

SJB Institute of Technology

(Affiliated to VTU, Belagavi & Approved by AICTE, New Delhi & Accredited by NAAC – New Delhi with 'A' Grade, CGPA-3.22)

No. 67, BGS Health & Edu City, Dr. Vishnuvardhan Road, Kengeri, Bangalore – 560060

Department of Mathematics

Course Outcomes (2019 -2020)

Subject / Subject Code	CO Mapped	Description
18MAT11 Calculus & Linear Algebra	CO1	Apply the knowledge of calculus to solve problems related to polar curves and its applications in determining the bentness of a curve.
	CO2	Learn the notion of partial differentiation to calculate rates of change of multivariate functions and solve problems related to composite functions and Jacobians.
	CO3	Apply the concept of change of order of integration and variable to evaluate multiple integrals and their usage in computing the area and volumes
	CO4	Solve first order linear / nonlinear differential equation analytically using standard methods
	CO5	Make use of matrix theory for solving of linear equations and compute Eigen values and Eigen vectors required for matrix diagonalization process

18MAT21 Advanced Calculus & Numerical Techniques	CO1	Illustrate the applications of multivariate calculus to understand the solenoidal and irrotational vectors and also exhibit the inter dependence of line, surface and volume integrals.
	CO2	Demonstrate various physical models through higher order differential equations and solve such linear ordinary differential equations and solve such linear ordinary differential equations .
	CO3	Construct a variety of partial differential equations and solution by exact methods / method of separation of variables.
	CO4	Explain the applications of infinite series and obtain series solution of ordinary differential equations.
	CO5	Apply the knowledge of numerical in the modeling of various physical and engineering phenomena.

	CO Mapped	Description
18MAT31 Transform Calculus, Fourier Series And Numerical Techniques	CO1	Use Laplace transform and inverse Laplace transform in solving differential/ integral equation arising in network analysis, control systems and other fields of engineering.
	CO2	Demonstrate Fourier series to study the behaviour of periodic functions and their applications in system communications, digital signal processing and field theory.
	CO3	Make use of Fourier transform and Z-transform to illustrate discrete/continuous function arising in wave and heat propagation, signals and systems.
	CO4	Solve first and second order ordinary differential equations arising in engineering problems using single step and multistep numerical methods.
	CO5	Determine the external of functional using calculus of variations and solve problems arising in dynamics of rigid bodies and vibrational analysis

	CO Mapped	Description
18MAT41 Complex Analysis, Probability and Statistical Methods	CO1	Use the concepts of analytic function and complex potentials to solve the problems arising in electromagnetic field theory.
	CO2	Utilize conformal transformation and complex integral arising in aerofoil theory, fluid flow visualization and image processing.
	CO3	Apply discrete and continuous probability distributions in analyzing the probability models arising in engineering field.
	CO4	Make use of the correlation and regression analysis to fit a suitable mathematical model for the statistical data.
	CO5	Construct joint probability distributions and demonstrate the validity of testing the hypothesis.

Sri Adichunchanagiri Shikshana Trust (R)
S J B INSTITUTE OF TECHNOLOGY
BGS Health & Education City, Kengeri, Bangalore – 60.

DEPARTMENT OF CHEMISTRY

Course outcomes of Engineering Chemistry(2019-20):

Theory Course Outcomes: 18CHE12/22

CO1: Understand the use of free energy in equilibria using thermodynamic consideration, electrochemical energy systems.

CO2: Understand and explain the Causes & effects of corrosion of metals and control of corrosion. Modification of surface properties of metals to develop resistance to corrosion, wear, tear, impact etc. by electroplating and electro less plating.

CO3: Apply the knowledge for Production & consumption of energy for industrialization of country and living standards of people. Utilization of solar energy for different useful forms of energy.

CO4: Analyse the engineering chemistry problems related to Environmental pollution waste management and water chemistry.

CO5: Understand and explain different techniques of instrumental method of analysis, Fundamental principles of nanomaterial

Course outcomes of Engineering Chemistry Lab(2019-20):

Lab Course outcomes: 18CHEL16/26

CO1: Handling different types of instruments for analysis of materials using small quantities of materials involved for quick and accurate results.

CO2: Carrying out different types of titrations for estimation of concerned in materials using comparatively more quantities of materials involved for good results

Sri Adichunchanagiri Shikshana Trust (R)
S J B INSTITUTE OF TECHNOLOGY
BGS Health & Education City, Kengeri, Bangalore –60.

Engineering Physics and Engineering physics Lab

Theory Course Outcomes: 18PHY12/26

CO1: Understand various types of oscillations and their implications, the role of Shock waves in various fields and recognize the elastic properties of materials for engineering applications

CO2: Realize the interrelation between time varying electric field and magnetic field, the transverse nature of the EM waves and their role in optical fiber communication.

CO3: Compute Eigen values, Eigen functions of Atomic and subatomic particles using Time independent 1-D Schrodinger's wave equation

CO4: Apprehend theoretical background of laser, construction and working of different types of laser and its applications in different fields

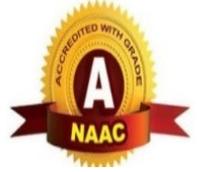
CO5: Understand various electrical properties of materials like conductors, semiconductors and dielectrics using different theoretical models.

Lab Course outcomes: 18PHYL16/26

CO1: Apprehend the concepts of elasticity and Resonance.

CO2: Apply the basic phenomenon and principles of optics.

CO3: Understand the principles of operations of semiconductor devices, dielectrics and concepts of Fermi energy and magnetic effect of electric current.



DEPARTMENT VISION

Empowering Electronics and Communication engineers to meet the advancements in technological and societal needs.

DEPARTMENT MISSION

- **M1:** To facilitate students in acquiring proficiency & providing eminence in Technical education.
- **M2:** To imbibe value based education that contributes to the human values, ethics and societal relevance.
- **M3:** To foster culture of innovation, industry and research in developing intellectual professionals and entrepreneurs.

Program Educational Objectives(PEO)

- **PEO1:** Proficiency to work in multidisciplinary domains, technological advancements through continuous learning process.
- **PEO2:** Graduate with moral and ethical values
- **PEO3:** Explore the research possibilities, innovative practices and entrepreneurship.

PSO (Program Specific Outcomes)

- Understand, analyse and realise the concepts in the field of analog and digital signal processing, communication, networking and semiconductor technology by applying modern design tools.
- Ability to enrich the design in electronics through optimization, better efficiency and innovative ideas.
- Enabling the graduates with excellent technical and soft skills, lifelong learning, leadership qualities, ethics and societal responsibilities.

Program Outcomes

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.

Course Outcomes

SEMESTER : III

Sl. No.	Subject Code	Subject Title
1	18MAT31	Mathematics
2	18EC32	Network Theory
3	18EC33	Electronic Devices
4	18EC34	Digital System Design
5	18EC35	Computer Organization & Architecture
6	18EC36	Power Electronics & Instrumentation
7	18ECL37	Electronic Devices and Instrumentation Laboratory
8	18ECL38	Digital System Design laboratory

Network Theory:

Course Outcomes:

- 1) Distinguish the networks and discuss various circuit analysis techniques.
- 2) Analyze the circuit parameters during switching transients and apply Laplace transform to solve the given network
- 3) Apply network theorems to solve a given network.
- 4) Evaluate the frequency response for resonant circuits and the network parameters for two port networks.

Electronic Devices:

Course Outcomes:

Upon successful completion of this course, students should be able to:

1. Understand the principles of semiconductor Physics
2. Understand the principles and characteristics of different types of semiconductor devices
3. Understand the fabrication process of semiconductor devices
4. Utilize the mathematical models of semiconductor junctions and MOS transistors for circuits and systems.

Digital System Design:

Course outcomes: After studying this course, students will be able to:

1. Explain the concept of combinational and sequential logic circuits and PLD.
2. Design the combinational logic circuits.
3. Design the sequential circuits using SR, JK, D, T flip-flops and Mealy & Moore machines
4. Design applications of Combinational & Sequential Circuits.

Computer Organization & Architecture:

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

1. Explain the basic organization of a computer system.
2. Explain different ways of accessing an input / output device including interrupts.
3. Illustrate the organization of different types of semiconductor and other secondary storage memories.
4. Illustrate simple processor organization based on hardwired control and micro programmed control.

Power Electronics & Instrumentation:

Course Outcomes:

1. Build and test circuits using power electronic devices.
2. Analyze and design controlled rectifier, DC to DC converters, DC to AC inverters and SMPS.
3. Define instrument errors and develop circuits for multirange Ammeters, Voltmeters and Bridges to measure passive component values and frequency
4. Describe the principle of operation of Digital instruments and PLCs
5. Use Instrumentation amplifier for measuring physical parameters and transducer.

18ECL37 (ELECTRONIC DEVICES AND INSTRUMENTATION LABORATORY)

Course Outcomes: On the completion of this laboratory course, the students will be able to:

1. Understand the characteristics of various electronic devices and measurement of parameters.
2. Design and test simple electronic circuits.
3. Use of circuit simulation software for the implementation and characterization of electronic circuits and devices.

18ECL38 (DIGITAL SYSTEM DESIGN LABORATORY)

Course Outcomes: On the completion of this laboratory course, the students will be able to:

1. Demonstrate the truth table of various expressions and combinational circuits using logic gates.
2. Design various combinational circuits such as adders, subtractors, comparators, multiplexers and demultiplexers.
3. Construct flips-flops, counters and shift registers.
4. Simulate Serial adder and Binary Multiplier.

Sl. No.	Subject Code	Subject Title
1	18MAT41	
2	18EC42	Analog Circuits
3	18EC43	Control Systems
4	18EC44	Engineering Statistics & Linear Algebra
5	18EC45	Signals & Systems
6	18EC46	Microcontroller
7	18ECL47	Microcontroller Laboratory
8	18ECL48	Analog Circuits Laboratory

Analog Circuits:

Course Outcomes:

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

1. Understand the characteristics of BJTs and FETs.
2. Design and analyze BJT and FET amplifier circuits.
3. Design sinusoidal oscillators and power amplifiers.
4. Understand, analyze and design the functioning of linear ICs and applications.

Control Systems:

Course Outcomes:

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

- Understand and develop the mathematical model of mechanical, electrical systems
- Determine transfer function for a given control system using block diagram reduction techniques and signal flow graph method.
- Determine the time domain specifications for first and second order systems.
- Analyse the stability of a system using Routh-Hurwit Criterion, Root-locus technique, Nyquist and bode plots.
- Develop a control system model in continuous and discrete time using state variable techniques

Engineering Statistics & Linear Algebra:

Course Outcomes:

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

Understand and analyze single and multiple random variables, and their extension to Random Processes.

Compute the quantitative parameters for the functions of single and multiple random variables and processes

Familiarization with the concept of Vector spaces and orthogonality with quantitative insight into application

Compute the quantitative parameters for matrices and Linear transformation.

Signals & Systems:

Course Outcomes:

At the end of this course, students would be able to:

- Understand and analyze the different types of signals and systems.
- Determine the various properties of continuous and discrete time systems.
- Comprehend the knowledge LTI systems and compute the response of a Continuous and Discrete LTI system using convolution.
- Determine the spectral characteristics of continuous and discrete time signal using Fourier analysis.
- Apply the knowledge of Z-transforms to analyse discrete systems in frequency domain.

Microcontroller:

Course outcomes: After studying this course, students will be able to:

- Explain the difference between Microprocessors & Microcontrollers, Architecture of 8051 Microcontroller, Interfacing of 8051 to external memory and Instruction set of 8051.
- Write 8051 Assembly level programs using 8051 instruction set.
- Explain the Interrupt system, operation of Timers/Counters and Serial port of 8051.
- Write 8051 Assembly language program to generate timings and waveforms using 8051 timers, to send & receive serial data using 8051 serial port and to generate an external interrupt using a switch.
- Write 8051 Assembly language programs to generate square wave on 8051 I/O port pin using interrupt and C Programme to send & receive serial data using 8051 serial port.
- Interface simple switches, simple LEDs, ADC 0804, LCD and Stepper Motor to 8051 using 8051 I/O ports

18ECL47 (MICROCONTROLLER LABORATORY)

Course Outcomes: On the completion of this laboratory course, the students will be able to:

1. Write Assembly language programs in 8051 for solving simple problems that manipulate input data using different instructions of 8051.
2. Interface different input and output devices to 8051 and control them using Assembly language programs.
3. Interface the serial devices to 8051 and do the serial transfer using C programming.

18ECL48 (ANALOG CIRCUITS LABORATORY)

Course Outcomes: On the completion of this laboratory course, the students will be able to:

1. Design analog circuits using BJT/FETs and evaluate their performance characteristics.
2. Design analog circuits using OPAMPs for different applications
3. Simulate and analyze analog circuits that uses ICs for different electronic applications.

SEMESTER : V

Sl. No.	Subject Code	Subject Title	
1	17ES51	Management and Entrepreneurship Development	
2	17EC52	Digital Signal Processing	
3	17EC53	Verilog HDL	
4	17EC54	Information Theory & Coding	
5	17EC553	Operating Systems	Professional Elective-1
6	17EC561 17EC562	Automotive Electronics C++	Open Elective-1
7	17ECL57	DSP LAB	
8	17ECL58	HDL LAB	

Management and Entrepreneurship Development:

Course Outcomes:

Upon successful completion of this course, students should be able to:

1. Understand the fundamental concepts of Management and Entrepreneurship.
2. Select a best Entrepreneurship model for the required domain of establishment.
3. Describe the functions of Managers, Entrepreneurs and their social responsibilities.
4. Compare various types of Entrepreneurs.
5. Analyze the Institutional support by various state and central government agencies.

Digital Signal Processing:

Course Outcomes: After studying this course, students will be able to:

1. Ability to apply the knowledge of sampling in frequency domain and reconstruction of Aperiodic discrete time signals.
2. Analyze the system response in frequency domain for real and complex signals
3. Develop FFT algorithms for DFT computation.
4. Realization of filters in direct form, cascade form, parallel and lattice realization

Verilog HDL:

Course Outcomes:

After studying this course, students will be able to:

- Define and describe the usage of Verilog Hardware Description Language (HDL) in Semiconductor Technology and Design flow of Digital Circuits.
- Write Register Transfer Level (RTL) models of digital circuits in different modeling style.
- Design dataflow and structural designing and verify the same models.
- Implement digital circuits in behavioral designing and verify the same models.
- Differentiate Verilog HDL and VHDL, Design RTL code in VHDL.

Information Theory & Coding:

Course Outcomes:

1. Ability to **apply** the mathematical knowledge of probability to measure information in discrete message source (Dependent and independent source)
2. **Apply** source encoding algorithm such as Shannon coding, Huffman coding, Arithmetic coding to ensure transmission of information of a discrete message source using minimum number of bits.
3. Ability to compute and **analyze** the capacity and efficiency of discrete and continuous time channels.
4. **Design** encoding and decoding techniques for Linear block code, Cyclic code, Convolution code, BCH code and Go lay code to ensure error free transmission of information of a discrete message source.

Operating Systems:

Course Outcomes:

After studying this course, students will be able to:

1. Explain the goals structures and operation and types of operating system.
2. Explain the scheduling techniques and long term, middle term and short term schedulers.
3. Apply the suitable techniques for contiguous and noncontiguous memory allocation.
4. Explain the organization of file systems and IOCS
5. Explain the message passing and deadlock detection and prevention methods.

Automotive Electronics:

Course Outcomes:

After studying this course, students will be able to:

1. Understand and implement various control requirements in the automotive system.
2. Comprehend dashboard electronics and engine system electronics.
3. Identify various physical parameters that are to be sensed and monitored for maintaining the stability of the vehicle under dynamic conditions.
4. To understand and implement the controls and actuator system pertaining to the comfort and safety of commuters.
5. Design and implement sensor network for mechanical fault diagnostics in an automotive vehicle.

C++:

Course Outcomes:

1. Explain the object oriented programming C++ program structure with all its components.
2. Develop functions using classes and objects.
3. Apply the concept of constructors, destructors and operator overloading for efficient programming.
4. Apply the concept of inheritance , pointers , virtual functions and polymorphism features.

5. Develop programs using suitable I/O and file operations for different application.

17ECL57 (DSP LAB)

Course Outcomes: On the completion of this laboratory course, the students will be able to:

1. Understand the concepts of analog to digital conversion of signals and frequency domain sampling of signals.
2. Modelling of discrete time signals and systems and verification of its properties and results.
3. Implementation of discrete computations using DSP processor and verify the results.
4. Realize the digital filters using a simulation tool and a DSP processor and verify the frequency and phase response.

17ECL58 (HDL LAB)

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

1. Write the Verilog/VHDL programs to simulate Combinational circuits in Dataflow, Behavioral and Gate level Abstractions.
2. Describe sequential circuits like flip flops and counters in Behavioral description and obtain simulation waveforms.
3. Synthesize Combinational and Sequential circuits on programmable ICs and test the hardware.
4. Interface the hardware to the programmable chips and obtain the required output.

SEMESTER : VI

Sl. No.	Subject Code	Subject Title	
1	17EC61	Digital Communication	
2	17EC62	ARM Microcontroller & Embedded Sys	
3	17EC63	VLSI Design	
4	17EC64	Computer Communication Networks	
5	17EC653/17EC654	Artificial Neural Network	Digital Switching System
6	17EC663/17CS664	DSD using Verilog	Python Appl. Programming
7	17ECL67	Embedded Controller Lab	
8	17ECL68	Computer Networks Lab	

Digital Communication:

Course Outcomes:

1. Associate and apply the concepts of bandpass sampling to well specified signals and channels.
2. Analyse symbol processing and performance parameters at the receiver under ideal and corrupted bandlimited channels.
3. Demonstrate bandpass signals subjected to corrupt and distorted symbols in a bandlimited channel can be demodulated and estimated at receiver to meet specified performed criteria
4. Analyse and compute spread spectrum techniques.

ARM Microcontroller & Embedded System:

Course outcomes: After studying this course, students will be able to:

- Describe the architectural features and instructions of 32 bit microcontroller ARM Cortex M3.
- Apply the knowledge gained for Programming ARM Cortex M3 for different applications.
- Understand the basic hardware components and their selection method based on the characteristics and attributes of an embedded system.
- Develop the hardware /software co-design and firmware design approaches.
- Explain the need of real time operating system for embedded system applications.

VLSI Design:

Course Outcomes:

After studying this course, students will be able to:

1. Demonstration of MOS transistor, CMOS fabrication flow and scaling.
2. Develop basic gates using the stick and layout diagrams.
3. Analyze CMOS subsystems and architectural issues.
4. Demonstrate knowledge of FPGA based system design.
5. Interpret memory elements along with timing considerations, testing and testability issues in VLSI Design.

Computer Communication Networks:

Course Outcomes:

After completing this course the student must demonstrate the knowledge and ability to:

1. Describe the layering architecture of computer networks and distinguish between the OSI reference model and TCP/IP protocol suite
2. Identify the protocols and services of Data link layer.
3. Distinguish the basic network configurations and standards associated with each network
4. Construct a network model and determine the routing of packets using different routing algorithms
5. Identify the protocols and functions associated with the transport layer services

Artificial Neural Network:

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

- Understand the role of neural networks in engineering, artificial intelligence, and cognitive modelling.
- Understand the concepts and techniques of neural networks through the study of the most important neural network models.
- Evaluate whether neural networks are appropriate to a particular application.
- Apply neural networks to particular applications, and to know what steps to take to improve performance.

Digital Switching System:

Course Outcomes:

1. Describe the electromechanical switching systems and its comparison with the digital switching.
2. Determine the telecommunication traffic and its measurements.
3. Define the technologies associated with the data switching operations.
4. Describe the software aspects of switching systems and its maintenance.

DSD using Verilog:

Course Outcomes:

After studying this course, students will be able to:

1. Design embedded systems, using small microcontrollers, larger CPUs/DSPs, or hard or soft processor cores.
2. Design & Construct the combinational circuits using discrete gates and programmable logic devices.
3. Describe Verilog model for sequential circuits and test pattern generation
4. Explore the different types of semiconductor memories and their usage for specific chip design
5. Design and synthesis of different types of processor and I/O controllers that are used in embedded system design.

Python Appl. Programming:

Course Outcomes:

The students should be able to:

1. Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.
2. Demonstrate proficiency in handling Strings and File Systems.
3. Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.
4. Interpret the concepts of Object-Oriented Programming as used in Python.
5. Implement exemplary applications related to Network Programming, Web Services and Databases in Python.

17ECL67 (EMBEDDED CONTROLLER LAB)

Course outcomes: After studying this course, students will be able to:

1. Understand the instruction set of 32 bit microcontroller ARM Cortex M3, and the software tool required for programming in Assembly and C language.
2. Develop assembly language programs using ARM Cortex M3 for different applications.
3. Interface external devices and I/O with ARM Cortex M3.
4. Develop C language programs and library functions for embedded system applications.

17ECL68 (COMPUTER NETWORKS LAB)

Course outcomes: On the completion of this laboratory course, the students will be able to:

1. Use the network simulator for learning and practice of networking algorithms.
2. Illustrate the operations of network protocols and algorithms using C programming.
3. Simulate the network with different configurations to measure the performance parameters.
4. Implement the data link and routing protocols using C programming.

SEMESTER : VII

Sl. No.	Subject Code	Subject Title	
1	15EC71	Microwave and Antennas	
2	15EC72	Digital Image Processing	
3	15EC73	Power Electronics	
4	15EC741	Multimedia Communications	Professional Elective 3
	15EC743	Real time Systems	
5	15EC751	DSPAA	Professional Elective 4
	15EC752	IoT & Wireless Sensor Networks	
6	15ECL77	VLSI LAB	
7	15ECL78	ADC LAB	

15EC71 Microwave And Antennas

CO1	Describe the use and advantages of microwave transmission
CO2	Analyze various parameters related to microwave transmission lines and
CO3	waveguides
CO4	Identify microwave devices for several applications
CO5	Analyze various antenna parameters necessary for building an RF system

15EC72 Digital Image Processing

CO1	Understand image formation and the role human visual system plays in perception of gray and color image data.
CO2	Apply image processing techniques in both the spatial and frequency (Fourier) domains.
CO3	Design image analysis techniques in the form of image segmentation and to evaluate the Methodologies for segmentation.
CO4	Conduct independent study and analysis of Image Enhancement techniques.

15EC73 Power Electronics

CO1	Understand the construction and working of various power devices.
CO2	Design and analysis of thyristor circuits with different triggering conditions..
CO3	Learn the applications of power devices in controlled rectifiers, converters and inverters to the society.
CO4	Demonstrate and understanding the power electronics circuits and models using modern tools under various load conditions

15EC741 Multimedia Communication

CO1	Understand basics of different multimedia networks and applications.
CO2	Understand different media types to represent them in digital form and determine the magnitude of quantization noise.
CO3	Apply different compression techniques for text and images and analyse DMS.
CO4	Understand different compression techniques to compress audio, video and multimedia communication across networks.

15EC743 Real Time Systems

CO1	Understand the fundamentals of Real time systems and its classifications.
CO2	Understand the concepts of computer control, the suitable computer hardware requirements for real-time applications.
CO3	Develop the software languages to meet Real time applications.
CO4	Understand the aspects of operating system for real-time control application.
CO5	Apply suitable methodologies to design and develop Real-Time Systems.

15EC751 DSP Algorithms and Architecture

CO1	Comprehend the knowledge and concepts of digital signal processing techniques.
CO2	Understand of the architecture of DSP computational building blocks and apply the knowledge to achieve speed in DSP architecture or processor.
CO3	Apply knowledge of various types of addressing modes, instructions, interrupts, peripherals and pipelining structure of DSP processor and develop programs to solve simple problems using programming language or tool.
CO4	Develop basic algorithms using DSP processors and conduct experiments with assembly level language programming using Code composer Studio tool.
CO5	Discuss about synchronous serial interface and multichannel buffered serial port (McBSP) of DSP device and demonstrate the implementation of Bio-telemetry Receiver, Speech Processing System, Image Processing System using CODEC interfacing on DSP Processor.

15EC752 IoT & Wireless Sensor Networks

CO1	Describe the OSI model for the IoT/M2M Systems.
CO2	Understand the architecture and design principles for IoT.
CO3	Learn the programming for IoT Applications.
CO4	Understand the Architecture and challenges of WSNs.
CO5	Identify the communication protocols which best suits the WSNs.

15ECL77

1. Develop the test bench to stimulate the various digital circuit
2. Examine and stimulate basic CMOS circuits like inverter, common source amplifier Differential amplifier and high level circuits like OPAMP, ADC circuits to meet desired parameter.
3. Interpret concepts of AC analysis, DC analysis and transient analysis in analog circuit
4. Design the gates, using gates realize the shift register and adder to meet desired parameter.
5. Demonstrate knowledge and understanding the engineering principles to manage projects

15ECL78

1. Determine the characteristics and response of microwave devices.
2. Determine the characteristics of micro strip antennas and compute the parameters associated with it.
3. Simulate the digital modulation schemes with the display of waveforms and computation of performance parameters using MATLAB.
4. Design and test the digital modulation circuits/systems and display the waveforms.
5. Determine the losses in optical fiber and measure numerical aperture using optical fiber link.

SEMESTER : VIII

Sl. No.	Subject Code	Subject Title
1	15EC81	Wireless Cellular and LTE 4G Broadband
2	15EC82	Fiber Optics & Networks
3	15EC834	Machine Learning
4	15EC835	Network and Cyber Security

15EC81 Wireless cellular and LTE 4G Broadband

CO1	Explain the system architecture and the functional standards of LTE 4G.
CO2	Analyze the role of LTE radio interface protocols and EPS Data convergence protocols to set up, reconfigure and release data and voice from users.
CO3	Demonstrate the UTRAN and EPS handling processes from set up to release including mobility management for a variety of data call scenarios.
CO4	Evaluate the Performance of resource management and packet data processing and transport algorithms.

15EC82 Fiber Optics and Networks

CO1	Understand and describe the basic concepts of optical fiber, classify different types and modes of propagation, transmission characteristics and losses in optical fiber communication.
CO2	Understand and analyze the construction, working principle of optical sources, detectors and receiver.
CO3	Explain and demonstrate the concepts of WDM, active and passive elements and optical amplifiers.
CO4	Illustrate the networking aspects of optical fiber and describe various standards associated with it.

15EC834 Machine Learning

CO1	Understand the core concepts of Machine learning.
CO2	Appreciate the underlying mathematical relationships within and across Machine Learning algorithms.
CO3	Explain paradigms of supervised and un-supervised learning.
CO4	Recognize a real world problem and apply the learned techniques of Machine Learning to solve the problem.

15EC835 Network and Cyber Security

CO1	Ability to learn various networking protocols to provide security of the data over the network
CO2	Understand and analyze the vulnerabilities in any computing system for different applications and design a security solution.
CO3	Apply scientific method to design antipatterns and perform investigations.
CO4	Capable to implement the concept of cyber security framework in computer system administration

|| JAI SRI GURUDEV ||
 Sri Adichunchanagiri Shikshana Trust(R)
SJB Institute of Technology
 No. 67, BGS Health & Education City, Dr. Vishnuvardhan Road
 Kengeri, Bengaluru -560060
DEPARTMENT OF MECHANICAL ENGINEERING

Course Outcomes (COs)

Semester: I

Subject Code	CO's	Description
18MAT 11	CO 1	Apply the knowledge of calculus to solve problems related to polar curves and its applications in determining the bentness of a curve.
	CO 2	Learn the notion of partial differentiation to calculate rates of change of multivariate functions and solve problems related to composite functions and Jacobians.
	CO 3	Apply the concept of change of order of integration and variable to evaluate multiple integrals and their usage in computing the area and volumes
	CO 4	Solve first order linear / nonlinear differential equation analytically using standard methods
	CO 5	Make use of matrix theory for solving of linear equations and compute Eigen values and Eigen vectors required for matrix diagonalization process

Subject Code	CO's	Description
18ME1 5	CO 1	Identify different sources of energy and their conversion process
	CO 2	Describe the working of boilers, hydraulic turbines and pumps
	CO 3	Discuss the working of IC engines, principle of refrigeration & air-conditioning.
	CO 4	Distinguish the types of engineering materials, metal joining processes and types of power transmission elements like gear and belt drives
	CO 5	Categorize different types of lathe & milling machine operations, Robotic configurations

Subject Code	CO's	Description
18EGD L25	CO 1	Analyze orthogonal projection theory, dimensions and annotations in engineering drawing
	CO 2	Develop engineering drawings as per BIS codes and conventions
	CO 3	Compose manual and computerized drawings using 2D and 3D modeling software packages
	CO 4	Build geometric objects using development and Isometric concepts

Semester: II

Subject Code	CO's	Description
18MAT 21	CO 1	Illustrate the applications of multivariate calculus to understand the solenoidal and irrotational vectors and also exhibit the inter dependence of line, surface and volume integrals.
	CO 2	Demonstrate various physical models through higher order differential equations and solve such linear ordinary differential equations and solve such linear ordinary differential equations .
	CO 3	Construct a variety of partial differential equations and solution by exact methods / method of separation of variables.
	CO 4	Explain the applications of infinite series and obtain series solution of ordinary differential equations.
	CO 5	Apply the knowledge of numerical in the modeling of various physical and engineering phenomena.

Subject Code	CO's	Description
18ME25	CO 1	Identify different sources of energy and their conversion process
	CO 2	Describe the working of boilers, hydraulic turbines and pumps
	CO 3	Discuss the working of IC engines, principle of refrigeration & air-conditioning.
	CO 4	Distinguish the types of engineering materials, metal joining processes and types of power transmission elements like gear and belt drives
	CO 5	Categorize different types of lathe & milling machine operations, Robotic configurations

Subject Code	CO's	Description
18EG DL25	CO 1	Analyze orthogonal projection theory, dimensions and annotations in engineering drawing
	CO 2	Develop engineering drawings as per BIS codes and conventions
	CO 3	Compose manual and computerized drawings using 2D and 3D modeling software packages
	CO 4	Build geometric objects using development and Isometric concepts

Semester: III

Subject Code	CO's	Description
18MA T31	CO 1	Use Laplace transform and inverse Laplace transform in solving differential/integral equation arising in network analysis, control systems and other fields of engineering.
	CO 2	Demonstrate Fourier series to study the behaviour of periodic functions and their applications in system communications, digital signal processing and field theory.
	CO 3	Make use of Fourier transform and Z-transform to illustrate discrete/continuous function arising in wave and heat propagation, signals and systems.
	CO 4	Solve first and second order ordinary differential equations arising in engineering problems using single step and multistep numerical methods.
	CO 5	Determine the external of functional using calculus of variations and solve problems arising in dynamics of rigid bodies and vibrational analysis

Subject Code	CO's	Description
18ME3 2	CO 1	Apply an engineering knowledge to demonstrate the behaviour of materials
	CO 2	Analyze the thin and thick cylinders and draw stress distribution curve, also to create Mohrs circle diagram for plane stress conditions.
	CO 3	Determine the various forces and moments in beams.
	CO 4	Evaluate the dimensions of mechanical elements for various applications.
	CO 5	Compare different strain energy methods and theories of failures in design of machineries

Subject Code	CO's	Description
18ME3 3	CO 1	Understand the fundamental concepts of basic thermodynamics.
	CO 2	Evaluate the work and heat interaction across the boundary of thermodynamics systems. Also to apply the first law of thermodynamics to closed and open systems.
	CO 3	Apply the knowledge of second law of thermodynamics to reversible heat engine, heat pump. Also to evaluate the change in entropy, reversibility and irreversibility.
	CO 4	Interpret the behavior of pure substances and its applications in practical problems.
	CO 5	Discuss the differences between ideal and real gases and evaluate thermodynamic properties of ideal and real gas mixtures using various relations.

Subject Code	CO's	Description
18ME3 4	CO 1	Chose appropriate materials based on its structure and mechanical behavior for engineering application
	CO 2	Analyse the various modes of failure of materials and its effects on alloys for better performance
	CO 3	Assess the structural and physical properties of materials through various heat treatment process
	CO 4	Perceive properties of composites, its application and to provide an alternate to conventional structural materials
	CO 5	Recommend alternate materials which are sustainable, economic and enable new product generation

Subject Code	CO's	Description
18ME3 5A	CO 1	Apply the knowledge of metal cutting using basic machine tools for production of components
	CO 2	Choose the right cutting tool materials and fluid and also to evaluate cutting tool parameter for different machining operation
	CO 3	Evaluate tool life on the basis of wear and wear rate and also discuss the economics of machining process of various cutting tools
	CO 4	Apply the knowledge of metal forming process for production of components
	CO 5	Design different sheet metal dies for simple sheet metal components

Subject Code	CO's	Description
18ME3 6A	CO 1	Identify and develop the orthographic, sectional views of various machine components
	CO 2	Apply the knowledge of thread forms, fasteners, keys and couplings.
	CO 3	Make use of drafting packages to produce 2D drawings of various machine components
	CO 4	Apply limits, tolerances and fits to assemblies
	CO 5	Create the part and assembly drawings as per the conventions with CAD packages.

Semester: IV

Subject Code	CO's	Description
18MA T41	CO 1	Use the concepts of analytic function and complex potentials to solve the problems arising in electromagnetic field theory.
	CO 2	Utilize conformal transformation and complex integral arising in aerofoil theory, fluid flow visualization and image processing.
	CO 3	Apply discrete and continuous probability distributions in analyzing the probability models arising in engineering field.
	CO 4	Make use of the correlation and regression analysis to fit a suitable mathematical model for the statistical data.
	CO 5	Construct joint probability distributions and demonstrate the validity of testing the hypothesis.

Subject Code	CO's	Description
18ME4 2	CO 1	Analyze the performance of gas power cycles and propulsion systems.
	CO 2	Examine the working principles and practical applications of vapour Power Cycles.
	CO 3	Analyze the combustion phenomena, performance of IC engine and also the effect of alternate fuels.
	CO 4	Discuss the principles, applications of refrigeration systems and to analyze air-conditioning processes using the principles of psychrometry.
	CO 5	Evaluate the performance of reciprocating compressors and steam nozzles.

Subject Code	CO's	Description
--------------	------	-------------

18ME4 3	CO 1	Identify and calculate the key fluid properties used in the analysis of fluid behavior.
	CO 2	Explain the principles of pressure, buoyancy and floatation
	CO 3	Apply the knowledge of fluid statics, kinematics and dynamics while addressing problems of mechanical and chemical engineering
	CO 4	Explain the concept of boundary layer in fluid flow and apply dimensional analysis to form dimensionless numbers in terms of input output variables
	CO 5	Illustrate and explain the basic concept of compressible flow and CFD

Subject Code	CO's	Description
18ME4 4	CO 1	Describe the kinematic link, kinematic pairs, chains, mechanisms, mobility, and inversions.
	CO 2	Determine the velocities and accelerations of linkages and joints of mechanisms graphical method.
	CO 3	Determine the velocities and accelerations by analytical method for four bar and slider crank mechanism.
	CO 4	Evaluate the velocity ratio and torque in various types of gear trains.
	CO 5	Analyses different cams and sketch the cam profiles for various motions of the follower, motion characteristics.

Subject Code	CO's	Description
18M18 MEE4 5B	CO 1	To provide adequate knowledge of quality test method conducted on welded and cast components
	CO 2	To provide knowledge of various casting process in manufacturing
	CO 3	To provide detailed information about the molding process
	CO 4	To impart knowledge about behavior of materials during welding and the effect of process

Subject Code	CO's	Description
18ME 46B	CO 1	Understand the concept and need of metrology and their methods of measurement.
	CO 2	Choose types of tolerances, fits, gauges and comparators for the assembly of the components as per the standards.
	CO 3	Analyse screw thread parameters and gear tooth terminology using tool makers microscopes and profile projectors.
	CO 4	Identify generalized measurement systems and their errors.
	CO 5	Identify the effective methods for the measurement of force, torque, pressure and also the gauges for strain and temperature.

Semester: V

Subject Code	CO's	Description
17ME5 1	CO 1	Summarize the concepts of management roles, levels, different management approaches, planning, types of plans, steps in planning and hierarchy of plans
	CO 2	Define the organizing, nature and importance of staffing, selection, recruitment, different leadership styles, communication and coordination
	CO 3	Solve the different types of interest, interest factors, cash flow diagram, different loans and EMI payment calculation
	CO 4	Calculate present worth, annual worth and IRR for different alternatives in economic decision making
	CO 5	To Acquire skills regarding components of costs, depreciation, methods of computing different depreciation charges and tax concepts

Subject Code	CO's	Description
17ME5 2	CO 1	Determine the forces and couples for static and dynamic conditions of four bar and slider crank mechanisms to keep the system in equilibrium.
	CO 2	Illustrate magnitude and angular position of balancing masses under static and dynamic condition of rotating and reciprocating masses in same and different planes.
	CO 3	Applying principles of governors and gyroscope and its applications
	CO 4	Analyse different modes of vibration for un damped vibration with single degree of freedom systems
	CO 5	Differentiate/Evaluate modes of vibration for forced and damped vibration with single degree of freedom systems

Subject Code	CO's	Description
17ME5 3	CO 1	Recognize the appropriate turbo machine and dimensionless variables for a given dynamical situation and predict prototype based on similitude.
	CO 2	Comprehend the significance of static and stagnation properties for turbines and compressors.
	CO 3	Summarize the Euler's equation to analyze energy transfer in turbo machines.
	CO 4	Apply the velocity triangles for steam turbines and hydraulic turbines to estimate various performance parameters.
	CO 5	Perform the preliminary design of centrifugal pumps and centrifugal compressors.

Subject Code	CO's	Description
17ME5 4	CO 1	Evaluate the stresses in curved beams, cylinders, and cylinder heads.
	CO 2	Differentiate flexible drives (belts, ropes, and chains) and springs.
	CO 3	Design of different types of gears, clutches, and brakes for static and dynamic loads
	CO 4	Apply design concepts of hydrodynamic bearings for selection of Anti friction, ball and roller bearings
	CO 5	Design and Development of different theoretical models using engineering design tools.

Subject Code	CO's	Description
17ME55	CO 1	Identify the difference between traditional and non-traditional machining process, its need and their applications.
	CO 2	Analyze the working principles and process parameters involved in mechanical non- traditional machining processes.
	CO 3	Interpret the different elements that affect the working of chemical non-traditional machining processes.
	CO 4	Apply the knowledge of constructional features and process parameters of electro chemical machining process.
	CO 5	Make use of the parameters that influence the mechanism and working principle of thermal non-traditional machining

Subject Code	CO's	Description
17ME56	CO 1	Understand thermal energy conversion systems for real time applications.
	CO 2	Apply the knowledge of principle of energy conversion by diesel and hydel energy.
	CO 3	Analyze the solar radiation parameters, working of solar PV and thermal systems.
	CO 4	Interpret principle of energy conversion from wind and tidal.
	CO 5	Review the applications of bio mass energy, fuel cells, thermoelectric convertor and MHD generator

Semester: VI

Subject Code	CO's	Description
17ME61	CO 1	Illustrate FEM as a numerical procedure for design based on direct method, energy method, variation method, and weighted residual method.
	CO 2	Describe the interpolation models and elements for analysis.
	CO 3	Determine the stress and strains in structural elements like bars, beams, trusses, shafts, and axi-symmetric members in static condition.
	CO 4	Solve for field variables in heat transfer and fluid flow problems.
	CO 5	Analyze the bars and beams in dynamic conditions.

Subject Code	CO's	Description
17ME62	CO 1	Interpret various automation methods to develop mathematical models in production system
	CO 2	Analyse the design process using computer drafting softwares and CAPP
	CO 3	Develop an algorithm function line line balancing to improve the productivity by adopting flexible manufacturing systems
	CO 4	Apply different computer application in manufacturing and prepare part program for simple jobs in CNC machine tools and robot technology
	CO 5	Identify the modern trends in manufacturing process like additive manufacturing ,industry 4.0 and application of IOT leading to smart manufacturing

Subject Code	CO's	Description
17ME6 3	CO 1	Define the modes of heat transfer and apply basic laws of heat transfer to formulate and solve steady state heat transfer problems.
	CO 2	Solve the heat transfer problems involving critical thickness of insulation, variable thermal conductivity and fins.
	CO 3	Analyze transient heat transfer problems for finite, semi-infinite and infinite solids.
	CO 4	Apply the dimensional analysis to solve free and forced convection heat transfer problems.
	CO 5	Execute the heat transfer basics to solve heat exchanger problems and explain the concept of condensation and boiling of liquids.

Subject Code	CO's	Description
17ME6 4	CO 1	Evaluate the stresses in curved beams, cylinders, and cylinder heads.
	CO 2	Differentiate flexible drives (belts, ropes, and chains) and springs.
	CO 3	Design of different types of gears, clutches, and brakes for static and dynamic loads
	CO 4	Apply design concepts of hydrodynamic bearings for selection of Anti friction, ball and roller bearings
	CO 5	Design and Development of different theoretical models using engineering design tools.

Subject Code	CO's	Description
--------------	------	-------------

17ME6 53	CO 1	Interpret mechanism of deformation for different metal forming processes and analyze the concept of yield criteria applicable to different material deformation processes
	CO 2	Understand the various factors that affect the metal forming processes under different working conditions
	CO 3	Outline tooling and equipment's that is required for important metal forming processes.
	CO 4	Able to approach metal forming processes both analytically and numerically
	CO 5	Choose the different high energy rate forming process suitable for fabrication of bulk sheet metal products & Apply the concept of powder metallurgy technique in forming industries.

Subject Code	CO's	Description
17ME6 55	CO 1	Apply the knowledge of engineering fundamentals related to automobile engines to solve complex engineering problems
	CO 2	Analyze the design of engine, transmission & controlling system to draw the conclusion on the basis of engineering sciences to address the performance parameters of the engines.
	CO 3	Apply the knowledge of controlling auxiliary system and other support systems employed in automobile to find solution to complex engineering problems
	CO 4	To incorporate the contextual knowledge of standard norms to address the safety and legal issues related to automobiles in one's professional engineering practice.
	CO 5	Demonstrate the knowledge of standards and norms towards automobile pollutions and respective control system to address environment and sustainability issues.

Subject Code	CO's	Description
--------------	------	-------------

17ME6 62	CO 1	Apply the knowledge of safety parameters, firefighting devices to be implemented in the workplace
	CO 2	Analyze the cause and types of fire accidents and formulate remedial actions
	CO 3	Analyze probable accident prone activities and implement proper PPE (Personal Protective Equipment) while working on machines and chemical plant
	CO 4	Identify the electrical hazards and formulate remedial measures with safety precautions at both residential and workplace
	CO 5	Demonstrate the knowledge of standards, norms and legal issues towards safety in one's professional engineering practice in risk management

Semester: VII

Subject Code	CO's	Description
15ME7 1	CO 1	Understand thermal energy conversion systems for real time applications.
	CO 2	Apply the knowledge of principle of energy conversion by diesel and hydel energy.
	CO 3	Analyze the solar radiation parameters, working of solar PV and thermal systems.
	CO 4	Interpret principle of energy conversion from wind and tidal.
	CO 5	Review the applications of bio mass energy, fuel cells, thermoelectric convertor and MHD generator

Subject Code	CO's	Description
--------------	------	-------------

15ME7 2	CO 1	Demonstrate the meaning, definitions, scope, need, phases, techniques and applications of Operations Research.
	CO 2	Formulate as Linear Programming Problems and derive optimal solutions by graphical and tabulation techniques.
	CO 3	Model Transportation and Assignment problems and derive optimum solutions.
	CO 4	Solve problems on game theory for pure and mixed strategy under competitive environment and waiting line problems for M/M/1 and M/M/K queuing models.
	CO 5	Construct network diagrams and determine critical path, floats for deterministic and PERT networks including crashing of Networks.

Subject Code	CO's	Description
15ME7 3	CO 1	Identify the control system and its types , control actions
	CO 2	Construct the system governing equations for physical models(Electrical, Thermal, Mechanical, Electro Mechanical
	CO 3	Analyze the gain of the system using block diagram and signal flow graph
	CO 4	Evaluate the stability of Control system in complex domain and frequency domain
	CO 5	Employ state equations to study the controllability and observability

Subject Code	CO's	Description
15ME7 53	CO 1	Develop electronic, hydraulic, pneumatic and electrical actuation circuits using sensors, transducers, Microprocessors and PLC programming
	CO 2	Analyze the various hydraulics and pneumatics actuation circuits and rectify the errors
	CO 3	Construct hydraulic and pneumatic circuits using Automation studio software
	CO 4	Propose a solution for the situation related to automation system

Subject Code	CO's	Description
15ME7 45	CO 1	Discuss smart structures, piezoelectric properties and shape memory alloys.
	CO 2	Interpret the properties and characteristics of electro, magneto rheological fluids and fiber optics on real time applications.
	CO 3	Analyze vibration absorbers and characteristics of Biomimetics
	CO 4	Understand intrinsic characteristics and properties of MEMS, piezoelectric sensing and actuation systems.
	CO 5	Distinguish composites made of smart materials along with other composites.

Semester: VIII

Subject Code	CO's	Description
15ME8 1	CO 1	Understand the meaning, definitions, scope, need, phases, techniques and applications of operations research.
	CO 2	Formulate as Linear Programming Problems and derive optimal solutions by graphical and tabulation techniques.
	CO 3	Model Transportation and Assignment problems and derive optimum solutions
	CO 4	Solve problems on game theory for pure and mixed strategy under competitive environment and waiting line problems for M/M/1 and M/M/K queuing models.
	CO 5	Construct network diagrams and determine critical path, floats for deterministic and PERT networks including crashing of Networks.

Subject Code	CO's	Description
15ME8 2	CO 1	Apply the knowledge of Additive Manufacturing and Rapid Prototyping technologies
	CO 2	Choose various Nonmaterial's production techniques.
	CO 3	Develop NC machine program
	CO 4	Utilize the knowledge of Pneumatic and hydraulics Systems to automate the process in various industrial applications
	CO 5	Decide the types of Industrial controls required

Subject Code	CO's	Description
15ME8 35	CO 1	Point out the Components, Phases, Characteristics, and Opportunities, benefits, Views, feasibility, vision and Drivers of PLM.
	CO 2	Choose Conceptualization, Design, Development, Validation, Production, implementation of PLM and PDM.
	CO 3	Calculate the Engineering prototype development, design for environment, virtual testing, validation and Creation of animation using CAD software
	CO 4	Analyze the parameterization of design, optimization of products, Digital manufacturing, virtual learning curve, production planning
	CO 5	Evaluate the PLM strategy, PLM initiatives to support corporate objectives Infrastructure assessment, assessment of current systems and applications.

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

PROGRAM OUTCOMES (POs)

Engineering Graduate will be able to:

1. **Engineering Knowledge:** Apply the knowledge of mathematics, Science, engineering fundamentals, and an engineering specification to the solution of complex engineering problems.
2. **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.
3. **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.
4. **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.
5. **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.
6. **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.
7. **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.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. **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.
11. **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.
12. **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.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO 1: The Electrical and Electronics Engineering program must demonstrate that graduates can design and analyze systems that efficiently generate, transmit & distribute, measurement, protection and utilization of electric power.

PSO 2: The Electrical and Electronics Engineering program must demonstrate that graduates can understand the Operation of Electrical machines, Drives and their Control using Electronic Circuits and applying to the ever evolving societal and Industrial needs.

PSO 3: The Electrical and Electronics Engineering program must demonstrate design, analyze, implement and test the analog & digital circuits, signal processing, microcontrollers & computer programming.

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**Semesters wise Subject List for Academic Year 2019-20**

I/II Semester		
SL. No.	Subject Code	Subject Name
1.	18ELE13/23	Basic Electrical Engineering
2.	18EEL17/27	Basic Electrical Engineering Lab
III Semester		
SL. No.	Subject Code	Subject Name
1.	18MAT31	Engineering Mathematics-III
2.	18EE32	Electric Circuit Analysis
3.	18EE33	Transformers and Generators
4.	18EE34	Analog Electronic Circuits
5.	18EE35	Digital System Design
6.	18EE36	Electrical and Electronic Measurements
7.	18EEL37	Electrical Machines Laboratory -1
8.	18EEL38	Electronics Laboratory
IV Semester		
SL. No.	Subject Code	Subject Name
1.	18MAT41	Engineering Mathematics-IV
2.	18EE42	Power Generation and Economics
3.	18EE43	Transmission and Distribution
4.	18EE44	Electric Motors
5.	18EE45	Electromagnetic Field Theory
6.	18EE46	Operational Amplifiers and Linear ICs
7.	18EEL47	Electrical Machines Laboratory -2
8.	18EEL48	Op- amp and Linear ICs Laboratory
V Semester		
SL. No.	Subject Code	Subject Name
1.	17EE51	Management and Entrepreneurship
2.	17EE52	Microcontroller
3.	17EE53	Power Electronics
4.	17EE54	Signals and Systems
5.	17EE55X	Professional Elective – I
6.	17EE56Y	Open Elective - I
7.	17EEL57	Microcontroller Laboratory
8.	17EEL58	Power Electronics Laboratory

VI Semester		
SL. No.	Subject Code	Subject Name
1.	17EE61	Control Systems
2.	17EE62	Power System Analysis – 1
3.	17EE63	Digital Signal Processing
4.	17EE64	Electrical Machine Design
5.	17EE65X	Professional Elective – II
6.	17EE66Y	Open Elective - II
7.	17EEL67	Control System Laboratory
8.	17EEL68	Digital Signal Processing Laboratory
VII Semester		
SL. No.	Subject Code	Subject Name
1.	15EE71	Power System Analysis - 2
2.	15EE72	Power System Protection
3.	15EE73	High Voltage Engineering
4.	15EE74X	Professional Elective – III
5.	15EE75Y	Professional Elective – IV
6.	15EEL76	Power system Simulation Laboratory
7.	15EEL77	Relay and High Voltage Laboratory
8.	15EEP78	Project Phase – I + Seminar
VIII Semester		
SL. No.	Subject Code	Subject Name
1.	15EE81	Power System Operation and Control
2.	15EE82	Industrial Drives and Applications
3.	15EE83X	Professional Elective – V
4.	15EE84	Internship / Professional Practice
5.	15EEP85	Project Work Phase -II
6.	15EES86	Seminar

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Outcome of all subjects of 2018 Scheme

I/II Semester

Course Name: Basic Electrical Engineering

Course Code: 18ELE13/23

CO's	CO Statement
18ELE13.1	Understand the basic concepts of DC circuits and Magnetic circuits and also able to solve problems related to DC and magnetic circuits.
18ELE13.2	Analysis of Single Phase and three phase AC Circuits and the representation of alternating quantities and also determining the power and other parameters in these circuits
18ELE13.3	Explain the construction, basic principle of operation, applications and also determine performance parameters of electrical Machines.
18ELE13.4	Practice Electrical Safety Rules & standards and types of electrical wiring and domestic earthing.

Course Name: Basic Electrical Engineering Lab

Course Code: 18ELEL17/27

CO's	CO Statement
18ELEL17.1	To verify the fundamental laws of electrical engineering and to measure an impedance of a given coil.
18ELEL17.2	To compare Power, Power factor of different lamps and to analyze an open and short circuit condition for an electrical circuit.
18ELEL17.3	Determine earth resistance and understand two way and three-way control of lamps.
18ELEL17.4	Measure the three-phase power by two wattmeter's and determine the power consumed in a 3-phase load.

III Semester

Course Name: Engineering Mathematics III

Course Code: 18MAT31

CO's	CO Statement
18MAT31.1	Know the use of periodic signals and Fourier series to analyze circuits and systems communication.
18MAT31.2	Explain the general linear system theory for continuous - time signals and digital signal processing using the Fourier transform and z-transform.
18MAT31.3	Employ appropriate numerical methods to solve algebraic and transcendental equations.
18MAT31.4	Apply Green's theorem, Divergence theorem and Stokes theorem in various application in the field of electro-magnetic and gravitational fields and fluid flow problems.
18MAT31.5	Determine the external of functional and solve the simple problems for calculus of variations. Utilize the concepts of functional and their variations in the applications of communication systems, decision theory, synthesis and optimization of digital circuits.

Course Name: Electric Circuit Analysis**Course Code: 18EE32**

CO's	CO Statement
18EE32.1	Understand the basic concepts, basic laws and methods of analysis of DC and AC networks
18EE32.2	Solve complex electric circuits using network theorems
18EE32.3	Analyze the resonant series and parallel circuits and Discuss transient analysis of RL and RC circuit Switching action with evaluation of Initial conditions
18EE32.4	Synthesize typical waveforms using Laplace transformation
18EE32.5	Solve unbalanced three phase systems and also evaluate the performance of two port networks

Course Name: Transformers and Generators**Course Code: 18EE33**

CO's	CO Statement
18EE33.1	Explanation and understanding and of construction and operation of transformers and autotransformer
18EE33.2	Analyze the performance of transformer by various tests, phase conversion and parallel operation
18EE33.3	Explanation and understanding of construction and operation of DC and AC Generators.
18EE33.4	Analyze the performance of Synchronous machines by various tests, parallel operation and performance of Synchronous machines on infinite bus

Course Name: Analog Electronic Circuits**Course Code: 18EE34**

CO's	CO Statement
18EE34.1	Illustrate the construction and working of Diodes, BJT and FET
18EE34.2	Design different amplifiers, Oscillators, signal conditioning circuit using diodes, BJT and FET.
18EE34.3	Analysis of transistor behaviour at different frequencies.

Course Name: Digital System Design**Course Code: 18EE35**

CO's	CO Statement
18EE35.1	Develop simplified switching equation using different reduction techniques, mealy/Moore models and state diagrams.
18EE35.2	Design different sequential and combinational circuits
18EE35.3	Explain the function of different sequential and combinational circuits

Course Name: Electrical and Electronic Measurements**Course Code: 18EE36**

CO's	CO Statement
18EE36.1	Explain the working of various circuits and equipments used for electrical parameters and components measurements. Also explain working of recording and display devices.
18EE36.2	Analyze and exhibit process of adjustments, calibrations and errors in electrical and electronics instruments
18EE36.3	Formulate the techniques to extend range of electrical and electronics instruments

Course Name: Electrical Machines Laboratory-1

Course Code: 18EEL37

CO's	CO Statement
18EEL37.1	Conduct different tests on transformers to evaluate the performance characteristics of the 1-phase and 3-phase transformers.
18EEL37.2	Connect single phase transformers for three phase operation and phase conversion.
18EEL37.3	Compute the voltage regulation of synchronous generator using the test data obtained in the laboratory. Evaluate the performance of synchronous generators from the test data.

Course Name: Electronics Laboratory

Course Code: 18EEL38

CO's	CO Statement
18EEL38.1	Design Rectifiers, oscillators, amplifiers using diodes, BJT and FET. Also determine their characteristic parameters.
18EEL38.2	Illustrate the characteristics of CB, CC,CE modes.
18EEL38.3	Design combinational and sequential logic circuits and test for their desired output.

IV Semester

Course Name: Engineering Mathematics IV

Course Code: 18MAT41

CO's	CO Statement
18MAT41.1	Solve first and second ordinary differential equations arising in flow problems using single step and multistep numerical methods.
18MAT41.2	Solve problems of quantum mechanics employing Bessel's function relating to cylindrical polar coordinate systems and Legendre's polynomials relating to spherical polar coordinate systems
18MAT41.3	Understand the analyticity, potential fields, residues and poles of complex potentials in field theory and electromagnetic theory Describe conformal and bilinear transformation arising in aerofoil theory fluid flow visualization and image processing
18MAT41.4	Solve problems on probability distributions relating to digital signal processing, determine joint probability distributions and stochastic matrix connected with multivariate correlation problems for feasible random events
18MAT41.5	Draw the validity of the hypothesis proposed for the given sampling distribution in accepting or rejecting the hypothesis, Define transition probability matrix of a Markov chain and solve problems related to discrete parameter random process.

Course Name: Power Generation & Economics

Course Code: 18EE42

CO's	CO Statement
18EE42.1	Understand and describe the working of hydroelectric, steam, nuclear power plants and state functions of major equipment of the power plants.
18EE42.2	Understand and classify various substations and explain the importance of grounding.
18EE42.3	Understand the economic aspects of power system operation and its effects.
18EE42.4	Explain the importance of power factor improvement

Course Name: Transmission and Distribution**Course Code: 18EE43**

CO's	CO Statement
18EE43.1	Explain transmission and distribution scheme, Identify the importance of different transmission systems and Types and study of Insulators
18EE43.2	Analyze and compute the parameters of the transmission line for different configurations and Assess the performance of overhead lines.
18EE43.3	Interpret corona, explain the use of underground cables
18EE43.4	Classify different types of distribution systems; examine its quality & reliability.

Course Name: Electric Motors**Course Code: 18EE44**

CO's	CO Statement
18EE44.1	Explain the constructional features of DC Motors and selection of a suitable drive for specific Application.
18EE44.2	Analyze and assess the performance characteristics of DC motors by conducting suitable tests and control the speed by suitable method.
18EE44.3	Explain the constructional features of Three Phase and Single phase induction Motors and assess their performance.
18EE44.4	Starting and speed control of induction motor
18EE44.5	Explain the operation of Synchronous motor and special motors.

Course Name: Electro Magnetic Field Theory**Course Code: 18EE45**

CO's	CO Statement
18EE45.1	Knowledge about the vector and calculus and fundamental laws of physics to understand the electric and magnetic field
18EE45.2	Problem formulation and analysis of electromagnetic fields in the region surrounded by different static and moving charge configuration
18EE45.3	Explain the behavior of electric and magnetic field across a boundary

Course Name: Operational Amplifiers and Linear ICs**Course Code: 18EE46**

CO's	CO Statement
18EE46.1	To understand the basics of Linear ICs such as Op-amp, Regulator, Timer & PLL.
18EE46.2	To learn the designing of various circuits using linear ICs.
18EE46.3	To use these linear ICs for specific applications
18EE46.4	To understand the concept and various types of converters.
18EE46.5	To use these ICs, in Hardware projects.

Course Name: Electrical Machines Laboratory-2

Course Code: 18EEL47

CO's	CO Statement
18EEL47.1	Demonstrate and understanding the performance of DC motors by conducting suitable experiments and report the results
18EEL47.2	Estimate or test the performance of induction and synchronous motor by conducting suitable experiments and report the results.
18EEL47.3	Experiment and analyze the speed control techniques for single phase and three-phase induction motors.

Course Name: Op-Amp and LIC Laboratory

Course Code: 18EEL48

CO's	CO Statement
18EEL48.1	To conduct experiment to determine the characteristic parameters of OP-Amp.
18EEL48.2	To design test the OP-Amp as Amplifier, adder, subtractor, differentiator and integrator.
18EEL48.3	To design test the OP-Amp as oscillators and filters
18EEL48.4	Design and study of Linear IC's as multivibrator power supplies.
18EEL48.5	To design test the different applications of OP-Amp in comparator and converter circuits

V Semester

Course Name: Management and Entrepreneurship

Course Code: 17EE51

CO's	CO Statement
17EE51.1	Explain the nature, characteristics, needs and process of management, entrepreneurship, intrapreneurship
17EE51.2	Apply the knowledge of project proposal for getting the funding from different private and government agencies & also apply knowledge of CPM/PERT algorithms for their enterprise
17EE51.3	Utilize the schemes and facilities provided by Government
17EE51.4	Manage the human, material resources and Capital in enterprise

Course Name: Microcontrollers

Course Code: 17EE52

CO's	CO Statement
17EE52.1	Discuss the architectural details of microcontrollers and instruction set
17EE52.2	Develop and analyse the assembly and C language programs to facilitate the data movement, arithmetic, logical, branching operation and other operations
17EE52.3	Design and apply the knowledge of on-chip peripherals and also to interface external hardware to microcontroller

Course Name: Power Electronics**Course Code: 17EE53**

CO's	CO Statement
17EE53.1	Explain the working, sketch the steady state and dynamic characteristics of power semiconductor devices, types of power converters and their applications, Peripheral effects, and derive relevant expressions for their performance parameters etc. Explain types of power diodes, their characteristics, and the effects of power diodes on RL circuits
17EE53.2	Formulate equations and estimate circuit components, power loss for given specifications of operation of power devices under steady state and dynamic conditions. Design protective circuits.
17EE53.3	Apply relevant expressions to analyze the performance of different power converters.

Course Name: Signals & Systems**Course Code: 17EE54**

CO's	CO Statement
17EE54.1	Explain basic signals, it's classification and properties of various systems
17EE54.2	Analysis of the given continuous and discrete LTI system using frequency response, different transforms, & convolution methods.
17EE54.3	Solve difference and differential equation and block diagram representation of the LTI system

Course Name: Electrical Estimation & Costing**Course Code: 17EE553**

CO's	CO Statement
17EE553.1	Explain the purpose of estimation and costing. Discuss market survey, estimates, purchase enquiries, tenders, comparative statement and payment of bills and Indian electricity act and some of the rules.
17EE553.2	Discuss distribution of energy in a building, wiring and methods of wiring, cables used in internal wiring, wiring accessories, fittings and fuses & its types.
17EE553.3	Discuss design of lighting points and its number, total load, sub-circuits, size of conductor.
17EE553.4	Discuss different types of service mains and estimation of power circuits.
17EE553.5	Discuss estimation of overhead transmission and distribution system and its components
17EE553.6	Discuss main components of a substation, their graphical representation and preparation of single line diagram of a substation

Course Name: Renewable Energy Systems**Course Code: 17EE563**

CO's	CO Statement
17EE563.1	Summarize the energy sources of India and world, classification of non - conventional energy sources. Explain the energy consumption as a measure of prosperity. Define solar constant, basic sun-Earth Angles and their representation related to solar geometry.
17EE563.2	Explain the different types of solar thermal energy collectors used for various thermal applications, describe the working solar cell system, characteristics and their applications.
17EE563.3	Understand and explain the different types of energy production from hydrogen, Wind and geothermal system. Calculate the power available in the wind turbines. Explain the importance of solid waste and agriculture refuse.
17EE563.4	Discuss the importance of tidal power generation, tidal energy availability, sea wave energy and explain the methods of power generation.

Course Name: Micro Controller Laboratory**Course Code: 17EEL57**

CO's	CO Statement
17EEL57.1	Formulate programs to handle data movement, arithmetic and logical instructions
17EEL57.2	Develop codes to handle different data types
17EEL57.3	Create codes in order to control the external devices using microcontroller

Course Name: Power Electronics Laboratory**Course Code: 17EEL58**

CO's	CO Statement
17EEL58.1	Understand and Analyze the static characteristics of power semiconductor devices.
17EEL58.2	Trigger the SCR by different methods.
17EEL58.3	Verify the performance of single phase controlled full wave rectifier and AC voltage controller with R and RL loads.
17EEL58.4	Demonstrated the speed control of universal motor, DC motor and Stepper motor using power converters.

III Semester

Course Name: Control Systems

Course Code: 17EE61

CO's	CO Statement
17EE61.1	Analyze and model electrical and mechanical system using analogous system .
17EE61.2	Formulate transfer functions using block diagram and signal flow graphs.
17EE61.3	Design and Analyze the stability of control system, ability to determine transient and steady state time response.
17EE61.4	Illustrate the performance of a given system in time and frequency domains, stability analysis using Root locus , Bode plots ad Nyquist plots.

Course Name: Power System Analysis - I

Course Code: 17EE62

CO's	CO Statement
17EE62.1	Show understanding of per unit system, computation and its implementation in problems of one-line diagram power system
17EE62.2	Model and analyse power systems using complex mathematical transformations under short circuit and unbalanced conditions
17EE62.3	Analyse different unsymmetrical faults on unloaded alternator and on complex power systems using symmetrical component transformations
17EE62.4	Apply mathematical techniques to evaluate system stability

Course Name: Digital Signal Processing

Course Code: 17EE63

CO's	CO Statement
17EE63.1	Analyze signals and perform various signal processing operations using DFT.
17EE63.2	Explain and Apply FFT algorithms for efficient computation of DFT and IDFT of a given sequence.
17EE63.3	Design of IIR analog and digital filters by using Butterworth and Chebyshev technique.
17EE63.4	Design of IIR digital filters by using impulse invariant technique and bilinear transformation technique.
17EE63.5	Design a digital IIR and FIR filter by using direct, cascade, parallel and linear phase methods of realization.
17EE63.6	Design FIR filters by use of window functions and frequency sampling method

Course Name: Electrical Machine Design**Course Code: 17EE64**

CO's	CO Statement
17EE64.1	Discuss different design trends, factors, properties of materials, manufacturing process, limitations of electrical machines, short circuit ratio and its effects on performance of synchronous machines
17EE64.2	Formulate, Design and solve the output equations, stator and rotor circuits of DC machines and AC machines.
17EE64.3	Design windings, core of transformer and Estimate the number of cooling tubes, no load current and leakage reactance of core type transformer

Course Name: Computer Aided Engineering Drawing**Course Code: 17EE651**

CO's	CO Statement
17EE651.1	Discuss the terminology and develop armature windings for DC and AC machines
17EE651.2	Develop a layout for substation using the standard symbols for substation equipment.
17EE651.3	Sketch the sectional views of core and shell types transformers, assembled DC machine and alternators design data and its parts.

Course Name: Control System Laboratory**Course Code: 17EEL67**

CO's	CO Statement
17EEL67.1	Use software package or discrete components in assessing the time and frequency domain responses of a given second order system
17EEL67.2	Design and analyze Lead, Lag and Lag – Lead compensators for given specifications.
17EEL67.3	Determine the performance characteristics of AC and DC servomotors and synchro-transmitter receiver pair used in control systems
17EEL67.4	Simulate the DC position and feedback control system to study the effect of P, PI, PD and PID controller and Lead compensator on the step response of the system
17EEL67.5	Write a script files to plot root locus, bode plot, Nyquist plots to study the stability of the system using a software package

Course Name: Digital Signal Processing Laboratory**Course Code: 17EEL68**

CO's	CO Statement
17EEL68.1	Utilize MATLAB platform to perform interpretation of sampling theorem in time and frequency domains.
17EEL68.2	Perform the impulse response, Linear and circular convolution of given sequences.
17EEL68.3	Compute DFT and IDFT of a given sequence using the basic definition and also using FFT algorithms
17EEL68.4	Design and implementation of IIR and FIR filters for the given specifications.

Course Name: Power System Analysis -2

Course Code: 15EE71

CO's	CO Statement
15EE71.1	Formulate network matrices and models for solving load flow problems. Perform steady state power flow analysis of power systems using numerical iterative techniques.
15EE71.2	Suggest a method to control voltage profile. Show knowledge of optimal operation of generators on a bus bar, optimal operation of generators on a busbar, optimal unit commitment
15EE71.3	Discuss optimal scheduling for hydro-thermal system, power system security and reliability. Analyze short circuit faults in power system networks using bus impedance matrix
15EE71.4	Perform numerical solution of swing equation for multimachine stability

Course Name: Power System Protection

Course Code: 15EE72

CO's	CO Statement
15EE72.1	Discuss the performance of protective relays, components of protection scheme and relay terminology, over current protection.
15EE72.2	Explain the working of distance relays & effect of arc resistance, power swings, line length & source impedance on performance of distance relay
15EE72.3	Discuss construction, operating principles & performance of differential relays for differential protection.
15EE72.4	Discuss protection of generators, motors, Transformers & Bus-zone protection
15EE72.5	Explain the principle of circuit interruption in different types of circuit breakers & fuse
15EE72.6	Discuss protection against over-voltages & Gas insulated Substation-GIS

Course Name: High Voltage Engineering

Course Code: 15EE73

CO's	CO Statement
15EE73.1	Explain conduction and breakdown phenomenon in gases, liquid dielectrics.
15EE73.2	Explain breakdown phenomenon in solid dielectrics.
15EE73.3	Explain generation of high voltages and currents
15EE73.4	Discuss measurement techniques for high voltages and currents
15EE73.5	Discuss overvoltage phenomenon and insulation coordination in electric power systems.
15EE73.6	Discuss non-destructive testing of materials and electric apparatus and high-voltage testing of electric apparatus

Course Name: Utilization of Electrical Power

Course Code: 15EE742

CO's	CO Statement
15EE74.1	Understand the importance and types of electric heating, electric welding used for industrial applications and solve related problems.
15EE74.2	Explain the laws of electrolysis, extraction and refining of metals, electro deposition and solve problems related electro deposition of various metals.
15EE74.3	Explain the concept of illumination, laws, construction and working of different lamps, design lighting scheme for domestic and commercial applications and solve related problems.
15EE74.4	Discuss the concept of electric traction, speed time curves for train movement,

	various motors used for traction purpose, characteristics and speed control mechanism and solve problems.
15EE74.5	Discuss the importance of braking, types of braking employed for traction systems and also the importance of power supply used for traction purpose.
15EE74.6	Explain the importance of Electric Vehicles and working of electric and hybrid electric vehicles used

Course Name: Power System Planning

Course Code: 15EE744

CO's	CO Statement
15EE75.1	Discuss primary components of power system planning, planning methodology for optimum power system expansion, various types of generation, transmission and distribution.
15EE75.2	Show knowledge of forecasting of future load requirements of both demand and energy by deterministic and statistical techniques using forecasting tools.
15EE75.3	Discuss methods to mobilize resources to meet the investment requirement for the power sector
15EE75.4	Understand economic appraisal to allocate the resources efficiently and appreciate the investment decisions.
15EE75.5	Discuss expansion of power generation and planning for system energy in the country, evaluation of operating states of transmission system, their associated contingencies, reliability criteria, evaluation, power market and the stability of the system.
15EE75.6	Discuss principles of distribution planning, supply rules, network development and the system studies.

Course Name: Testing and Commissioning of Power System Apparatus **Course Code:** 15EE752

CO's	CO Statement
15EE76.1	Describe the process to plan, control and implement commissioning of electrical equipment's.
15EE76.2	Differentiate the performance specifications of transformer and induction motor.
15EE76.3	Demonstrate the routine tests for synchronous machine, induction motor, transformer & switchgears.
15EE76.4	Identification of tools and equipment's used for installation and maintenance of electrical equipment.
15EE76.5	Explain the operation of an electrical equipment's such as isolators, circuit breakers, insulators and switchgears.

Course Name: Power systems simulation Lab

Course Code: 15EEL76

CO's	CO Statement
15EE77.1	Ability to form the Y-bus and Z-bus for the given power system
15EE77.2	Ability to determination of efficiency and regulation of transmission lines
15EE77.3	Ability to determine the Jacobian matrix, bus currents, bus power and line flow and line losses for the given power system
15EE77.4	Ability to determine the power angle diagram, swing curve for the given synchronous machines power system
15EE77.5	Ability to perform load flow studies, short circuit studies and ELD for the given power system

Course Name: Relay & High voltage Lab

Course Code: 15EEL77

CO's	CO Statement
15EE78.1	Student will be able to apply knowledge on conduct experiment for obtaining breakdown characteristic of air insulation subjected for HVAC, HVDC applications to distinguish between Uniform/Non-uniform field conditions.
15EE78.2	Student will be able to apply knowledge on the quality of transformer oil sample by conducting experiment as per standards and assessing dielectric strength of it.
15EE78.3	Student can analyze the experiment on an Electromechanical type overcurrent relay, Static over-voltage relay, Static undervoltage relay, Microprocessor based overcurrent relay and Microprocessor based overvoltage/under-voltage relay.
15EE78.4	Student can acquire the knowledge experimentally by map field lines for co-axial cable model using electrolytic tank.
15EE78.5	Student can analyze the experiment on Motor protection, Merz prize protection.

Course Name: Project Phase – I

Course Code: 15EEP78

CO's	CO Statement
15EE79.1	Ability to research literature, and formulate a complex engineering problem of their selected project topic.
15EE79.2	Apply the fundamental knowledge of mathematics, science and engineering principles in design of Solutions or system components.
15EE79.3	Identify, Select, Apply a suitable engineering/IT tool in modeling/data interpretation/analytical Studies, conduct experiments leading to a logical solution.
15EE79.4	Design engineering solutions to complex problems utilising a systems approach.
15EE79.5	Communicate effectively to a diverse audience and develop technical reports and publications.
15EE79.6	Work as a team member/leader to manage projects in a multidisciplinary environment.

Course Name: Power System operation and control

Course Code: 15EE81

CO's	CO Statement
15EE81.1	Students will be able to various levels of controls in power systems, the vulnerability of the system, components, architecture and configuration of SCADA and solve unit commitment problems
15EE81.2	Students will be able analyze issues of hydrothermal scheduling and solutions to hydro thermal problems
15EE81.3	Students will be able to understand basic generator control loops, functions of Automatic generation control, speed governors
15EE81.4	Students will be to understand analyze mathematical models of Automatic Load Frequency Control
15EE81.5	Students will be able to understand Automatic generation control, voltage and reactive power control in an interconnected power system.
15EE81.6	Students will be able to understand reliability, security, contingency analysis, state estimation and related issues of power systems

Course Name: Industrial Drives and Applications

Course Code: 15EE82

CO's	CO Statement
15EE82.1	Explain the advantages and choice of electric drive
15EE82.2	Explain dynamics and modes of operation of electric drives.
15EE82.3	Suggest a motor for a drive and control of dc motor controlled rectifiers.
15EE82.4	Analyze the performance of induction motor drives under different conditions.
15EE82.5	Control of induction motor, synchronous motor and stepper motor drives
15EE82.6	Suggest a suitable electrical drive for specific application in the industry

Course Name: Smart Grid

Course Code: 15EE831

CO's	CO Statement
15EE83.1	Explain methods to promote smart grid awareness and making the existing transmission system smarter by investing in new technology and discuss the progress made by different stakeholders in the design and development of smart grid.
15EE83.2	Explain measurement techniques using Phasor Measurement Units and smart meters
15EE83.3	Discuss tools for the analysis of smart grid and design, operation and performance
15EE83.4	Discuss classical optimization techniques and computational methods for smart grid design, planning and operation.
15EE83.5	Explain predictive grid management and control technology for enhancing the smart grid performance and discuss the computational techniques, communication, measurement, and monitoring technology tools essential to the design of the smart grid.
15EE83.6	Develop cleaner, more environmentally responsible technologies for the electric system.

Course Name: Internship/ Professional Practice

Course Code: 15EE84

CO's	CO Statement
15EE84.1	Demonstrate the ability to assess and report
15EE84.2	Assess interests and abilities in their field of study
15EE84.3	Demonstrate the ability to plan, implement, professional, ethical practice and evaluate engineering studies
15EE84.4	Develop communication, interpersonal and other critical skills in the job interview process

Course Name: Project Phase – II

Course Code: 15EEP85

CO's	CO Statement
15EE85.1	Ability to research literature, and formulate a complex engineering problem of their selected project topic.
15EE85.2	Apply the fundamental knowledge of mathematics, science and engineering principles in design of Solutions or system components.
15EE85.3	Identify, Select, Apply a suitable engineering/IT tool in modeling/data interpretation/analytical Studies, conduct experiments leading to a logical solution.
15EE85.4	Design engineering solutions to complex problems utilizing a systems approach.
15EE85.5	Communicate effectively to a diverse audience and develop technical reports and publications.
15EE85.6	Work as a team member/leader to manage projects in a multidisciplinary environment.

Course Name: Technical Seminar

Course Code: 15EES86

CO's	CO Statement
15EES86.1	Work in actual working environment and utilize technical resources
15EES86.2	Find appropriate sources that can be summarized, give oral presentations related to the work and integrated into multimedia presentation
15EES86.3	Engage in independent learning
15EES86.4	Be aware of importance of access to data, knowledge and results of engineering studies
15EES86.5	Demonstrate the ability to assess and report

Department of Civil Engineering

Programme Outcomes

PO-1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO-2: Problem analysis: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO-3: 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.

PO-4: 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.

PO-5: 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.

PO-6: 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.

PO-7: 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.

PO-8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO-9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO-10: 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.

PO-11: 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.

PO-12: 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.

Program Specific Outcomes (PSOs)

Graduates will be able to,

1. Analyse, design and recommend solutions for sustainable development of sub structures and super-structures.
2. Apply appropriate techniques for creating eco-friendly infrastructure and resolving field problems in context of environmental, economical and societal requirements.

Program Educational Objectives (PEOs)

1. Become successful professionals and entrepreneurs in various fields of Civil Engineering and allied branches
2. Pursue higher studies and research activities in Engineering and Technology.
3. Acquire proficiency in soft skills, industrial training and multidisciplinary projects in contributing to the societal needs.

Course Outcomes

1st and 2nd semester

18CV14/24	Elements of civil Engineering On successful completion of this course students will be able to,
CO's	CO Statement
CO1	Outline the various fields in Civil Engineering & its Importance on Infrastructure .
CO2	Evaluating the force system and analyzing bodies with rough surface of contacts.
CO3	Analyzing the forces for equilibrium and non-equilibrium structures
CO4	Evaluating the effect of center of gravity and moment of inertia for given structure .
CO5	Analyzing the force system and dynamic condition

3rd Semester

18CV32	Strength of Materials
CO's	CO Statement (On successful completion of this course students will be able to)
C202.1	Explains the basic concept of stress and strains, strength of different materials experiencing axial forces, tangential forces and moments
C202.2	Evaluate the internal forces and resistance mechanism for one dimensional structural element
C202.3	Analyse bending and shearing stress induced due to representative loads on beams
C202.4	Determine slope and deflections in beams by double integration method
C202.5	Estimate the strength of torsion members column and strut's

18CV33	Fluid Mechanics
CO's	CO Statement (On successful completion of this course students will be able to)

C203.1	Describes the fundamental properties of fluids and its applications
C203.2	Explain hydrostatic forces and principles of kinematics
C203.3	Illustrate the Bernoulli's Principle and its applications
C203.4	Estimate the discharge through pipes & over notches and weirs
C203.5	Evaluate the discharge of fluid through different pipe conditions and its network

18CV34	Building Materials and Construction
CO's	CO Statement (On successful completion of this course students will be able to)
C204.1	identify suitable materials for buildings and adopt suitable construction techniques.
C204.2	Adopt suitable repair and maintenance work to enhance durability of buildings
C204.3	Acquiring the knowledge on special concrete

18CV35	Basic Surveying
CO's	CO Statement (On successful completion of this course students will be able to)
C205.1	Outline the fundamental principles Surveying
C205.2	Utilize linear and angular measurements to solve basic surveying problems
C205.3	Make use of geodetic data to solve survey problems
C205.4	Analyse the obtained spatial data and compute the areas and volumes

18CV36	Engineering Geology
CO's	CO Statement (On successful completion of this course students will be able to)
C206.1	Students will able to apply the knowledge of geology and in Civil Engineering
C206.2	Students will effectively utilize earth's materials such as mineral, rocks and water in civil engineering practices
C206.3	Analyze the natural disasters and their mitigation
C206.4	Assess various structural features and geological tools in ground water exploration, Natural resource estimation and solving civil engineering problems
C206.5	Apply and asses use of building materials in construction and asses their properties

18CVL37	Computer Aided Building Planning and Drawing On successful completion of this course students will be able to,
CO's	CO Statement
C207.1	Gain a broad understanding of planning and designing of buildings
C207.2	Prepare, read and interpret the drawings in a professional set up
C207.3	Know the procedures of submission of drawings and Develop working and submission drawings for building
C207.4	Plan and design a residential or public building as per the given requirements

18CVL38	Building Materials Testing Laboratory On successful completion of this course students will be able to,
CO's	CO Statement
C208.1	Reproduce (Apply) the basic knowledge of mathematics and engineering in finding the strength in tension, compression, shear and torsion.
C208.2	Identify, formulate and solve engineering problems of structural elements subjected to flexure.
C208.3	Evaluate the impact of engineering solutions on the society and also will be aware of contemporary issues regarding failure of structures due to unsuitable materials.

4th Semester

18CV42	Analysis of Determinate Structures On successful completion of this course students will be able to,
CO's	CO Statement
C210.1	Evaluate the forces in determinate trusses by method of joints and sections.
C210.2	Evaluate the deflection of cantilever, simply supported and overhanging beams by different methods.
C210.3	Understand(Make use of) the energy principles and energy theorems and its applications to determine the deflections of trusses and bent frames.
C210.4	Determine the stress resultants in arches and cables.
C210.5	Understand(Apply) the concept of influence lines and construct the ILD diagram for the moving loads.

18CV43	Applied Hydraulics On successful completion of this course students will be able to,
CO's	CO Statement
C211.1	Apply dimensional analysis to develop mathematical modeling and compute the parametric values in prototype by analyzing the corresponding model parameters.
C211.2	Design the open channels of various cross sections including economical channel sections.
C211.3	Apply Energy concepts to flow in open channel sections, Calculate Energy dissipation, Compute water surface profiles at different conditions.
C211.4	Design turbines for the given data, and to know their operation characteristics under different operating conditions.

18CV44	Concrete Technology On successful completion of this course students will be able to,
CO's	CO Statement
C212.1	Relate(Outline) material characteristics and their influence on microstructure of concrete.
C212.2	Distinguish concrete behavior based on its fresh and hardened properties.
C212.3	Illustrate proportioning of different types of concrete mixes for required fresh and hardened properties using professional codes

18CV45	Advanced Surveying On successful completion of this course students will be able to,
CO's	CO Statement
C213.1	Apply the knowledge of geometric principles to arrive at surveying problems
C213.2	Use modern instruments to obtain geo-spatial data and analyze the same to appropriate engineering problems.
C213.3	Capture geodetic data to process and perform analysis for survey problems with the use of electronic instruments;
C213.4	Design and implement the different types of curves for deviating type of alignments.

18CV46	Water Supply & Treatment Engineering On successful completion of this course students will be able to,
CO's	CO Statement
C214.1	Estimate average and peak water demand for a community
C214.2	Evaluate available sources of water, quantitatively and qualitatively and make appropriate choice for a community
C214.3	Evaluate water quality and environmental significance of various parameters and plan suitable treatment system
C214.4	Design a comprehensive water treatment and distribution system to purify and distribute water to the required quality standards

18CVL47	Applied Engineering Geology Laboratory On successful completion of this course students will be able to,
CO's	CO Statement
C215.1	Identify the minerals and rocks and utilize them effectively in civil engineering practices.
C215.2	Assess the geological conditions of the area for the implementation of civil engineering projects
C215.3	Interpret subsurface information such as thickness of soil, weathered zone, depth of hard rock and saturated zone by using geophysical methods.
C215.4	classify the curves of electrical resistivity data and its interpretation for aquifer boundaries.

18CVL48	Fluid Mechanics and Hydraulic Machines Laboratory On successful completion of this course students will be able to,
CO's	CO Statement
C216.1	Properties of fluids and the use of various instruments for fluid flow measurement.
C216.2	Working of hydraulic machines under various conditions of working and their characteristics.

5th Semester

17CV51	Design of RCC Structural Elements On successful completion of this course students will be able to,
CO's	CO Statement
C301.1	(explain) Understand the design philosophy and principles
C301.2	Solve engineering problems of RC elements subjected to flexure, shear and torsion
C301.3	Design RC structural elements such as slabs, columns and footings
C301.4	Adopt professional and ethical practices

17CV52	Analysis of Indeterminate structures On successful completion of this course students will be able to,
CO's	CO Statement
C302.1	Determine the moment in indeterminate beams and frames having variable moment of inertia and subsidence using slope deflection method
C302.2	Determine the moment in indeterminate beams and frames of no sway and sway using moment distribution method
C302.3	Construct the bending moment diagram for beams and frames by Kani's method
C302.4	construct the bending moment diagram for beams and frames using flexibility method
C302.5	Analyze the beams and indeterminate frames by system stiffness method

17CV53	Applied Geotechnical Engineering On successful completion of this course students will be able to,
CO's	CO Statement
C303.1	Plan and execute geotechnical site investigation program for different civil engineering projects
C303.2	Analyze stress distribution and resulting settlement beneath the loaded footings on sand and clayey soils
C303.3	Estimate factor of safety against failure of slopes and to compute lateral pressure distribution behind earth retaining structures

C303.4	Determine bearing capacity of soil and achieve proficiency in proportioning shallow isolated and combined footings for uniform bearing pressure
C303.5	Evaluate load carrying capacity of single and group of piles

17CV54	Computer Aided Building Planning and Drawing On successful completion of this course students will be able to,
CO's	CO Statement
C304.1	Gain a broad understanding of planning and designing of buildings
C304.2	Prepare, read and interpret the drawings in a professional set up
C304.3	Know the procedures of submission of drawings and Develop working and submission drawings for building
C304.4	Plan and design a residential or public building as per the given requirements

17CV551	Air Pollution and Control On successful completion of this course students will be able to,
CO's	CO Statement
C305A.1	Identify the major sources of air pollution and understand their effects on health and environment
C305A.2	Evaluate the dispersion of air pollutants in the atmosphere and to develop air quality models
C305A.3	Ascertain and evaluate sampling techniques for atmospheric and stack pollutants
C305A.4	Choose and design control techniques for particulate and gaseous emissions.

17CV552	Railways, Harbour, Tunneling and Airports On successful completion of this course students will be able to,
----------------	---

CO's	CO Statement
C305B.1	Choose alignment and design geometric aspects of railway system, runway, taxiway
C305B.2	Estimate the material quantity required for laying a railway track and also will be able to determine the hauling capacity of a locomotive
C305B.3	Develop layout plan of airport, harbor, dock and will be able relate the gained knowledge to identify required type of visual and/or navigational aids for the same
C305B.4	Apply the knowledge gained to conduct surveying, understand the tunneling activities

17CV554	Theory of Elasticity
	On successful completion of this course students will be able to,
CO's	CO Statement
C305C.1	Apply knowledge of mechanics and mathematics to model elastic bodies as continuum
C305C.2	Formulate boundary value problems; and calculate stresses and strains
C305C.3	Comprehend constitutive relations for elastic solids and compatibility constraints
C305C.4	Solve two-dimensional problems (plane stress and plane strain) using the concept of stress function

17CV561	Traffic Engineering
	On successful completion of this course students will be able to,
CO's	CO Statement
C306A.1	Outline the human factors and vehicular factors in traffic engineering design
C306A.2	Make use of data from various traffic surveys and analyze collected data using statistical techniques.
C306A.3	Choose an appropriate traffic flow theory to comprehend the capacity & analyze intersection
C306A.4	Outline the applications of Intelligent Transportation System

17CV564	Occupational Health and Safety
	On successful completion of this course students will be able to,

CO's	CO Statement
C306B.1	Identify hazards in the workplace that pose a danger or threat to their safety or health, or that of others
C306B.2	Suggest control measures for unsafe or unhealthy hazards and propose methods to eliminate the hazard
C306B.3	Analyze potential safety or health hazards citing the Occupational Health and Safety Regulations as well as supported legislation
C306B.4	Discuss the role of health and safety in the workplace pertaining to the responsibilities of workers, managers, supervisors
C306B.5	Identify the decisions required to maintain protection of the environment, workplace as well as personal health and safety

17CVL57	Geotechnical Engineering Lab
	On successful completion of this course students will be able to,
CO's	CO Statement
C307.1	Determine physical and index properties of the soil
C307.2	Classify based on index properties and field identification
C307.3	Estimate OMC and MDD, plan and assess field compaction program
C307.4	Evaluate the Shear strength and consolidation parameters to assess strength and deformation characteristics
C307.5	Assess in-situ shear strength characteristics (SPT- Demonstration)

17CVL58	Concrete and Highway Materials Laboratory
	On successful completion of this course students will be able to,
CO's	CO Statement
C308.1	Conduct appropriate laboratory experiments and interpret the results
C308.2	Determine the quality and suitability of cement
C308.3	Design appropriate concrete mix
C308.4	Determine strength and quality of concrete
C308.5	Test the road aggregates and bitumen for their suitability as road material
C308.6	Test the soil for its suitability as sub grade soil for pavements

6th Semester

17CV61	Construction Management and Entrepreneurship On successful completion of this course students will be able to,
CO's	CO Statement
C309.1	Outline the construction management process
C309.2	Assess various issues that are encountered by every professional in discharging professional duties
C309.3	Fulfill(Identify) the professional obligations and address them with global outlook
C309.4	Understand(Explain) the business process and different schemes

17CV62	Design of Steel Structural Elements On successful completion of this course students will be able to,
CO's	CO Statement
C310.1	List Advantages and Disadvantages of Steel structures and summarize concepts of Limit State Design
C310.2	Design Bolted and Welded connections
C310.3	Design compression members, built-up columns and columns splices
C310.4	Design of tension members, simple slab base and gusseted base
C310.5	Explain the design concepts of laterally supported and un-supported steel beams

17CV63	Highway Engineering On successful completion of this course students will be able to,
CO's	CO Statement
C311.1	Plan new alignment or re-alignment of existing roads, conduct necessary field investigation for required data
C311.2	Evaluate the engineering properties of the materials and suggest the suitability of the same for pavement construction

C311.3	Design road geometrics, structural components of pavement and drainage
C311.4	Evaluate the highway economics by few select methods and also will have a basic knowledge of various highway financing concepts

17CV64	Water Supply and Treatment Engineering On successful completion of this course students will be able to,
CO's	CO Statement
C312.1	Estimate average and peak water demand for a community
C312.2	Evaluate available sources of water, quantitatively and qualitatively and make appropriate choice for a community
C312.3	Evaluate water quality and environmental significance of various parameters and plan suitable treatment system
C312.4	Design a comprehensive water treatment and distribution system to purify and distribute water to the required quality standards

17CV651	Solid Waste Management On successful completion of this course students will be able to,
CO's	CO Statement
C313A.1	Analyze existing solid waste management system and to identify their drawbacks
C313A.2	Evaluate different elements of solid waste management system
C313A.3	Suggest suitable scientific methods for solid waste management elements
C313A.4	Design suitable processing system and evaluate disposal sites

17CV652	Matrix Method of Structural Analysis On successful completion of this course students will be able to,
CO's	CO Statement
C313B.1	Evaluate the structural systems to application of concepts of flexibility and stiffness matrices for simple problems
C313B.2	Identify, formulate and solve engineering problems with respect to flexibility and stiffness matrices as applied to continuous beams, rigid frames and trusses
C313B.3	Identify, formulate and solve engineering problems by application of concepts of direct stiffness method as applied to continuous beams and trusses
C313B.4	Analyze the different types of trusses and beams by direct stiffness method

17CV654	Ground Improvement Techniques On successful completion of this course students will be able to,
CO's	CO Statement
C313A.1	Solve problems associated with soil formations having less strength
C313A.2	Make use of different methods of ground improvement techniques depending upon the requirements
C313A.3	Utilize properly the locally available materials and techniques for ground improvement so that economy in the design of foundations of various civil engineering structures
C313A.4	Explain concepts of geo-synthetics, vibrations, grouting and injection

17CV661	Water Resources Management On successful completion of this course students will be able to,
CO's	CO Statement
C314A.1	Assess the potential of groundwater and surface water resources
C314A.2	Address the issues related to planning and management of water resources
C314A.3	Know how to implement IWRM in different regions

C314A.4	Understand the legal issues of water policy
C314A.5	Select the method for water harvesting based on the area

17CV663	Numerical Methods and applications On successful completion of this course students will be able to,
CO's	CO Statement
C314B.1	Clear perception of the power of numerical techniques, ideas.
C314B.2	Demonstrate the applications of these techniques to problems drawn from industry, management and other engineering fields.
C314B.3	Acquire the necessary basic concepts of a few numerical methods
C314B.4	Analyze and solving numerically different kinds of problems

17CVL67	Software Application Lab On successful completion of this course students will be able to,
CO's	CO Statement
C315.1	Utilize software in a professional set up to automate the work
C315.2	Development of customized automation tools
C315.3	Analyze the structural elements using commercially available software
C315.4	Interpretthe results for final design

17CVL68	Extensive Survey Project /Camp On successful completion of this course students will be able to,
CO's	CO Statement
C316.1	Apply Surveying knowledge and tools effectively for the projects

C316.2	Asses goals, responsibilities, Task focus, working in Teams towards common goals, Organizational performance expectations, technical and behavioral competencies
C316.3	Apply individual skills in team and organizational context, goal setting, time management, communication and presentation skills
C316.4	Develop professional etiquettes at workplace, meeting and establish trust-based relationships in teams & organizational environment
C316.5	Discuss conflicts in team and organizational environment, Understanding the sources of conflicts, Conflict resolution styles and techniques

7th Semester

15CV71	Municipal and Industrial Waste water Engineering On successful completion of this course students will be able to,
CO's	CO Statement
C401.1	Design municipal and industrial waste water treatment plants.
C401.2	Estimate the degree and type of treatment for disposal, reuse and recycle.
C401.3	Analyze waste water characteristics.
C401.4	Recognize the physical, chemical and biological unit operations encountered in treatment processes.
C401.5	Communicate with stake holders on sewage and industrial effluent issues.

15CV72	Design of RCC & Steel Structures On successful completion of this course students will be able to,
CO's	CO Statement
C402.1	Acquire the basic knowledge in design of RCC and Steel structures
C402.2	Ability to follow design procedures as per codal provisions and skills to arrive the structurally safe RC and steel members
C402.3	Explain the behavior of special RC structures under different loading conditions such as IRC, dynamic etc

15CV73	Hydrology and Irrigation Engineering On successful completion of this course students will be able to,
CO's	CO Statement
C403.1	Summarize the importance of hydrology and its components
C403.2	Explain precipitation and analyze the data and analyze the losses in precipitation
C403.3	Estimate runoff and develop unit hydrographs
C403.4	Outline the benefits and ill-effects of irrigation
C403.5	Asses the quality of irrigation water and frequency of irrigation for various crops.

C403.6	Design the canal and compute the reservoir capacity.
--------	--

15CV741	Design of Bridges On successful completion of this course students will be able to,
CO's	CO Statement
C404A.1	Explain the load distribution and IRC standards
C404A.2	Design the slab and T beam bridges
C404A.3	Design box culvert, pipe culvert
C404A.4	Design piers and abutments, bearings, hinges and expansion joints

15CV742	Ground Water & Hydraulics On successful completion of this course students will be able to,
CO's	CO Statement
C404B.1	Asses the characteristics of aquifers
C404B.2	Estimate the quantity of ground water by various methods
C404B.3	Identify the zones of ground water resources
C404B.4	Choose suitable type of well to augment the ground water storage

15CV751	Urban Transportation and Planning On successful completion of this course students will be able to,
C405.1	Explain various methods of survey related to transportation planning
C405.2	Analyze the collected data about travel behavior and use in transport planning
C405.3	Develop trip generation , distribution rate and calibrate modal split for specific types of land use developments.

C405.4	Discuss the steps that are necessary to complete a long term transportation
---------------	---

15CVL76	Environmental Engineering Laboratory On successful completion of this course students will be able to,
CO's	CO Statement
C406.1	Analyse& Estimate the various parameters present in water and waste water
C406.2	Compare the result with Codal provisions.
C406.3	Evaluate type of treatment, degree of treatment for water and waste water
C406.4	Conduct investigations on water, wastewater, air and noise using modern equipment.
C406.5	Formulate the problem statement and remedial solutions for their project work.

15CVL77	Computer Aided Detailing of Structures On successful completion of this course students will be able to,
CO's	CO Statement
C407.1	Acquire proficiency over software skills
C407.2	Outline the principles of detailing as per codal provisions
C407.3	Develop detailed working drawings of RC and steel Structures

15CV78	Project Phase – 1 + Project Seminar On successful completion of this course students will be able to,
CO's	CO Statement
C408.1	Identification of complex problems by comprehensive literature review and formulate the sustainable objectives.
C408.2	Design the methodology and selection of suitable materials for the experimental work or design the suitable methodology for the analysis
C408.3	Choose the appropriate approach for the condition of project
C408.4	Form a group to function effectively in a diverse teams and multidisciplinary settings

C408.5	Communicate effectively to address complex engineering problems with proper documentations, reports and presentations through ICT tools.
--------	--

8th Semester

15CV81	Quantity Surveying and Contracts Management On successful completion of this course students will be able to,
CO's	CO Statement
C409.1	Prepare detailed abstract estimates for roads and building
C409.2	Prepare valuation reports of buildings
C409.3	Interpret contract documents of domestic and international construction works

15CV82	Design of Pre-Stressed Concrete Elements On successful completion of this course students will be able to,
CO's	CO Statement
C410.1	Apply the knowledge in understanding concept of PSC.
C410.2	Analyse the forces in the PSC members.
C410.3	Estimate the losses and deflection of PSC members.
C410.4	Design PSC members subjected to flexure.
C410.5	Evaluate the anchorage zone stresses and design of shear and end block.

15CV832	Hydraulic Structures On successful completion of this course students will be able to,
CO	Description
C411.1	Check the stability of gravity dams and design the dam
C411.2	Estimate the quantity of seepage through earth dam
C411.3	Design spillways and aprons for various diversion works
C411.4	Select particular type of canal regulation work for canal work

15CV833	Pavement Design On successful completion of this course students will be able to,
CO	Description
C411.1	Organize required data for design of pavement (Highway& Airfield)
C411.2	Analyze stress, strain and deflection by Boussinesq and Westergaard's theory
C411.3	Design rigid pavement and flexible pavement conforming to IRC58-2002 and IRC37-2001
C411.4	Evaluate the performance of the pavement and also develops maintenance statement based on requirements

15CV84	Internship /Professional Practice On successful completion of this course students will be able to,
CO's	CO Statement
C412.1	Understand the importance of Industry Institute Interaction
C412.2	Apply the practical knowledge in various fields of Civil Engineering.
C412.3	Solve the problems encountered in the field.
C412.4	Recognize the need for lifelong learning processes through critical reflection of internship experiences

15CV85	Project Work On successful completion of this course students will be able to,
CO's	CO Statement
C413.1	Identification of complex problems by comprehensive literature review and formulate the sustainable objectives.
C413.2	Design the methodology and selection of suitable materials for the experimental work or design the suitable methodology for the analysis
C413.3	Develop and demonstrate the project models to meet the needs of the society
C413.4	Apply appropriate techniques and tools to develop the solutions to the complex problems addressing society after understanding the limitations.

C413.5	Communicate effectively to address complex engineering problems with proper documentations, reports and presentations through ICT tools.
--------	--

15CV86	Seminar on Current Trends in Engineering On successful completion of this course students will be able to,
CO's	CO Statement
C414.1	Identification of seminar topic on recent developments in Civil and allied branches
C414.2	Prepare a comprehensive report based on the Literature review
C414.3	Communicate effectively to address the complex engineering problems with proper documentations and presentations through ICT tools

Program Outcomes (PO)

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and engg. specialization to the solution of complex engineering problems.
2. Problem analysis: Identify, formulate, research literature, and analyze engineering problems to arrive at substantiated conclusions using first principles of mathematics, natural, and engineering sciences.
3. Design/development of solutions: Design solutions for complex engineering problems and design system components, processes to meet the specifications with consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. Conduct investigations of complex problems: Use research-based knowledge including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. 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.
6. 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.
7. 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.
8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. Individual and team work: Function effectively as an individual, and as a member or leader in teams, and in multidisciplinary settings.
10. Communication: Communicate effectively with the engineering community and with society at large. Be able to comprehend and write effective reports documentation. Make effective presentations, and give and receive clear instructions.
11. Project management and finance: Demonstrate knowledge and understanding of engineering and management principles and apply these to one's own work, as a member and leader in a team. Manage projects in multidisciplinary environments.
12. 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.

Program Educational Objectives (PEO)

Graduates will

PEO1: possess expertise in problem solving, design and analysis, technical skills for a fruitful career accomplishing professional and social ethics with exposure to modern designing tools and technologies in Information Science and Engineering.

PEO2: excel in communication, teamwork and multiple domains related to engineering issues accomplishing social responsibilities and management skills.

PEO3: outclass in competitive environment through certification courses, gaining leadership qualities and progressive research to become successful entrepreneurs.

Program Specific Outcome (PSO)

1. Apply the Knowledge of Information Science to develop software solutions in current research trends and technology.
2. Create Social awareness & environmental wisdom along with ethical responsibility to lead a successful career and sustain passion using optimal resources to become an Entrepreneur.

Course Outcomes (2019-20)

1st SEMESTER

Course Name: C103 –C Programming for Problem Solving [18CPS13]

Semester: I		Year of Study: 2019-20
C103.1	Achieve Knowledge on computers and basic concepts of networks.	
C103.2	Apply the basic principles of design and development of C Programming.	
C103.3	Design and development of modular programming skills.	
C103.4	Demonstrate Arrays and Strings in C programming concepts.	
C103.5	Illustrate the basic concepts of Structures, Pointers and Preprocessor Directives.	

Course Name: C107 –C Programming Laboratory [18CPL17]

Semester: I		Year of Study: 2019-20
C107.1	Understand the knowledge on simple applications in C using conditional statements and looping concepts	
C107.2	Demonstrate and implement applications using arrays and strings	
C107.3	Apply knowledge on functions, recursions, pointers and structures.	

2nd SEMESTER 2019-20

Course Name: C111 –C Programming for Problem Solving [18CPS23]

Semester: II		Year of Study: 2019-20
C111.1	Achieve Knowledge on computers and basic concepts of networks.	
C111.2	Apply the basic principles of design and development of C Programming.	
C111.3	Design and development of modular programming skills.	
C111.4	Demonstrate Arrays and Strings in C programming concepts.	
C111.5	Illustrate the basic concepts of Structures, Pointers and Preprocessor Directives.	

Course Name: C Programming Laboratory [18CPL27]

Semester: II		Year of Study: 2019-20
C115.1	Understand the knowledge on simple applications in C using conditional statements and looping concepts	
C115.2	Demonstrate and implement applications using arrays and strings	
C115.3	Apply knowledge on functions, recursions, pointers and structures.	

[18- Series] 3rd SEMESTER

Course Name: C201–Mathematics [18MAT31]

Semester: III		Year of Study: 2019-20
C201.1	Use Laplace transform and inverse Laplace transform in solving differential/ integral equation arising in network analysis, control systems and other fields of engineering.	
C201.2	Demonstrate Fourier series to study the behaviour of periodic functions and their applications in system communications, digital signal processing and field theory.	
C201.3	Make use of Fourier transform and Z-transform to illustrate discrete/continuous function arising in wave and heat propagation, signals and systems.	
C201.4	Solve first and second order ordinary differential equations arising in engineering problems using single step and multistep numerical methods.	
C201.5	Determine the externals of functional using calculus of variations and solve problems arising in dynamics of rigid bodies and vibrational analysis	

Course Name: C202–Data Structures [18CS32]

Semester: III		Year of Study: 2019-20
C202.1	Understand pointer concepts, Arrays and Memory allocation.	
C202.2	Acquire knowledge of –Data abstraction, Data structures, Algorithms.	
C202.3	Design linear data structures-Stacks, Queues.	
C202.4	Design of non linear data structures-Trees, Graphs, Heaps.	
C202.5	Design and apply appropriate data structures for solving Computing	

Course Name/Code -C203 ANALOG AND DIGITAL ELECTRONICS [18CS33]

Semester: III		Year of Study: 2019--20
C203.1	Make use the BJTs, Operational Amplifier circuits and their applications, ADC, DAC circuits with its characteristics in the circuit configuration.	
C203.2	Implement the expressions in Combinational Logic circuit, Simplification Techniques using Karnaugh Maps, Quine McClusky technique and Petricks Method.	
C203.3	Analyzing and discuss Operation of Decoders, Encoders, Multiplexers, Adders and Subtractors.	
C203.4	Demonstrate the Latches, Flip-Flops for designing Registers in different scenarios in digital circuits.	
C203.5	Recognize the various complicated issues in respect of performance of Synchronous and Asynchronous counters in Sequential Circuits and design of State Table and graph.	

Course Name/Code: C204 - COMPUTER ORGANIZATION [18CS34]

Semester: III		Year of Study: 2019-20
C204.1	Learn basic organization of computer system.	
C204.2	Analyze different ways of communication between processor and I/O devices.	
C204.3	Design basic memory chip and demonstrate functioning of memory system.	
C204.4	Analyze simple arithmetic and logical units	
C204.5	Examine Hardwired control and micro program control and other computing systems.	

Course Name: C205 SOFTWARE ENGINEERING [18CS35]

C205.1	Design a software system, component, or process to meet desired needs within realistic constraints.
C205.2	Assess professional and ethical responsibility.
C205.3	Function on multi-disciplinary teams.
C205.4	Using the techniques, skills, and modern engineering tools necessary for engineering practice.
C205.5	Analyze, design, implement, verify, validate, implement, apply, and maintain software systems or parts of software systems.

Course Name: C206 -Discrete Mathematical Structures [18CS36]

Semester: III		Year of Study: 2019-20
C206.1	Verify the correctness of an argument using propositional logic and truth table.	of an argument using propositional and predicate
C206.2	Demonstrate the ability to solve problems using counting techniques and combinatorics in the context of discrete probability.	
C206.3	Solve problems involving recurrence relations and generating functions.	
C206.4	Construct proofs using direct proof, proof by contraposition, proof of contradiction, and proof by cases and mathematical induction.	
C206.5	Explain and differentiate graphs and trees.	

Course Name/ Code :C207 ANALOG AND DIGITAL ELECTRONICSLABORATORY [18CSL37]

Semester: III		Year of Study: 2019-20
C207.1	Make Use of various Electronic devices like cathode ray oscilloscope, signal generators, digital trainer kit, multimeter and components like resistor, capacitor, op-amp and integrated circuit.	
C207.2	Rate yourself in Design and demonstrate various combinational logic circuits & sequential circuits	
C207.3	Design and demonstrate various types of counters and Registers using Flip-flops	
C207.4	Make Use of simulation package to design analog and digital circuits.	
C207.5	Understand the working and implementation of Code converter, Adder and Subtractor.	

Course Name: C208 –Data StructuresLaboratory [18CSL38]

Semester: III		Year of Study: 2019-20
C208.1	Able to implement linear and nonlinear data structures and understand its application.	
C208.2	Create and analyze searching algorithm in data structures.	
C208.3	Demonstrate data structure for solving real world problem .	

4th SEMESTER 2019-20

Course Name/ Code: C209 - Complex Analysis, Probability and Statistical Methods [18MAT41]

Semester: IV		Year of Study: 2019-2020
C209.1	Use the concepts of analytic function and complex potentials to solve the problems arising in electromagnetic field theory.	
C209.2	Utilize conformal transformation and complex integral arising in aerofoil theory, fluid flow visualization and image processing.	
C209.3	Apply discrete and continuous probability distributions in analyzing the probability models arising in engineering field.	
C209.4	Make use of the correlation and regression analysis to fit a suitable mathematical model for the statistical data.	
C209.5	Construct joint probability distributions and demonstrate the validity of testing the hypothesis.	

Course Name/ Code: C210 - Design and Analysis of Algorithms [18CS42]

Semester: IV		Year of Study: 2019-2020
C210.1	Analyze and compare the running time of algorithms using asymptotic notations	
C210.2	Able to apply and describe the method of divide-and-conquer and decrease-and-conquer strategies	
C210.3	Apply and describe the dynamic programming and greedy strategy paradigm	
C210.4	Describe and apply backtracking and branch-and-bound approaches.	
C210.5	Interpret the efficient algorithms in common engineering design situations, NP, P class problems	

Course Name/ Code: C211 - Operating System [18CS43]

Semester: IV		Year of Study: 2019-2020
C211.1	Organize different types of OS and need for OS.	
C211.2	Apply suitable techniques for management of different resources	
C211.3	Examine deadlock situation and solve deadlock scenarios in a OS	
C211.4	Analyze processor , memory, storage and file system commands	
C211.5	Distinguish the different concepts of OS in platform of usage through case studies	

Course Name: C212 Microcontroller and Embedded System [18CS44]

Semester: IV		Year of Study: 2019-20
C212.1	Apply the architectural features and instructions of ARM microcontroller, by gaining the knowledge and programming ARM for different applications.	
C212.2	Examine the various Interfaces with external devices and I/O instructions with ARM microcontroller	
C212.3	Interpret the basic hardware components based on the characteristics and attributes of an embedded system with firmware design approaches.	
C212.4	Demonstrate the need of real time operating system for embedded system applications	

Course Name/ 213 -OOC Object Oriented Concepts[18CS45]

Semester: IV		Year of Study: 2019-20
C213.1	Explain the object-oriented concepts using C++ and JAVA	
C213.2	Develop computer programs to solve real world problems in C++.	
C213.3	Develop computer programs to solve real world problems by using multithreading and exception handling, event handling in Java.	
C213.4	Develop simple GUI interfaces for a computer program to interact with users, and to understand the event-based GUI handling principles using Applets and swings.	

Course Name/ 214 -DC Data Communication [18CS46]

Semester: IV		Year of Study: 2019-20
C214.1	Apply the knowledge of layers functionalities, encoding schemes to identify network issues	
C214.2	Compare and contrast conversion techniques(A/D, D/D), bandwidth utilization methods	
C214.3	Analyse error detection techniques, working of Data Link layer protocols.	
C214.4	Examine Ethernet technologies , and wireless technologies	
C214.5	Interpret 3 G, 4G , 5G technologies	

Course Name/ C215 - Design and Analysis of Algorithms Lab [18CSL47]

Semester: IV		Year of Study: 2019-20
C215.1	Analyze the running time of sorting, searching, graph, string matching problems and able to apply design techniques	
C215.2	Design algorithms using appropriate design techniques divide and conquer, greedy, dynamic programming, and Backtracking etc	
C215.3	Implement a variety of algorithms such as sorting, graph related problems using python or java language.	
C215.4	Analyze and compare the performance of algorithms and Apply learned algorithms design techniques and data structures to solve real world problems	

Course Name/ Code: C216 MICROCONTROLLER AND EMBEDDED SYSTEM LABORATORY [18CSL48]

Semester: IV		Year of Study: 2019-20
C216.1	Summarize 80x86 instruction sets and comprehend the knowledge of how assembly language works.	
C216.2	Design and develop assembly programs using 80x86 assembly language instructions	
C216.3	Infer functioning of hardware devices and interfacing them to x86 family	
C216.4	Choose processors for various kinds of applications.	

5th SEMESTER 2019-20

Course Name/ Code: 301- M&E for IT Industry [17CS51]

Semester: V		Year of Study: 2019-20
C301.1	Ability to manage people, processes, and resources within a diverse organization, knowledge about planning, staffing, organization, entrepreneur.	
C301.2	Demonstrate an ability to engage in critical thinking by analyzing situations and constructing and selecting viable solutions to solve problems and to work effectively with others	
C301.3	Applying knowledge of current information, theories and models, techniques and practices in all of the major business disciplines including the general areas of Accounting and Finance, Information Technologies, Management, Marketing, and Quantitative Analysis.	
C301.4	Demonstrate knowledge of utilizing the resources available effectively through ERP and make use of IPRs and institutional support in entrepreneurship	
C301.5	Adopting of the key steps in the elaboration of business idea, and about the small scale industries and prepare the project report.	

Course Name/ Code: C302 –Computer Network[17CS52]

Semester: V		Year of Study: 2019-20
C302.1	Examine the principles of application layer protocols.	
C302.2	Recognize transport layer services and infer UDP and TCP protocols.	
C302.3	Analyze router functionality, IP addressing and Routing Algorithms in network layer.	
C302.4	Explore the Wireless and Mobile Networks covering IEEE 802.11 Standard.	
C302.5	Examine And Analyze Multimedia Networking and Network Management through case studies	

Course Name/ C303 - Data Base Management Systems [17CS53]

Semester: V		Year of Study: 2019-20
C303.1	Illustrate the database design for applications	
C303.2	Make use of ER Diagrams and Normalization techniques in DB Applications	
C303.3	Apply concurrency control and recovery mechanism for data base problems	
C303.4	Apply various concepts in Query processing.	

Course Name/ Code: C304 - Automata Theory and Computability [17CS54]

Semester: V		Year of Study: 2019-20
C304.1	Demonstrate an in-depth understanding of theories, concepts and techniques in automata and their link to computation.	
C304.2	Compare the Different models of Computation like Deterministic, Non-deterministic and Software models	
C304.3	Design Grammars and Automata for different language classes and become knowledgeable about restricted models of Computation (Regular, Context Free) and their relative powers.	
C304.4	Develop skills in formal reasoning and reduction of a problem to a formal model, with an emphasis on semantic precision and conciseness.	
C304.5	Formulate a problem with respect to different models of Computation.	

Course Name/ Code: C305 - Advance JAVA and J2EE [17CS553]

Semester: V		Year of Study: 2019-20
C305.1	Understand Java Concepts like enumerations and strings in developing modular programs	

C305.2	Illustrate use of collection framework in developing modular programs.
C305.3	Understand string handling mechanism
C305.4	Develop web applications
C305.5	Illustrate use of database connectivity

Course Name: C306 –ARTIFICIAL INTELLIGENCE

[17CS562]

Semester: V		Year of Study: 2019-20	
C306.1	Analyze and identify the problems based on artificial intelligence		
C306.2	Interpret the type of problem to choose suitable technique for solution.		
C306.3	Apply techniques in artificial intelligence technique to solve problems.		
C306.4	Illustrate representation of knowledge in different form.		
C306.5	Interpret various aspects of expert system		

Course Name/ C306 - C306 DOTNET FRAMEWORK FOR APPLICATION DEVELOPMENT [17CS564]

Semester: V		Year of Study: 2019-20	
C306.1	Build applications on Visual Studio .NET platform by understanding the syntax and semantics of C#.		
C306.2	Demonstrate Object Oriented Programming concepts in C# programming language.		
C306.3	Design custom interfaces and leverage the available built-in interfaces in building complex applications.		
C306.4	Illustrate the use of generics and collections in C#.		
C306.5	Compose queries to query in-memory data.		

Course Name/Code: C307- COMPUTER NETWORKS LABORATORY [17CSL57]

Semester: V		Year of Study: 2019-20
C307.1	Analyze and Compare various networking algorithms to secure data	
C307.2	Demonstrate the concepts of client server communication through socket programming	
C307.3	Analyze the different parameters of network configuration	
C307.4	Analyze transport layer protocols to evaluate congestion in network	
C307.5	Demonstrate the performance of CDMA and GSM using NS2/NS3	
C307.6	Implement Ethernet LAN and ESS in WIRELESS LAN through simulation using NS2/NS3	

Course Name/ C308 - Data Base Management Systems Lab [17CSL58]

Semester: V		Year of Study: 2019-20
C308.1	Infer database language commands to create simple database	
C308.2	Analyze the database using queries to retrieve records	
C308.3	Apply pl/sql for processing database	
C308.4	Analyze front ends tools to design forms, report and menus.	
C308.5	Develop solutions using database concepts for real time requirements.	

6th SEMESTER

Course Name/ Code: C309 - Cryptography, Computer Networks & Cyber Law [17CS61]

Semester: VI		Year of Study: 2019-2020
C309.1	Identify cryptographic techniques and its various applications.	
C309.2	Examine simple cryptographic algorithms.	
C309.3	Analyze various authentication and key agreement protocols.	
C309.4	Compare different protocols used in wireless LAN.	
C309.5	Analyze the need for cyber Law.	

Course Name/ C310 -File Structures [17IS62]

Semester: VI		Year of Study: 2019-20
C310.1	Retrieve and explain different techniques for organization and manipulation of data in secondary storage which include basic file structure concepts, file operations, secondary storage devices and system software	
C310.2	Illustrate management of records and organization of files for performance by applying object oriented concepts.	
C310.3	Compare primary and secondary indexing and construct model for implementing consequential processing and sorting large files.	
C310.4	Construct B trees and illustrate indexed sequential access and prefix B+ trees with appropriate data structures.	
C310.5	Discuss hashing and its methods and demonstrate collision resolution using different techniques.	

Course Name/ C311 - SOFTWARE TESTING [17IS63]

Semester: VI		Year of Study: 2019-20
CO311.1	Understanding basic terminologies of software testing methods	
CO311.2	Derive test cases for any given problem using black box and white box testing	
CO311.3	Understanding and apply different levels of testing	
CO311.4	Identify the needs of testing process framework	
CO311.5	Understanding the need of documenting and analysis and test	

Course Name/ C311 - SOFTWARE TESTING [17IS63]

Semester: VI		Year of Study: 2019-20
CO311.1	Understanding basic terminologies of software testing methods	
CO311.2	Derive test cases for any given problem using black box and white box testing	
CO311.3	Understanding and apply different levels of testing	
CO311.4	Identify the needs of testing process framework	
CO311.5	Understanding the need of documenting and analysis and test	

Course Name/ Code: C312 - Operating System [17CS64]

Semester: VI		Year of Study: 2019-20
C312.1	Demonstrate need for OS and different types of OS	
C312.2	Apply suitable techniques for management of different resources	
C312.3	Analyze deadlock characteristics and provide solutions to deadlock, process synchronization and monitors	
C312.4	Investigate file allocation disk access strategies and the different concepts of OS in platform of usage through case studies	

Course Name/ Code: 313- OPERATION RESEARCH [17CS653]

Semester: VI		Year of Study: 2019-20
C313.1	Formulate the Linear Programming and solve.	
C313.2	Select and apply optimization techniques for various problems.	
C313.3	Model the given problem as transportation and assignment problem and solve.	
C313.4	Apply game theory for decision support system.	
C313.5	Illustrate the application of meta-heuristics	

Course Name/ Code: C314 - Python Applications Programming [17CS664]

Semester: VI		Year of Study: 2019-2020
C314.1	Apply Python syntax and semantics, flow control, functions, strings, files and object oriented concepts to build applications.	
C314.2	Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions	
C314.3	Develop exemplary applications related to Network Programming, Web Services and Databases in Python.	

Course Name/ C315 - SOFTWARE TESTING LABORATORY [17ISL67]

Semester: VI		Year of Study: 2019-20
CO315.1	List out the requirements for the given problem	
CO315.2	Design and implement the solution for given problem in any programming language	
CO315.3	Apply the appropriate technique for the design test cases	
CO315.4	Derive test cases for any given problem	
CO315.5	Create appropriate document for test cases	

Course Name/ C316 -File Structures Laboratory with mini project [17ISL68]

Semester: VI		Year of Study: 2019-20
C316.1	Implement various operations such insert, search, delete and modify on files.	
C316.2	Design and develop record organization techniques on files.	
C316.3	Design and develop indexing techniques on files.	
C316.4	Design and develop co-sequential processing and merging concept for files.	

7th SEMESTER

Course Name: C401 –Web Technology and its application

[15CS71]

Semester: VII		Year of Study: 2019-20
C401.1	Illustrate the semantic structure of HTML and CSS	
C401.2	Compose forms and tables using HTML and CSS	
C401.3	Design C/S program using JS and Server side program using PHP	
C401.4	Infer OO Programming capabilities of PHP	
C401.5	Examine JS frameworks such as jquery and backbone	

Course Name/Code: C702 - Software Architecture & Design Patterns [15IS72]

Semester: VII		Year of Study: 2019-20
C702.1	Identify appropriate pattern and solutions for customer requirements	
C702.2	Analyze user requirements and prepare appropriate design documentation	
C702.3	Design and document methodologies of Architectural Patterns	
C702.4	Develop Design Patterns of real-time systems	
C702.5	Implementing object oriented systems	

Course Name/ C403 -Machine Learning [15CS73]

Semester: VII		Year of Study: 2019-20
C403.1	Identify the problems for machine learning. And select the either supervised, unsupervised, reinforcement	
C403.2	Differentiate between supervised, unsupervised and reinforcement learning.	
C403.3	Investigate concept learning, ANN, Bayes classifier, k nearest neighbor, K-means	
C403.4	Explain theory of probability and statistics related to machine learning	
C403.5	Will be capable of performing experiments in machine learning using real world data and do the research	

Course Name/ Code: C404 -Unix System Programming[15CS744]

Semester: VII		Year of Study: 2019-20
C404.1	Understand the various Standards like ANSI C, POSIX and X/OPEN Standards. UNIX Kernel Support for Files.	
C404.2	Design and Develop Commands using various API	
C404.3	Explains about Process Creation and Controlling and Process Relationship	
C404.4	Describes Unix Kernel support for Signals, Daemon Process & Characteristics	
C404.5	Elaborate the need of Interprocess Communication, Message Queues, Semaphores, Shared Memory , Client Server Connections Functions.	

Course Name/ Code: C404 -Storage Area Network [15CS754]

Semester: VII		Year of Study: 2019-20
C404.1	Identify key challenges in managing information and analyze different storage networking technologies and virtualization	
C404.2	Explain components and the implementation of NAS	
C404.3	Describe CAS architecture and types of archives and forms of virtualization	
C404.4	Illustrate the storage infrastructure and management activities	
C404.5	Analyze the components of cloud computing showing how business agility in an organization can be created	

Course Name/ C406 -Machine Learning Lab [15CSL76]

Semester: VII		Year of Study: 2019-20
C406.1	Understand the implementation procedures for the machine learning algorithms	
C406.2	Differentiate between supervised, unsupervised and reinforcement learning.	
C406.3	Investigate concept learning, ANN, Bayes classifier, k nearest neighbor, K-means	
C406.4	Explain theory of probability and statistics related to machine learning	

Course Name/ Code: C407 -WEB Programming Laboratory with Mini Project[15CSL77]

Semester: VII		Year of Study: 2019-20
C407.1	Design and develop static and dynamic web pages.	
C407.2	Familiarize with Client-Side Programming, Server-Side Programming, Active server Pages.	
C407.3	Learn Database Connectivity to web applications.	

8th SEMESTER

Course Name: C409 Internet of Things Technology [15CS81]

Semester: VIII		Year of Study: 2019-20
C409.1	Interpret the impact and challenges posed by IoT networks leading to new architectural models	
C409.2	Compare and contrast the deployment of smart objects and the technologies to connect them to network.	
C409.3	Discuss the role of IoT protocols for efficient network communication.	
C409.4	Understand the need for Data Analytics and Security in IoT.	
C409.5	Illustrate different sensor technologies for sensing real world entities and identify the applications of IoT in Industry	

Course Name: C410 - Big Data Analytics [15CS82]

Semester: VIII		Year of Study: 2019-20
C410.1	Illustrate the concept of HDFS and Map-Reduce framework	
C410.2	Investigate Hadoop related tools for Big Data analytics and perform basic Hadoop administration	
C410.3	Recognise the role of business intelligence, data warehousing and visualization in decision making	
C410.4	Infer the importance of core data mining techniques for data analytics.	
C410.5	Compare and contrast text mining, web mining, naïve-bayes analysis, support vector machines and social network analysis.	

Course Name/ Code: C411 -System Simulation and Modeling [15CS834]

Semester: VIII		Year of Study: 2019-20
C411.1	Explain the system concepts and apply functional modeling method to model the activities of a static system	
C411.2	Describe the behavior of a dynamic system and create an analogous model for a dynamic system	
C411.3	Simulate the operation of a dynamic system and make improvement according to the simulation results.	

Course Name: C412 -Internship / Professional Practice [15IS84]

Semester: VIII		Year of Study: 2019-20
C412.1	Apply domain knowledge in proposing solution for IT problem.	
C412.2	Develop/implement the design with appropriate techniques, resources and contemporary tools and deliver solution with stipulated planning.	
C412.3	Make the graduates work in collaboration/multidisciplinary environment.	
C412.4	Construct an integrity and ethical behavior during preparation of Technical document/Report/development of solution.	
C412.5	Discuss and make formal and informal communications with guide, make presentations and prepare technical document.	

Course Name/ Code: C413 - Project Work [15ISP85]

Semester: VIII		Year of Study: 2019-20
C413.1	Discover Potential research areas in the field of IT.	
C413.2	Conduct a Survey of Several available literature in the preferred field of study.	
C413.3	Compare and contrast the several existing solutions for research challenge.	
C413.4	Demonstrate an ability to work in teams and manage the conduct of the research study.	
C413.5	Formulate and purpose a plan for creating a solution for the research plan identified and to report and present the findings of the study conducted in the preferred domain.	

Course Name/Code: C414 - Technical Seminar [15ISS86]

Semester: VIII		Year of Study: 2019-20
C414.1	Identify and Analyze information about emerging technologies with respect to current trends.	
C414.2	Identify promising new directions of various cutting edge technologies with intrapersonal skills.	
C414.3	Communicate effectively to a diverse audience, exhibit effective communication skills.	
C414.4	Understand appropriate modern engineering and IT Tools in new innovations and inventions.	
C414.5	Develop technique by imparting skills in preparing detailed report and describing the topic along with results.	

Department of Management studies

Program outcome:

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

PO2:Foster analytical and critical thinking abilities for databased decision making

PO3:Ability to develop value based leadership ability

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

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

PO6:Ability to recognise the need for sustained research orientation to comprehend a growingly complex business environment .

PO7:Process self sustaining entrepreneurship qualities that encourages evaluated risk taking.

Course Outcome:

ODD

First semester

18MBA11-Management & Organizational Behavior

CO1:To make students understand fundamental concepts and principles of management, including the basic roles, skills, and functions of management

CO2:To make students knowledgeable of historical development, theoretical aspects and practice applications of managerial process

CO3:To understand the basic concepts and theories underlying individual behavior besides developing better insights into one's own self.

CO4:To make students aware of Individual behavior in groups, dynamics of groups, team building and interpersonal effectiveness besides developing a better awareness of how they can be better facilitators for building effective teams as leaders themselves

18MBA12-Managerial Economics Core

CO1: The students will understand the application of Economic Principles in Management Decision Making.

CO2: The students will learn the micro economic concepts and apply them for effective functioning of a Firm and Industry.

CO3: The Students will be able to understand, assess and forecast Demand.

CO4: The student will apply the concepts of production and cost for optimization of production.

CO5: the student will design competitive strategies like Pricing, Product Differentiation etc. and marketing according to the market structure.

CO6: The students will be able to identify, assess profits and apply BEP for decision making.

18MBA13- Accounting for Managers Core

CO1: Demonstrate theoretical knowledge and its application in real time accounting

CO2: Demonstrate knowledge regarding accounting principles and its application.

CO3: Capable of preparing financial statement of sole trading concerns and companies

CO4: Independently undertake financial statement analysis and take decisions.

CO5: Comprehend emerging trends in accounting and taxation

18MBA14- Business Statistics & Analytics

Students will be able to

CO1: Understand the meaning, scope and functions of statistics and also to analyze the measure the central tendency

CO1: Understand the different statistical techniques i.e correlation and Regression analysis.

CO2: Understand the importance of probability in decision making using Binominal Poisson and Normal Distribution

CO3: Understand the need and application of analytics.

CO4: Understand and apply various data analysis functions for business problems.

CO5: To know the difference between PERT & CPM, Network components critical path analysis project scheduling etc.

18MBA15- Marketing Management

CO1. Develop an ability to assess the impact of the environment on marketing function.

CO2. To formulate marketing strategies that incorporate psychological and sociological factors which influence buying.

CO3. Explain how companies identify attractive market segments, differentiate and position their products for maximum competitive advantage in the market place.

CO4. Build marketing strategies based on product, price, place and promotion objectives.

CO5. Synthesize ideas into a viable marketing plan.

18MBA16- Managerial Communications

Third Semester

18MBAFM301- Banking & Financial Services

CO1: The Student will be acquainted to various Banking and Non-Banking financial services in India.

CO2: The Student will understand the activities of Merchant Banking and credit rating.

CO3: The Student will be equipped to understand micro financing and other financial services in India.

CO4: The Student will understand how to evaluate and compare leasing & hire purchase.

18MBAFM302- Banking & Financial Services

CO1: The student will understand the capital market and various Instruments for Investment.

CO2: The learner will be able to assess the risk and return associated with investments and

methods to value securities.

CO3: The student will be able to analyse the Economy, Industry and Company framework for Investment Management.

CO4: The student will learn the theories of Portfolio management and also the tools and techniques for efficient portfolio management

18MBAFM303- Direct Taxation

CO1: Understand the basics of taxation and process of computing residential status

CO2: Calculate taxable income under different heads

CO3: Understand deductions and calculation of tax liability of Individuals

CO4: Know the corporate tax system

18MBAFM304-Advanced Financial Management

CO1: Get an overview of capital structure theories.

CO2: Understand and assess the dividend policy of the firm.

CO3: Realize the importance of management of working capital in an organization

CO4: Understand the techniques of Inventory management

CO5: Analyzing Credit management through credit policy variables

CO6: Understand the techniques of cash Management.

18MBAFM305- Cost Management

CO1: Understand various cost methods and techniques with their features, merits and demerits).

CO2: Demonstrate the application of cost sheet, marginal costing, budgetary control techniques, Activity based costing etc. with numerical problems

CO3: Analyse the results after applying various costing methods and techniques

CO4: Critically evaluate all traditional and non-traditional costing methods such as absorption costing, marginal costing and activity based costing

18MBAFM306- Project Appraisal, Planning & Control

CO1: Students would learn capital budgeting and project financing.

- CO2: Students would be quipped to appraise a project.
- CO3: Students would learn to prepare a Business plan.
- CO4: Students would learn the social cost benefit analysis.
- CO5: Student would learn the multiple projects and constraints.
- CO6: To understand various financial and technical aspects of project management

18MBAMM301- Consumer Behaviour

- CO1: Explain the background and concepts vital for understanding Consumer Behaviour.
- CO2: Identify the role of variables that determines Consumer Behaviour in Social & cultural domain.
- CO3: Identifying the psychological and behavioural factors to enhance the Consumer Behaviour.

18MBAMM302- Retail Management

- CO1: Find out the contemporary retail management, issues, and strategies.
- CO2: Evaluate the recent trends in retailing and its impact in the success of modern business.
- CO3: Relate store management and visual merchandising practices for effective retailing.
- CO4: Understand the process of international retailing and research in relationship
- CO5: Gain the insight of Retailing ethics and auditing procedure

18MBAMM303-Service Marketing

- CO1: To know the role and need of service in marketing.
- CO2: Outline the consumer behaviour in service execution, perception and satisfaction
- CO3: Analyse the customer expectation through market research in customer relation and retention
- CO4: Understand the service design and standards and importance of service employees.
- CO5: Analyse the role of marketing communication and pricing of services.
- CO6: Outline physical guidance and understanding service-SCAPES and its effects

18MBAMM304- Marketing Research & Analytics

- CO1: Comprehend the objectives of Market research & its application in solving marketing problems.

CO2: Appreciate the use of different data collection methods, sampling design techniques, measurement methods to analyze the data.

CO3: Generalize and interpret the data with the help of various measurement techniques.

CO4: To understand the emergence of new trends in research.

18MBAMM305- Business Marketing

CO1: Describe the nature of business markets and the related concepts.

CO2: Familiarize the business buying behaviour of industrial customers.

CO3: Analyze business situations in the context of buyer-seller relationships.

CO4: Apply concepts of pricing strategies for industrial goods

CO5: To evaluate the significance of E-Commerce in Business Marketing.

18MBAMM306-Supply chain Management

CO1: Demonstrate knowledge of the functions of logistics and supply chain management.

CO2: To relate concepts and activities of the supply chain to actual organizations.

CO3: Highlight the role of technology in logistics and supply chain management.

CO4: Evaluate cases for effective supply chain management and its implementation.

18MBAHR301-Recruitment and Selection

CO1-Gain the insights of various principles and practices of recruitment and selection in an industry

CO2-Equip students with decision making skills based on job analysis

CO3-Equip students with various recruitment procedure practiced in industry

CO4- Develop students with latest selection tools in the corporate sector

CO5-Develop students with various testing of job recruitment and selection

CO6-Implementation of skills on writing appointment orders

18MBAHR302- Hr Analytics

CO1: Have an understanding of How HR function adds value and demonstrates the value in business terms

CO2: Measure the value of Intangibles that HR helps builds for the organization given a particular business context to facilitate decision making.

CO3: Convert soft factors in a people management context into measurable variables across various domains.

CO4: Devise, conduct and analyse a study on employees or any other related to the HR context in an organization.

18MBAHR303- Compensation & Reward System

CO1: Benefits to achieve organizational goals.

CO2: Determine the performance based compensation system for business excellence and solve various cases.

CO3: Designing the compensation strategies for attraction, motivation and retaining high quality workforce

CO4: Understand the Legal & Administrative Issues in global compensation to prepare compensation plan, CTC, wage survey and calculate various bonus

18MBAHR304-Learning and Development

Students will be able to

CO1: Understand the concepts of learning and development and its role.

CO2: Learn various contemporary methods of learning and development.

CO3: Gain insights of various training evaluation methods and career planning.

CO4: Develop students with career management systems.

18MBAHR305-Industrial Relations and Legislations

CO1- Gain the insights of IR concepts and practices to design programs for better industrial relations and peace.

CO2-Develop the knowledge related to employee-management relations and demonstrate it in solving human resource issues.

CO3-Apply Knowledge on Grievance and disciplinary procedures

CO4-Enhance necessary critical thinking skills in order to evaluate different labour laws for harmonious employee – management relations.

CO5- Implementation of various industrial acts to an industry working.
CO6-Implementation of major provisions related to wages to an industry working.

18MBAHR306- Conflict & Negotiation Management

CO1: Defining the structure of conflict from an organisational prospective.

CO2:Understanding various types of conflict and its effects at individual ,groups or organisational level.

CO3:Understand effective conflict resolution strategies to handle the conflicts effectively

CO4:Comphersinsive understanding of roles of negatation conflit resolution.

CO5:Analysing the various issues associated and factors leading to effective negotiation.

CO6:Applying the negatation strategies during tough situation.

(EVEN)

Second semester

18MBA21- Human Resource Management

CO1: Understanding of HRM functions, principles, Job analysis that facilitates students to design a job description and job specification for various levels of employees.

CO2: Synthesize knowledge on effectiveness of recruitment process, sources & understanding of systematic selection procedure

CO3: Identify the various training methods and design a training program.

CO4: Understand the concept of performance appraisal process in an organization.

CO5: List out the regulations governing employee benefit practices.

CO6: Apply and use various employee welfare measures in organizations.

18MBA22- Financial Management

CO1: Understand the meaning, scope of basic financial concepts and know the sources of financing and emerging issues in financial management.

CO2: Understand the applying of time value of the money and evaluation of Simple interest & Compound interest, Capital recovery & loan amortization.

CO3: understanding the basic concept of cost of capital, cost of debenture, cost of preference share, term loan, and equity capital & retain earning

CO4: Evaluate the investment decisions & evaluation technique, Capital budgeting process, Net present value, internal rate of return.

CO5: Estimate working capital requirements. Current asset policy and current asset finance policy Determination of operating cycle and cash cycle.

CO6: Analyze the capital structure and dividend decisions, determinants of Leverages & Factors affecting the dividend policy.

18MBA23- Research Methodology

CO1: Understand various research approaches, techniques and strategies in the appropriate in business.

CO2: Apply a range of quantitative / qualitative research techniques to business and day to day management problems

CO3: Demonstrate knowledge and understanding of data analysis, interpretation and report writing.

CO4: Analyse the capital structure and dividend decisions

CO5: Develop necessary critical thinking skills in order to evaluate different research approaches in Business.

18MBA24- Legal and Business Environment

CO1: Students should get a clear idea about the concept of incorporation of a company, its relevance, characteristics, types of company, lifting of corporate.

CO2: Student to acquire knowledge about conducting meeting, duties of directors and Investigation of the company

CO3: To give the students an insight on Winding up of the companies, Mode of winding up of the companies.

CO4: Students will have an understanding of the macro environment of Business and various macroeconomic concepts.

CO5: The student will understand the industrial policies of the past and the present and the evolution over time, and how Indian Industrial structure evolved over time.

CO6: The student will be exposed to various economic policies of the country and the state of economy.

18MBA25- Strategic Management

CO1: Students should get clear idea about the concept of Strategic Management, its relevance, Characteristics, process nature and purpose

CO2. Student to acquire an understanding of how firms successfully institutionalize a strategy and create an organizational structure for domestic and overseas operations and gain competitive advantage

CO3: To give the students an insight on strategy at different levels of an organization to gain competitive Advantage.

CO4: To help students understand the strategic drive in multinational firms and their decisions in different markets

CO5: To enable the students to gain knowledge of strategy implementation and the control measures for effective decision-making.

18MBA26- Entrepreneurship Development

CO1: At the end of the course students will be able to:

CO2: Display keen interest and orientation towards entrepreneurship develop a business plan

CO4: Become aware about various sources of funding for an entrepreneur including financial Institutions, venture capitalists and Angel Investors

CO5: Gain consciousness towards social entrepreneurship and rural entrepreneurship Opportunities

Fourth Semester

18MBAFM401-Mergers, Acquisition And Corporate Structuring

- CO1: Understand M & A with its different classification, strategies, theories, synergy, etc.
CO2: Conduct the financial evaluation of M & A.
CO3: Analyze the results after evaluation.
CO4: Critically evaluate different types of M & A, takeover and anti-takeover strategies

18MBAFM402- Risk Management And Insurance

- CO1: Understand various types of risks.
CO2: Assess the process of identifying and measuring the risk.
CO3: Acquaint with the functioning of Life Insurance in risk management.
CO4: Understand general insurance contract.

18MBAFM403- Indirect Taxation

- CO1: To remember GST system in India.
CO2: Understanding levy and collection of GST in India
CO3: Application of GST in the valuation of goods and services and tax return.
CO4: Analyse the GST valuation and custom duty on goods and services
CO5: Evaluate the baggers duty on import of goods

18MBAFM404- International Financial Management

- CO1: The Student will have an understanding of the international financial Environment
CO2: The student will learn about the foreign exchange market, participants and transactions.
CO3: The student able to use derivatives in foreign exchange risk management
CO4: Understand the functioning of world financial markets and institutions.
CO5: Understand foreign exchange rate determination
CO6: The Student will able to evaluate the firm's exposure to risk in international environment and various theories associated with it.

18MBAFM406-Corporate Valuation

CO1: Understand corporate valuation and valuation process.

CO2: Familiarize herself/himself with the standard techniques (DCF) of corporate valuation.

CO3: Understand non-DCF approaches to valuation

CO4: Analyze valuation in different contexts

CO5: Evaluate strategic financial decisions in creating value

CO6: Apply Value based Management

18MBAMM401-Sales Management

CO1: Understand the apply the selling techniques in an organization.

CO2: Develop a plan for organizing, staffing & training sales force.

CO3: Organize sales territories to maximize selling effectiveness.

CO4: Evaluate sales management strategies.

18MBAMM402- Integrated Marketing Communication

CO1: Understand the pre requisites for achieving the effectiveness of marketing communication

CO2: Understand the Application of various IMC tools

CO3: To understands the skills of media planning

CO4: Understand the importance of monitoring, evaluation and control in IMC

CO5: Understand the factors affecting the global advertising industry.

18MBAMM403- Digital & Social Media Marketing

CO1: Recognize appropriate e-marketing objectives.

CO2: Appreciate the e-commerce framework and technology.

CO3: Illustrate the use of search engine marketing, online advertising and marketing strategies.

CO4: Use social media & create templates.

CO5: Develop social media strategy's to solve business problems.

18MBAMM404- Strategic Brand Management

CO1: Develop skills for managing brands strategically.

- CO2: Compare and contrast the elements of product and brand management.
CO3: Assess growth-opportunities for brands, e.g., brand extension strategies.
CO4: Critique the different measures of brand equity.

18MBAMM405- Rural Marketing

- CO1: Highlight the characteristics of Indian rural markets and describe the differences between rural and the urban economy.
CO2: Analyze the roadblocks of Indian rural market and advocate solutions for the problems of rural markets.
CO3: Emphasize the different strategies adopted by Indian companies for rural markets.
CO4: Apply the strategies to be adopted for influencing the rural consumers.

18MBAMM406- International Marketing Management

- CO1: Be aware of the differences between domestic marketing and international marketing.
CO2: Draft international marketing Strategies.
CO3: Note down the import export documentation.

18MBAHR401- Public Relations

- CO1: To know the theoretical meaning of public relation
CO2: To study various theories associated with public relation in business
CO3: To understand the importance of communication in maintain network.
CO4: To examine the role of public relation in the community.
CO5: To know the elements of media for media relation
CO6:To understand the various types of issues and different situations of crisis and strategies to act.

18MBAHR402- Organisation Leadrship

Students will be able to

- CO1- Comprehend & correlate organizational leadership styles which are happening around with fundamental concepts of team leadership.
CO 2- Understand the overview of leadership behavior and motivation in organization.
CO 3-Effectively uses their skills for self-grooming on leadership traits and ethics that influences them to effectively work in groups to achieve Organizational goals.

CO4- Demonstrate their acumen in applying their knowledge in organizational leadership and behavioral concept in real World/situation.

18MBAHR403-- International Human Resource Management

CO1: Apply the concepts and knowledge about the range of Human Resource functions

CO2: Deploy the expatriate employees and expatriate failures on international assignments

CO3: Evaluate the effects of different Human Resource and International Industrial Relations strategies adopted by multinational organizations

18MBAHR404- Organization Change And Development

CO1: Gain insights of change management components, process and its functions.

CO2: Enable with various OD diagnosing models.

CO3: Ability to handle various OD interventions.

CO4: Analyze the role of OD Consultant

18MBAHR405- Strategic Talent management

Students will be able to

CO1: To understand the basic concepts of STM

CO2: Acquire knowledge and the various challenges of acquisition and retention of talents for competitive advantage of the organization.

CO3. Gain insights to develop and retain best talents in the industry.

CO4. Learn the concepts of competency and its usage in evaluating a person's work.

CO5. To gain the insights of performance management and assessment centre.

18MBAHR406-Personal Growth and Interpersonal Effectiveness

CO1: The importance of self-awareness and personal growth for better efficiency of individuals is understood.

CO2: Students will be able to understand the significance of individual personality.

CO3: The importance of values and beliefs influencing behavior is understood.

CO4: Creativity, thinking process and learning abilities for better performance is understood.

CO5: Importance of interpersonal relations in organization for enhanced team work is understood.

CO6: The significance of Transactional Analysis and Ego states is made clear.



||JAI SRI GURUDEV||
Sri Adichunchanagiri Shikshana Trust ®

SJB INSTITUTE OF TECHNOLOGY

(Affiliated to VTU, Approved by AICTE - New Delhi, Accredited by NAAC with "A" Grade)
No. 67, BGS Health & Education City, Dr. Vishnuvardhan Road, Kengeri, Bengaluru - 560 060



Department of Computer Science & Engineering

Vision of CSE Department, SJBIT

To become a Centre of excellence producing "Creators of Innovative Technology" who can contribute positively to the ever changing industrial demands and societal needs.

Mission of CSE Department, SJBIT

- To encourage participation of faculty and students in research activities for enhancing their subject knowledge and acquire information regarding current trends
- To provide exposure to students in latest tools and technologies in area of Computer Science and Engineering
- Preparation of our graduates for leadership in profession and in higher education by providing excellent teaching learning environment enabling them to serve the society

Program Educational Objectives (PEOs)

PEO1: Our Graduates will be able to excel in Professional career by solving theoretical and practical problems of Computer Science and Engineering and allied areas

PEO2: Our Graduates will have the ability to provide solutions by creative intuitions towards technological growth and societal needs.

PEO3: Our Graduates will have the ability to pursue higher studies, research and career in different domains of Computer science and Engineering.

Program Specific Outcomes (PSOs)

PSO1: The ability to understand, analyze and develop computer applications in the areas related to Web Technology, Machine Learning, Data science, IoT and allied areas for efficient design of computer-based systems of varying complexity.

PSO2: Ability to apply various computing techniques using open-ended programming environments and adopt software engineering and professional practices to evolve optimal solutions.

PSO3: Inculcate skills required for a successful career in the industry based on sound principles of software project management and ethical practices with the spirit of entrepreneurship to nurture the quest for higher levels of knowledge.

HOD

Principal

Department of Computer Science & Engg

Course Outcomes During 2019-20 (For Naac)

3rd Sem

Course Code	Course Outcomes	Description
18MAT31	C01	Make use of periodic signals and Fourier series to analyze circuits and systems communication.
	C02	Explain the general linear system theory for continuous-time signals and digital signal processing using the Fourier transform and z-transform.
	C03	Employ appropriate numerical methods to solve algebraic and transcendental equations.
	C04	Apply Green;s theorem, Divergence theorem and Stokes theorem in various application in the field of electro-magnetic and gravitational fields and fluid flow problems.
	C05	Determine the extremals of functional and solve the simple problems of the calculus of variations. Utilize the concepts of functional and their variations in the applications of communication systems, decision theory, synthesis and optimization of digital circuits.
18CS32	C01	Apply the knowledge of fundamentals of C language and definition of data structure
	C02	Analyze and demonstrate the stacks, queues operations and its applications
	C03	Create data storage using linked lists concepts and demonstrate its applications
	C04	Construct trees data structures and perform operations such as traversals, searching and expression evaluation.
	C05	Use graph based data structure approach for storing, sorting, searching of data and understand file handling basics
18CS33	C01	Define and explain the current voltage characteristics of semiconductor and analog devices
	C02	Demonstrate the combinational and sequential logic circuits by using various logical blocks..
	C03	Design and Compare various digital data communication

		efficiency using Data Processing Circuits
	C04	Apply various methods to get more efficient throughput in synchronous counters and sequential circuit applications using flip flop and registers
	C05	Evaluate and develop an understanding the concept ADC, DAC blocks required for data conversion
18CS34	C01	Explain the basic organization of a computer system.
	C02	Examine the importance of I/O organization and interrupts in computer system
	C03	Demonstrate functioning main memory and imporatnce of virtual memory and secondary storage
	C04	Illustrate hardwired control and micro programmed control. pipelining, embedded and other computing systems
	C05	Design and analyze simple arithmetic and logical units
18CS35	C01	Understand Software Engineering methods, software process models, ethical and professional issues.
	C02	Analyze various system models in design and implementation
	C03	Evaluate software to verify and validate using various testing methods.
	C04	Create a quality project plan for software development .
	C05	Apply advanced software development methods like agile programming for better software development practice.
18CS36	C01	Verify the correctness of an argument using propositional and predicate logic and truth tables.
	C02	Demonstrate the ability to solve problems using counting techniques and combinatorics in the context of discrete probability
	C03	Solve problems involving recurrence relations and generating functions.
	C04	Construct proofs using direct proof, proof by contraposition, proof by contradiction, proof by cases, and mathematical induction.
	C05	Explain and differentiate graphs and trees
18CSL37	C01	Design different types of wiring and instruments connections and to evaluate performance characteristics of electronic

		circuits
	C02	Choose testing and experimental procedures on different types of electronic circuit and analyze their operation different operating conditions..
	C03	Identify the overheads in practical experiments simulations results and develop a new design to overcome those problem
18CSL38	C01	Able to implement linear and non linear data structures and understand its applications
	C02	Create and analyze searching and sorting algorithms in data structures.
	C03	Demonstrate data structure for solving real world problems

4th Sem

Course Code	Course Outcomes	Description
18MAT41	C01	Solve first and second order ordinary differential equations arising in flow problems using single step and multistep numerical methods
	C02	Solve problems of quantum mechanics employing Bessel's function relating to cylindrical polar coordinate systems and Legendre's polynomials relating to spherical polar coordinate systems
	C03	Understand the analyticity, potential fields, residues and poles of complex potentials in field theory and electromagnetic theory Describe conformal and bilinear transformation arising in aerofoil theory, fluid flow visualization and image processing,
	C04	Solve problems on probability distributions relating to digital signal processing ,Determine joint probability distributions and stochastic matrix connected with the multivariable correlation problems for feasible random events
	C05	Draw the validity of the hypothesis proposed for the given sampling distribution in accepting or rejecting the hypothesis, Define transition probability matrix of a Markov chain and solve problems related to discrete parameter random process.
18CS42	C01	Understand the basics of algorithm, methods for analyzing algorithm and also expressing the boundaries of efficiencies using asymptotic notations.
	C02	Describe the method of divide and conquer and when to use such algorithms
	C03	Describe dynamic programming paradigm and explain when an

		algorithm design situation calls for it
	C04	Describe Backtracking and branch and bound approaches
	C05	Analyze different classes of algorithms such as P, NP and NP hard.
18CS43	C01	Demonstrate need for OS and different types of OS.
	C02	Apply suitable techniques for management of different resources
	C03	Use processor, memory, storage and file system commands.
	C04	Define deadlock situation and solve deadlock scenarios in OS.
	C05	Realize the different concepts of OS in platform of usage through case studies
18CS44	C01	Describe the Architecture of 8086 & ARM
	C02	Illustrate the various addressing modes of 8086 & its operation
	C03	Apply the concepts of 8086 in Hardware programming .
	C04	Demonstrate the 8086 interrupts and its programming
	C05	Explain the concepts of ARM interfacing and its applications
18CS45	C01	Understand the object oriented concepts using C++
	C02	Demonstrate the fundamentals of java and working of java development kit
	C03	Understand object oriented concepts like class , inheritance, exception handling ,packages and interfaces in java
	C04	Interpret exception handling and demonstrate multithreading in java
	C05	Develop simple GUI and handling events using applets and swings
18CS46	C01	Illustrate basic computer network technology..
	C02	Identify the different types of network topologies and protocols..
	C03	Enumerate the layers of the OSI model and TCP/IP functions of each layer.
	C04	Make out the different types of network devices and their functions within a network.
	C05	Demonstrate the skills of IEEE Ethernet configurations..
18CSL47	C01	Write programs in java to solve Various problems.

	C02	implement Quicksort, Merge sort , and Dynamic algorithm
	C03	implement Backtracking algorithms for the sum of subset and Hamiltonian cycle, greedy algorithm for Knapsack prims and kruskal's
18CSL48	C01	Perceive the significance of the Assembly language programming (8086 and ARM)
	C02	Develop application using 8086 instruction set
	C03	Demonstrate the functioning of hardware devices and interfacing them to x86 and ARM family

5th Sem

17CS51	C01	Define the management, organization, entrepreneur, planning, staffing, ERP.
	C02	outline the importance of directing leadership styles, controlling and communication
	C03	Describe the quality and characteristics of entrepreneurs.
	C04	Utilize the resources available effectively through ERP..
	C05	use of IPR's and institutional support in entrepreneurship
17CS52	C01	Demonstration of Application layer protocols..
	C02	Recognize transport layer services and infer UDP/TCP protocols.
	C03	Classify routers, IP and Routing algorithms in Network layer.
	C04	Disseminate the wireless and mobile networks covering IEEE 802.11 standard..
	C05	Describe multimedia networking and network management
17CS53	C01	Learn the basic concepts, application and architecture of database systems
	C02	Understand the design principles and representing the description of the database using E-R diagram, and Gain Knowledge on relational database theory
	C03	understand the basics of SQL and construct queries using relational algebra ,expressions and SQL on commercial relational database system (oracle) and illustrate to tune the database design using normalization techniques
	C04	Learn basics issues of transaction processing and concurrency control, recovery.

	C05	Design and develop any database application system successfully
17CS54	C01	Demonstrate an in-depth understanding of theories, concepts and techniques in automata and their link to computation..
	C02	Compare the Different models of Computation like Deterministic, Non-deterministic and Software models.
	C03	Describe Grammars and Automata for different language classes and become knowledgeable about restricted models of Computation (Regular, Context Free) and their relative powers..
	C04	Develop skills in formal reasoning and reduction of a problem to a formal model, with an emphasis on semantic precision and conciseness.
	C05	Formulate a problem with respect to different models of Computation
17CS553	C01	Interpret the need of advanced java concepts such as enumerations, auto boxing and annotations.
	C02	Understand the working of collection framework and build programs in java
	C03	Demonstrate string and link functions and implement the string operations .
	C04	Build web application using servlets ,java server pages and deployment in web server
	C05	Illustrate the database access and manage data using jdbc concepts in java.
17CS562	C01	Understand the problem where AI is needed and solving using Heuristic search approaches
	C02	Analyze the issues in representing the knowledge and deriving the rules to represent knowledge
	C03	Understand and analyze the different AI technique to solve problems
	C04	Define learning techniques and compare learning techniques.
	C05	Discuss on natural language processing and expert system
17CS564	C01	Build applications on visual studio dot net platform by understanding

		syntax and semantics of C#
	C02	Demonstrate object oriented programming in C# programming languages
	C03	Design custom interfaces for applications and leverage the available built in interfaces in building complex applications
	C04	Illustrate the use of generics and collections in C#
	C05	Compose queries to query in memory data and define own operator behavior
17CSL57	C01	Analyze and Compare various networking protocols, security and error checking mechanisms..
	C02	Demonstrate the working of different concepts of computer networking
	C03	Analyze, Implement and evaluate networking protocols in NS2 / NS3
17CSL58	C01	Create ,update and query on the database
	C02	Demonstrate the working of different concepts of DBMS
	C03	Implement, analyze ,and evaluate the project developed for an application

6th Sem

17CS61	C01	Discuss cryptography and its need to various applications..
	C02	. Design and develop simple cryptography algorithms.
	C03	Analyze different digital signature algorithm and key management techniques for secure communication..
	C04	Compare and examine different protocols used in Wireless LAN.
	C05	Understand cyber security and cyber Law needs.
17CS62	C01	Explain the concepts of Computer graphics and usage of OpenGL
	C02	Illustrate geometric transformation and viewing functions on 2D objects.
	C03	Demonstrate the concepts of clipping, 3D transformations, color and illumination model.

	C04	Differentiate various projection and viewing techniques on 3D objects.
	C05	Demonstrate the use of various APIs for input interaction to develop GUI
17CS63	C01	Discuss & understand the various functions features of assemblers, loaders, linkers & macro processors.
	C02	Write object code for a given assembly level language program
	C03	Describe basics of compilers and its phases
	C04	Illustrate the problems related to SR parsing, compute FIRST and FOLLOW.
	C05	Write SDT's ,intermediate code and generate target code.
17CS64	C01	Demonstrate need for OS and different types of OS.
	C02	Apply suitable techniques for management of different resources
	C03	Use processor, memory, storage and file system commands.
	C04	Define deadlock situation and solve deadlock scenarios in OS.
	C05	Realize the different concepts of OS in platform of usage through case studies
17CS651	C01	understand the basics concepts of data mining and data warehousing
	C02	Identify datamining problems and implement the data warehouse
	C03	write the association rules for a given data pattern
	C04	describe the classification and clustering techniques
	C05	choose between classification and clustering solution for a given problem
17CS653	C01	Define and Explain the basic necessity to operate the problem.
	C02	Solve the Various problem using different optimization techniques.
	C03	Understand and Examine the given problem as transportation and assignment problem and solve.
	C04	Evaluate the game theory for decision support system..
	C05	Design lower-level procedure or heuristic (partial search algorithm) that may provide a sufficiently good solution to an optimization

		problem, especially with incomplete or imperfect information or limited computation capacity
17CS664	C01	Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.
	C02	Demonstrate proficiency in handling Strings and File Systems.
	C03	Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions..
	C04	Interpret the concepts of Object-Oriented Programming as used in Python.
	C05	Implement exemplary applications related to Network Programming, Web Services and Databases in Python.
17CSL67	C01	Implement and demonstrate Lexar's and Parser's.
	C02	Implement and demonstrate top down. Bottom up parsing and generation of intermediate code
	C03	Implement different algorithms required for memory management, process scheduling, Resource allocation used in OS and communication used in operating system.
17CSL68	C01	Illustrate the concepts of Computer Graphics and Implement computer graphics applications using open GL
	C02	Develop and execute polygon filling, clipping, algorithms and animate curves using openGL
	C03	Design and Implement basic transformations and viewing functions on objects using openGL for real world problems

7th Sem

15CS71	C01	Adapt HTML and CSS syntax and semantics to build web pages
	C02	Construct and visually format tables and forms using HTML and CSS
	C03	Develop Client-Side Scripts using JavaScript and Server-Side Scripts using PHP to generate and display the contents dynamically
	C04	Appraise the principles of object oriented development using PHP
	C05	Inspect JavaScript frameworks like JQuery and backbone which facilitates developer to focus on core features
15CS72	C01	explain the concepts of parallel computing and network technologies
	C02	Compare and contrast the parallel architecture

	C03	illustrate parallel programming concepts
	C04	Understand the concept of memory hierarchy and its importance
	C05	understand the concepts of advances in computer architecture area
15CS73	C01	Differentiate supervised and unsupervised techniques
	C02	Identify optimal techniques suitable for a given problem
	C03	Evaluate learning algorithms
	C04	Design an application using machine learning methods
	C05	Apply reinforcement technique towards real world data analysis.
15CS743	C01	Understand the fundamentals and history of cryptography
	C02	Understand the hash functions and applications of hash
	C03	Acquire knowledge on password schemes and analyzing the simple cryptographic protocol
	C04	Understand the various key distribution and management schemes
	C05	Acquire basic knowledge of design a security applications in the field of Information technology
15CS754	C01	Identify key challenges in managing information along with RAID implementations.
	C02	Describe different storage networking technologies and virtualization.
	C03	Illustrate backup, archive and replication. Explain components and the implementation of NAS
	C04	Describe the cloud computing characteristics, deployments and infrastructure components
	C05	Illustrate the storage infrastructure and management activities.
15CSL76	C01	Explore various python libraries useful for real time application and apply appropriate data sets to the machine learning algorithms
	C02	Understand the implementation of the procedures for the machine learning algorithms
	C03	Identify and apply machine learning algorithms to solve real world problems
15CSL77	C01	Adapt HTML and CSS syntax and semantics to build web pages
	C02	Construct and visually format tables and forms using HTML and CSS

	C03	Develop Client-Side Scripts using JavaScript and Server-Side Scripts using PHP to generate and display the contents dynamically..
15CSP78	C01	Apply knowledge gained from real time problems of society and innovation required
	C02	Undertake problem identification in different domain.
	C03	Analyze the Problem statement by applying the Survey
	C04	Formulation of methodology for the problem identified in different domains
	C05	Design engineering solutions to complex problems utilizing a systems approach.

8th Sem

15CS81	C01	Interpret the impact and challenges posed by IoT networks leading to new architectural models.
	C02	Compare and contrast the deployment of smart objects and the technologies to connect them to network
	C03	Appraise the role of IoT protocols for efficient network communication
	C04	Elaborate the need for Data Analytics and Security in IoT.
	C05	Illustrate different sensor technologies for sensing real world entities and identify the applications of IoT in Industry
15CS82	C01	Understand the concept of HDFS and MapReduce framework
	C02	Investigate Hadoop related tools for Big Data analytics and perform basic Hadoop administration
	C03	Recognize the role of business Intelligence, Dataware housing and visualization in decision making
	C04	Infer the importance of core data mining techniques for data Analytics
	C05	Compare and contrast text mining, web mining, naïve-bayes analysis, support vector machines and social network analysis.
15CS834	C01	Identify the role of important elements of discrete even simulation and modeling paradigm in real world.
	C02	Describe the various distribution models and analyze various quiuing models
	C03	Examine and apply techniques for generating random numbers and random variates.
	C04	Judge appropriate method for data collection and testing methods

	C05	Sketch the model and apply the results to resolve critical issues in a real world environment
--	-----	---

15CS84	C01	Identify and analyze the problem using engineering knowledge
	C02	Design and implement new concepts in multidisciplinary area.
	C03	Explore career alternatives prior to graduation in different domains
	C04	demonstrate professional and ethical practice
	C05	Gain more experience in accomplishing a long-term project, and managing the progress continuously.
15CSP85	C01	Communicate with engineers and the community at large in written and oral forms
	C02	Knowing the functionality of team work / individuals
	C03	Implement the innovative methodology designed and performance analysis with existing methods
	C04	Demonstrate a sound technical knowledge of their selected work
	C05	Develop a computer application in different fields
15CS86	C01	Identify and Analyze information about emerging technologies with respect to current trends.
	C02	Identify promising new directions of various cutting edge technologies with intrapersonal skills.
	C03	Communicate effectively to a diverse audience, exhibit effective communication skills.
	C04	Apply appropriate modern engineering and IT Tools in new innovations and inventions.
	C05	Develop technique by imparting skills in preparing detailed report and describing the topic along with results.
	C06	Learn and integrate through independent practice and collaborative study, attain, use and develop knowledge in latest technology.

