ELETRICAL MACHINE DESIGN	SEVENTH

1. Design a Transformer
2. Design Induction machine
3. Design Synchronous machine
4. Explain cooling methods for transformer and rotating machines

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-712	DIGITAL DESIGN	SEVENTH

1. Perform conversions among different number systems, became familiar with basic logic gates and understand Boolean algebra and simplify simple Boolean functions by using basic Boolean properties & design of combinational circuits such as MUX, DEMUX, Encoder and Decoder etc.
2. Understand the design of sequential Circuits such as Flip-Flops, Registers, and Counters.
3. Obtain a basic level of Digital Electronics knowledge and set the stage to perform the analysis and design of Complex Digital electronic Circuits.

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-715	COMPUTER METHODS IN POWER SYSTEMS	SEVENTH

4. Formulate the incidence, network matrices and model the power system components.
5. Perform steady state power flow analysis of power system networks using Gauss-Seidel,

Newton-Raphson and Fast decoupled iterative methods.

6. Analyze short circuit faults in power system networks using ZBus method.
7. Perform contingency analysis for power system networks using ZBus method.

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-717	SEMICONDUCTOR CONTROLLED DRIVES	SEVENTH

1. Determination of performance parameters of dc drive
2. Supply side Power factor and Harmonic factor control in Rectifier circuits
3. Analysis of close loop control of dc motor
4. Study on basics of variable voltage variable frequency VVVF) sources
5. Study on VVVF fed ac drives

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-719	VLSI DESIGN TECHNOLOGY	SEVENTH

1. Design building blocks of digital IC using Gate level Modeling.
2. Design building blocks of digital IC using Dataflow Modeling.
3. Design stimulus blocks to test the functionality of the designs.
4. Design any block of digital IC using Behavioral Modeling.
5. Design any block of digital IC using Switch level Modeling.
6. Design Mealy and Moore state machines using Verilog HDL.
7. Explain the importance of Logic Synthesis in IC design and its design flow.
8. Analyze modes of operation of MOS transistor and its basic electrical properties.
9. Design MOS inverter for different loads.
10. Analyze CMOS design technology and design various gate circuits.
11. Analyze BiCMOS design technology, there uses in ICs and operation of BiCMOS inverter.
12. Draw stick diagrams for any MOS transistors.
13. Draw layouts for any MOS transistors.
14. Calculate the parasitic resistance and capacitance produced by the layouts and thus designing circuits with better performance.
15. Design various combinational circuits using gates and transistors.
16. Design various circuits for RAM.
17. Design various circuits for ROM.

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-720	COMPUTER NETWORKS	SEVENTH

1. To explain how communication works in computer networks and to understand the basic terminology of computer networks
2. To explain the role of protocols in networking and to analyze the services and features of the various layers in the protocol stack.
3. To understand design issues in Network Security and to understand security threats, security services and mechanisms to counter them.

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-721	POWER SYSTEM MANAGEMENT	SEVENTH

1. **Understand** the concept of energy audit, types, index and cost risk analysis with depreciation Techniques
2. **Describe** the analysis of load management, conservation of energy, power factor Improvement methods, energy efficient motors
3. **Analyze** energy saving studies on lighting system

4. **Articulate** energy saving in heating systems, concept of co generation system

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-722	DIGITAL IMAGE PROCESSING	SEVENTH

1. Learn the fundamentals of digital image acquisition and analysis
2. Learn the various applications in which digital image processing is being used.
3. Study the image fundamentals and mathematical transforms necessary for image processing
4. Learn Image enhancement techniques used in spatial domain
5. Learn Image enhancement techniques used in frequency domain
6. Understand Image Segmentation and the various segmentation methods used in digital image processing.
7. Understand Image compression and various Compression techniques used with digital images.
8. Understand the current trends and applications of Image processing

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-723	SYSTEMS LAB	SEVENTH

1. To study transmission media and to realize and compare different LAN topologies.
2. To implement and compare the performance of Data Link Layer protocols.
3. The objective of this Lab is to understand the use of transmission media, network topologies and data link layer protocols.

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-724	FUZZY SYSTEMS	SEVENTH

1. Illustrate fuzzy concepts systems with understanding of basic mathematical elements of fuzzy set theory for representation of fuzzy systems.
2. Relate fuzzy sets and classical sets theories to understand the differences and similarities between them.
3. Build concepts of fuzzy logic and approximate reasoning by extending classical logic concepts (its operations, propositions, logical implications and certain classical inference mechanisms) for fuzzy rule based systems using natural language as expression of a knowledge form.
4. Explain methods of fuzzification, inference techniques for fuzzy systems based on linguistic rules and methods of defuzzification in order to provide an insight into fuzzy inference applications in the area of control.
5. Identify and analyze exciting applications of fuzzy knowledge processing in various domains such as fuzzy control system design by combining some of the traditional design approaches (P controller, PI controller, PD controller and PID controller) with fuzzy concepts, multi-objective decision making, system identification, modeling and simulation.

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-801	UTILIZATION OF ELECTRICAL POWER	EIGHTH

1. Study various lamps and fittings in use.
2. Study various electric heating and welding equipment used in industries
3. Study Electric Drive and elevator used in industries
4. Study Electric Traction system
5. Study various domestic electrical appliances.

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-803	SEMINARS	EIGHTH

1. Identify and analyze the real time system problems
2. Acquire awareness on latest technology and current trends in the field of respective areas
3. Document and present technical reports
4. Participate in discussions for enhancement of knowledge
5. Adapt professional ethics

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-811	ROBOTICS	EIGHTH

1. 1. Discuss the history, concepts and key components of robotics technologies.
2. 2. Describe and compare various robot sensors and their perception principles that enable a robot to analyse their environment, reason and take appropriate actions toward the given goal.
3. 3. Analyse and solve problems in spatial coordinate representation and spatial transformation, robot locomotion, kinematics, motion control, localization and mapping, navigation and path planning.
4. 4. Apply and demonstrate the learned knowledge and skills in practical robotics applications.
5. 5. Plan, design and implement robotic systems, algorithms and software capable of operating in complex and interactive environments.
6. 6. Effectively communicate engineering concepts and design decisions using a range of media.

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-812	OPERATING SYSTEMS	EIGHTH

1. What is an operating system
2. Types of operating systems and differences among them
3. Processes, threads, and the differences between the two
4. Interrupts, synchronization, waiting, and atomic behaviour
5. Virtual memory, paging, and memory allocation
6. Caching principles and quantitative estimation of cache behaviour
7. Paging performance and page replacement
8. Files and storage of persistent information
9. Types of files and file access
10. Input, output, and types of I/O devices

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-814	DIGITAL SIGNAL PROCESSING	EIGHTH

1. Identify the signals and systems
2. Apply the principles of discrete-time signal analysis to perform various signal operations

3. Apply the principles of z-transforms to finite difference equations.
4. Apply the principles of Fourier transform analysis to describe the frequency characteristics of discrete-time signals and systems
5. Apply the principles of signal analysis to filtering
6. Use computer programming tools to process and visualize signals
7. Ability to apply current knowledge and applications of mathematics, science, engineering and technology
8. Ability to creatively design a system, component or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
9. Ability to identify, formulate, analyze and solve technical and engineering problems
10. Ability to use the techniques, skills and modern technical tools necessary for technical or engineering practice

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-815	HIGH VOLTAGE D C	EIGHTH

1. Understand the importance of Transmission power through HVDC.
2. Analyse the HVDC Converter operation.
3. Discuss firing angle control of 6 pulse,12 pulse circuits.
4. Discuss harmonics in
5. Identify the importance of filters for HVDC system.
6. Analyse the impact of AC system faults on DC system operation.
7. Identify the need for proper grounding for HVDC operation.

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-817	MICROWAVE ENGINEERING	EIGHTH

1. After the course, an average student can design and analyze simple microwave circuits and components using analytical and computer-aided design tools.
2. The student knows the key characteristics of different components and has pre-requisites for designing microwave systems.
3. The student is familiar with the selected computer-aided microwave circuit design tool(s).
4. Students have had the opportunity to improve their presentation skills, group-working skills, documentation skills, and problem solving skills.

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-818	PLANNING & OPERATIONS OF RESTRUCTURED POWER SYSTEMS	EIGHTH

1. Understand how the Power Market operates in a deregulated Electrical Power Industry.
2. Know the significance of generation planning and transmission planning for power system reliability and security assessment.
3. Analyze and distinguish load forecasting and price forecasting methods
4. Analyze the power system reliability and security assessment under deregulated environmental.

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-820	QUANTUM COMPUTING	EIGHTH

1. The overarching aim of this course is to give the student an introduction to this unusual new field.
2. To understand the perspective that quantum phenomena bring to the questions of information and algorithm is quite unlike the conventional one.

3. Learn basics of linear algebra and basic quantum mechanics as relevant to Quantum Computing
4. Be familiar with qubits and basic quantum gates.
5. Learn standard quantum algorithms for Quantum teleportation, Super-dense coding and other applications.
6. Understand the idea of Universal Quantum Computation and Universal Quantum Gates
7. Shor's Algorithm in detail as example of how Quantum Algorithms work.
8. Understand requirements and issues in physical realization of Quantum Computers and some example attempts.
9. Understand trends in Quantum Information processing.

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-821	NEURAL NETWORKS	EIGHTH

1. Learn basic neural network architecture
2. Learn basic learning algorithms
3. Understand data pre and post processing
4. Learn training, verification and validation of neural network models
5. Design Engineering applications that can learn using neural networks

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-822	DIGITAL COMMUNICATIONS	EIGHTH

1. convert between wavelengths and frequencies
2. describe the main differences between lasers and LEDs as used as light sources for optical-fibre communications systems
3. describe the difference between direct and external modulation of a laser
4. describe the difference in structure and performance of step-index multimode, graded-index multimode and single-mode optical fibres
5. draw up a power budget for an optical-fibre communication link and use it to estimate the maximum link distance.

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-823	SYSTEM OPTIMIZATION USING EVOLUTIONARY ALGORITHMS	EIGHTH

1. Understand basics of fuzzy system, genetic algorithms & their relations.
2. Learn artificial neural n/ws, models 7 their functions.
3. Apply genetic algorithms & artificial neural N/ws as computation tools to solve a variety of problems in various areas of interest ranging from optimization problems to text analytics

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-825	MOBILE COMPUTING	EIGHTH

1. To provide the student with an understanding of the Cellular concept, Frequency reuse, Hand-off strategies.
2. To provide the student with an understanding of Equalization and diversity reception techniques
3. To give the student an understanding of digital cellular systems (GSM, GPRS, WAP, cdma2000, and W-CDMA)

COURSE NUMBER	COURSE TITLE	SEMESTER
EEM-826	ELECTRICAL MACHINES-III	EIGHTH

1. The role of magnetic energy in electromechanical energy conversion. Generalized

equation of machines.

2. Active and passive transformation. Linear transformation in circuits and machines.
3. Electric machine dynamics. The torque expressions.
4. Transient performance of various machines (motors and generators). Stability analysis using various stability criteria. Reference frames and applications.
5. Steady-state performance of induction machines. Steady-state performance of synchronous machines.
6. Description and utilization of mathematical software of electric machines analysis.