COURSE OUTCOMES

15ᵗʰ SCHEME

3ʳᵈ SEMESTER		
Subject Code: 15CS32	**Subject:ANALOG AND DIGIAL ELECTRONICS**	**Course Code: CO202**

After Studying this course, students will be able to

CO202.1: Acquire knowledge of

- JFETs and MOSFETs , Operational Amplifier circuits and their applications.
- Combinational Logic, Simplification Techniques using Karnaugh Maps, Quine McClusky technique.
- Operation of Decoders, Encoders, Multiplexers, Adders and Subtractors.
- Working of Latches, Flip-Flops, Designing Registers, Counters, A/D and D/A Converters.

CO202.2:Analyze the performance of

1. JFETs and MOSFETs , Operational Amplifier circuits
2. Simplification Techniques using Karnaugh Maps, Quine McClusky Technique.
3. Synchronous and Asynchronous Sequential Circuits.

Apply the knowledge gained in the design of Counters, Registers and A/D & D/A converters

Subject Code: 15CS33	**Subject :DATA STRUCTURE USING C**	**Course Code: CO203**

After studying this course, students will be able to:

CO203.1:Acquire knowledge of

- Various types of data structures, operations and algorithms.
- Sorting and searching operations.
- File structures.

CO203.2:Analyse the performance of

- Stack, Queue, Lists, Trees, Graphs, Searching and Sorting techniques.

CO203.3:Implement all the applications of Data structures in a high-level language.

CO203.4:Design and apply appropriate data structures for solving computing problems.

Subject Code: 15CS34	**Subject: COMPUTER ORGANISATION**	**Course Code: CO204**

After studying this course, students will be able to:

Acquire knowledge of

CO204.1:The basic structure of computers & machine instructions and programs, Addressing Modes, Assembly Language, Stacks, Queues and Subroutines.

CO204.2:Input/output Organization such as accessing I/O Devices, Interrupts.

CO204.3:Memory system basic Concepts, Semiconductor RAM Memories, Static memories,Asynchronous DRAMS, Read Only Memories, Cache Memories and Virtual Memories.

CO204.4:Some Fundamental Concepts of Basic Processing Unit, Execution of a Complete Instruction, Multiple Bus Organization, Hardwired Control and Micro programmed Control.

CO204.5:Pipelining, embedded and large computing system architecture.

- Analyse and design arithmetic and logical units.
- Apply the knowledge gained in the design of Computer.
- Design and evaluate performance of memory systems
- Understand the importance of life-long learning

Subject Code: 15CS35	Subject: UNIX AND SHELL PROGRAMMING	Course Code: CO205

After studying this course, students will be able to:
CO205.1:Explain multi user OS UNIX and its basic features
CO205.2:nterpret UNIX Commands, Shell basics, and shell environments
CO205.3:Design and develop shell programming, communication,System calls and terminology.
CO205.4:Design and develop UNIX File I/O and UNIX Processes.
CO205.5:Perl script writing

Subject Code: 15CS36	Subject: DISCRETE MATHEMATICAL STRUCTURES	Course Code: CO206

After studying this course, students will be able to:
CO206.1: Verify the correctness of an argument using propositional and predicate logic and truth tables.
CO206.2:Demonstrate the ability to solve problems using counting techniques and combinatorics in the context of discrete probability.
CO206.3:Solve problems involving recurrence relations and generating functions.
CO206.4:Construct proofs using direct proof, proof by contraposition, proof by contradiction, proof by cases, and mathematical induction.
CO206.5:Explain and differentiate graphs and trees

Subject Code: 15CSL37	Subject: ANALOG AND DIGITAL ELECTRONICS LABORATORY	Course Code: CO207

On the completion of this laboratory course, the students will be able to:
CO207.1: Use various Electronic Devices like Cathode ray Oscilloscope, Signal generators, Digital Trainer Kit, Multimeters and components like Resistors, Capacitors, Op amp and Integrated Circuit.
CO207.2: Design and demonstrate various combinational logic circuits.
CO207.3: Design and demonstrate various types of counters and Registers using Flip-flops
CO207.4: Use simulation package to design circuits.
CO207.5: Understand the working and implementation of ALU.

Subject Code: 15CSL38	Subject: DATA STRUCTURES LABORATORY	Course Code: CO208

On the completion of this laboratory course, the students will be able to:
CO208.1: Analyze and Compare various linear and non-linear data structures Code, debug and demonstrate the working nature of different types of data structures and their applications
CO208.2: Implement, analyze and evaluate the searching and sorting algorithms
CO208.3: Choose the appropriate data structure for solving real world problems

4th SEMESTER

Subject Code: 15CS42	Subject:SOFTWARE ENGINEERING	Course Code: CO209

After studying this course, students will be able to:

CO209.1: Design a software system, component, or process to meet desired needs within realistic constraints.
CO209.2: Assess professional and ethical responsibility
CO209.3: Function on multi-disciplinary teams
CO209.4: Use the techniques, skills, and modern engineering tools necessary for engineering practice
CO209.5: Analyze, design, implement, verify, validate, implement, apply, and maintain software systems or parts of software systems.

Subject Code: 15CS43	Subject: DESIGN AND ANALYSIS OF ALGORITHMS	Course Code: CO210

After studying this course, students will be able to:

CO210.1: Describe computational solution to well known problems like searching, sorting etc.
CO210.2: Estimate the computational complexity of different algorithms.
CO210.3: Devise an algorithm using appropriate design strategies for problem solving.

Subject Code: 15CS44	Subject: MICROPROCESSORS AND MICROCONTROLLERS	Course Code: CO211

After studying this course, students will be able to

CO211.1: Differentiate between microprocessors and microcontrollers
CO211.2:Design and develop assembly language code to solve problems
CO211.3:Gain the knowledge for interfacing various devices to x86 family and ARM processor
CO211.4:Demonstrate design of interrupt routines for interfacing devices

Subject Code: 15CS45	Subject: OBJECT ORIENTED CONCEPTS	Course Code: CO212

After studying this course, students will be able to:

CO212.1:Explain the object-oriented concepts and JAVA.

CO212.2:Develop computer programs to solve real world problems in Java.
CO212.3:Develop simple GUI interfaces for a computer program to interact with users,
CO212.4:and to understand the event-based GUI handling principles using Applets and swings.

Subject Code: 15CS46	Subject: DATA COMMUNICATION	Course Code: CO213

After studying this course, students will be able to

CO213.1:Illustrate basic computer network technology.
CO213.2:Identify the different types of network topologies and protocols.
CO213.3:Enumerate the layers of the OSI model and TCP/IP functions of each layer.
CO213.4:Make out the different types of network devices and their functions within a network
CO213.5:Demonstrate the skills of subnetting and routing mechanisms.

Subject Code: 15CSL47	Subject: DESIGN AND ANALYSIS OF ALGORITHM LABORATORY	Course Code: CO213

The students should be able to:

CO213.1:Design algorithms using appropriate design techniques (brute-force, greedy, dynamic programming, etc.)
CO213.2:Implement a variety of algorithms such assorting, graph related, combinatorial, etc., in a high level language.
CO213.3:Analyze and compare the performance of algorithms using language features.
CO213.4:Apply and implement learned algorithm design techniques and data structures to solve real world problems.

Subject Code: 15CSL48	Subject:MICROPROCESS OR AND MICROCONTROLLER LABORATORY	Course Code: CO214

After studying this course, students will be able to

CO214.1: Learn 80x86 instruction sets and gins the knowledge of how assembly language works.
CO214.2: Design and implement programs written in 80x86 assembly language
CO214.3: Know functioning of hardware devices and interfacing them to x86 family.
CO214.4: Choose processors for various kinds of applications.

5th SEMESTER		
Subject Code: 15CS51	Subject Name: Management Entrepreneurship & Cyber Law for IT Industry	Course Outcomes: C301
C301.1 Define management, organization, entrepreneur, planning, staffing, ERP and outline their importance in entrepreneurship C301.2 Utilize the resources available effectively through ERP C301.3 Make use of IPR s and institutional support in entrepreneurship.		

Subject Code: 15CS52	Subject Name: Computer Networks	Course Outcomes: C302
C302.1 Explain principles of application layer protocols C302.2 Recognize transport layer services and infer UDP and TCP protocols C302.3 Classify routers, IP and Routing Algorithms in network layer C302.4 Understand the Wireless and Mobile Networks covering IEEE 802.11 Standard C302.5 Describe Multimedia Networking and Network Management		
Subject Code: 15CS53	Subject Name: Database Management Systems	Course Outcomes: C303
C303.1 Identify, analyze and define database objects, enforce integrity constraints on a database using RDBMS C303.2 Use Structured Query Language (SQL) for database manipulation. C303.3 Design and build simple database systems C303.4 Develop application to interact with databases.		
Subject Code: 15CS5	Subject Name: Advanced JAVA and J2EE	Course Outcomes: C305
C305.1 Interpret the need for advanced Java concepts like enumerations and collections in developing modular and efficient programs C305.2 Build client-server applications and TCP/IP socket programs C305.3 Illustrate database access and details for managing information using the JDBC API C305.4 Describe how servlets fit into Java-based web application architecture C305.5 Develop reusable software components using Java Beans		
Subject Code: 15CS5	Subject Name: Dot Net Framework For Application Development	Course Outcomes: C306
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 for applications 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 and define own operator behaviour		
Subject Code: 15CSL57	Subject Name: Computer Networks Lab	Course Outcomes: C307
C307.1 Analyze and Compare various networking protocols. C307.2 Demonstrate the working of different concepts of networking. C307.3 Implement, analyze and evaluate networking protocols in NS2 / NS3		
Subject Code: 15CSL58	Subject Name: Data Base Applications Lab	Course Outcomes: C308
C308.1 Create, Update and query on the database. C308.2 Demonstrate the working of different concepts of DBMS C308.3 Implement, analyze and evaluate the project developed for an application.		

	6th SEMESTER		
SUBJECT CODE:15CS61	**Subject : CRYPTOGRAPHY, NETWORK SECURITY AND CYBER LAW**	**Course code :CO309**	
Course objectives: This course will enable students to CO309.1:Explain the concepts of Cyber security CO309.2:llustrate key management issues and solutions. CO309.3:Familiarize with Cryptography and very essential algorithms CO309.4: Introduce cyber Law and ethics to be followed.			
SUBJECT CODE:15CS62	**Subject :FILE STRUCTURES**	**Course code :CO310**	
This course will enable students to CO310.1:Explain the fundamentals of file structures and their management. CO310.2:Measure the performance of different file structures CO310.3:Organize different file structures in the memory. CO310.4:Demonstrate hashing and indexing techniques			
SUBJECT CODE:15CS63	**Subject :SOFTWARE TESTING**	**Course code :CO311**	Subject
This course will enable students to CO311.1: Differentiate the various testing techniques CO311.2: Analyze the problem and derive suitable test cases. CO311.3:Apply suitable technique for designing of flow graph CO311.4: Explain the need for planning and monitoring a process.			
SUBJECT CODE:15CS64	**Subject :OPEARTING SYSTEM**	**Course code :CO312**	
This course will enable students to CO312.1: Introduce concepts and terminology used in OS CO312.2: Explain threading and multithreaded systems CO312.3: Illustrate process synchronization and concept of Deadlock CO312.4: Introduce Memory and Virtual memory management, File system and storage techniques			
SUBJECT CODE:15CS651	Subject :**DATA MINING AND DATA WAREHOUSING**	Course code :CO313	
This course will enable students to CO313.1: Define multi-dimensional data models. CO313.2: Explain rules related to association, classification and clustering analysis. CO313.3: Compare and contrast between different classification and clustering algorithms			
SUBJECT CODE:15CS664	**Subject : PYTHON APPLICATION PROGRAMMING**	**Course code :CO314**	

This course will enable students to

CO314.1:Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.

CO314.1:Demonstrate proficiency in handling Strings and File Systems.

CO314.1: Create, run and manipulate Python Programs using core data structures like Lists,Dictionaries and use Regular Expressions.

CO314.1: Interpret the concepts of Object-Oriented Programming as used in Python.

CO314.1: Implement exemplary applications related to Network Programming, Web Services and Databases in Python.

SUBJECT CODE: 15ISL67	Subject : SOFTWARE TESTING LABORATORY	Course code :CO317

This course will enable students to
CO317.1: Analyse the requirements for the given problem statement
CO317.2: Design and implement various solutions for the given problem
CO317.3: Employ various design strategies for problem solving.
CO317.4: Construct control flow graphs for the solution that is implemented
CO317.5: Create appropriate document for the software artefact

SUBJECT CODE: 15ISL68	Subject : FILE STRUCTURES LABORATORY WITH MINI PROJECT	Course code :CO318

This course will enable students to

CO318.1: Apply the concepts of Unix IPC to implement a given function.
CO318.2: Measure the performance of different file structures
CO318.3: Write a program to manage operations on given file system.
CO318.4: Demonstrate hashing and indexing techniques

7th Semester		
Subject code: 15CS71	Course code: CO401	Subject Name: Web technology and its applications

· Compose forms and tables using HTML and CSS
· Design Client-Side programs using JavaScript and Server-Side programs using PHP
· Infer Object Oriented Programming capabilities of PHP
· Examine JavaScript frameworks such as jQuery and Backbone

Subject code: 15IS72	Course code: CO402	Subject name: Software architecture and design patterns

· Learn How to add functionality to designs while minimizing complexity.
· What code qualities are required to maintain to keep code flexible?
· To Understand the common design patterns.
· To explore the appropriate patterns for design problems

Subject code: 15CS73	Course code: CO403	Subject Name: Machine Learning

· Define machine learning and problems relevant to machine learning.
· Differentiate supervised, unsupervised and reinforcement learning
· Apply neural networks; Bayes classifier and k nearest neighbor, for problems appear in machine learning.
· Perform statistical analysis of machine learning techniques.

Subject code: 15CS741	Course code: CO404	Subject Name: Natural language processing

· Learn the techniques in natural language processing.
· Be familiar with the natural language generation.
· Be exposed to Text Mining.
· Understand the information retrieval techniques

Subject code: 15CS753	Course code: CO405	Subject Name: Information management system

· Explain the Role of information management system in business
· Evaluate the role of the major types of information systems in a business environment and their relationship to each other

Subject code: 15CSL76	Course code: CO406	Subject Name: Machine Learning Laboratory

- Make use of Data sets in implementing the machine learning algorithms
- Implement the machine learning concepts and algorithms in any suitable language of choice.

Subject code: 15CSL77	Course code: CO407	Subject Name: Web technology laboratory with mini project

- Design and develop static and dynamic web pages.
- Familiarize with Client-Side Programming, Server-Side Programming, active server Pages.
- Learn Database Connectivity to web applications.
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Subject code: 15ISP78	Course code: CO408	Subject Name: Project Phase I + Seminar

- Identify a domain area.
- Identify a problem within the scope of the domain area.
- Perform literature survey.
- Record and summarize the results.
- Prepare requirement specification.
- Perform comparative study of the existing system and the implemented project.
- Select the field/topic for presentation.
- To perform literature survey.
- Record and summarize the application results with respect to the topic chosen.

8th Semester		
Subject code: 15CS81	**Course code: CO409**	**Subject Name: Internet of things technology**

· Assess the genesis and impact of IoT applications, architectures in real world.
· Illustrate diverse methods of deploying smart objects and connect them to network.
· Compare different Application protocols for IoT.
· Infer the role of Data Analytics and Security in IoT.
· Identify sensor technologies for sensing real world entities and understand the role of IoT in various domains of Industry.

Subject code: 15CS82	**Course code: CO410**	**Subject Name: Big data analytics**

· Understand Hadoop Distributed File system and examine MapReduce Programming
· Explore Hadoop tools and manage Hadoop with Ambari
· Appraise the role of Business intelligence and its applications across industries
· Assess core data mining techniques for data analytics
· Identify various Text Mining techniques

Subject code: 15CS832	**Course code: CO411**	**Subject Name: User interface design**

• To study the concept of menus, windows, interfaces
• To study about business functions
• To study the characteristics and components of windows and the various controls for the windows.
• To study about various problems in windows design with color, text, graphics.
• To study the testing methods

Subject code: 15IS84	**Course code: CO412**	**Subject Name: INTERNSHIP / PROFESSIONAL PRACTISE**

- Apply practical problem-solving project that involves an engineering design approach.
- Involve individual student effort.
- Lifelong learning of professional ethics

Subject code:15ISP85	**Course code: CO413**	**Subject Name: Project work Phase II**

- Code and Implement the project.
- Test the implemented project.
- Develop report on the process and procedure followed throughout the project.
- Design presentation.
- Demonstrate the project.

Subject code: 15IS86	**Course code: CO414**	**Subject Name: Seminar**

- Analyze the data collected during literature survey
- Design the presentation.
- Develop the report.
- Demonstrate the presentation.

Vidya Vikas Institute of Engineering & Technology, Mysuru.

Department of Electrical & Electronics Engineering

Program Outcomes

1.Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization 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 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 lifelong learning in the broadest context of technological change.

Program Specific OutcoEEs

PSO1: Analyze, design and provide an engineering solution in the areas related to Power, Energy & protection systems.

PSO2: Implement principles of analog and digital control schemes for various engineering applications using relevant software and hardware tools.

PSO3: Explore technical areas for innovative projects and seminars effectively as an individual or in a team for social and environmental benefits.

Electrical & Electronics Engineering 15 Scheme Syllabus

Course OutcoEEs

Course Outcomes of subjects from 3rd to 8th Semester (CBCS 15 Scheme)

Course Name	Engineering Mathematics - III	Course Code	15MAT31

1. Know the use of periodic signals and Fourier series to analyze circuits and system communications

2. Explain the general linear system theory for continuous-ties signals and digital signal processing using the Fourier Transform and z-transform.

3. Employ appropriate numerical Methods to solve algebraic and transcendental equations.

4. Apply Green's Theorem, Divergence Theorem and Stokes' theorem in various applications in the field of electro-magnetic and gravitational fields and fluid flow problems

5. Determine the externals of functional and solve the simple problems of the calculus of variations.

Course Name	Electrical Circuit Analysis	Course Code	15EE32

1. Apply knowledge of mathematics, science, and engineering to the analysis and design of electrical circuits.

2. Understand the microstructures of ferrous and non-ferrous materials to Mechanical properties.

3. Analyze the solution and infer the authenticity of it.

Course Name	Transformers and Generators	Course Code	15EE33

1. Explain the construction and operation and performance of transformers.

2. Explain different connections for the three phase operations, their advantages and applications.

3. Explain the construction and operation of Synchronous machines and evaluate the regulation of synchronous machines by different methods. Analyze the operation of the synchronous machine connected to infinite machine. Interpret behavior of pure substances and its applications to practical problems.

4. Analyze the operation of the synchronous machine connected to infinite machine.

Course Name	Analog Electronics Circuits	Course Code	15EE34

1. Utilize the characteristics of transistor for different applications.

2. Design and analyze biasing circuits for transistor

3. Design, analyze and test transistor circuitry as amplifiers and oscillators.

Course Name	Digital System Design	Course Code	15EE35

1.Design and analyze combinational & sequential circuits

2. Design circuits like adder, sub tractor, code converter etc.

3. Understand counters and sequence generators.

Course Name	Electrical & Electronic Measurements	Course Code	15EE36

1. Explain the importance of units and dimensions.

2. Measure resistance, inductance and capacitance by different methods.

3 Explain the working of various meters used for measurement of power and energy.

4. Explain the working of different electronic instruments and display devices.

Course Name	Electrical Machine Lab-I	Course Code	15EEL37

1. Conduct different tests on transformers and synchronous generators and evaluate their performance.

2. Connect and operate two single phase transformers of different KVA rating in parallel.

3.Connect single phase transformers for three phase operation and phase conversion.

4.Assess the performance of synchronous generator connected to infinite bus.

Course Name	Electronics Lab	Course Code	15EEL38

1. Design and test different diode circuits

2. Design and test amplifier and oscillator circuits and analyse their performance

3. Use universal gates and ICs for code conversion and arithmetic operations

4. Design and verify on of different counters.

Course NaEE	Engineering Mathematics - IV	Course Code	15MAT41

1. Solve first and second order ordinary differential equations arising in flow problems using single step and multistep nuEErical EEthods.

2. Understand the analyticity, potential fields, residues and poles of complex potentials in field theory and electromagnetic theory.

3. Describe conformal and bilinear transformation arising in aerofoil theory, fluid flow visualization and image processing.

4. Solve problems of quantum EEchanics, hydrodynamics and heat conduction by employing Bessel's function relating to cylindrical polar coordinate systems and Legendre's polynomials relating to spherical polar coordinate systems.

5. Solve problems on probability distributions relating to digital signal processing , information theory and optimization concepts of stability of design and structural engineering.

6. Draw the validity of the hypothesis proposed for the given sampling distribution in accepting or rejecting the hypothesis.

7. Determine joint probability distributions and stochastic matrix connected with the multivariable correlation problems for feasible random events.

8. Define transition probability matrix of a Markov chain and solve problems related to discrete paraEEter random process.

Course Name	Power Generation & Economics	Course Code	15EE42

1. Describe the working of hydroelectric, steam, nuclear power plants and state functions of major equipment of the power plants.

2. Classify various substations and explain the importance of grounding.

3. Understand the economic aspects of power system operation and its effects.

4. Explain the importance of power factor improvement.

Course Name	Course Code	15EE43

1. Explain the concepts of various methods of generation of power.

2. Explain the importance of HVAC, EHVAC, UHVAC and HVDC transmission.

3. Design and analyze overhead transmission system for a given voltage level.

4.Calculate the parameters of the transmission line for different configurations and assess the performance of line

5. Explain the use of underground cables and evaluate different types of distribution systems.

Course Name	Electric Motors	Course Code	15EE44

1. Explain the constructional features of Motors and select a suitable drive for specific application

2. Analyze and assess the performance characteristics of DC motors by conducting suitable tests and control the speed by suitable method.

3. Explain the constructional features of Three Phase and Single phase induction Motors and assess their performance.

4. Control the speed of induction motor by a suitable method.

5. Explain the operation of Synchronous motor and special motors.

Course Name	Electromagnetic Field Theory	Course Code	15EE45

1. Use different coordinate systems to explain the concept of gradient, divergence and curl of a vector.

2. Use Coulomb's Law and Gauss Law for the evaluation of electric fields produced by different charge configurations.

3. Calculate the energy and potential due to a system of charges.

4. Explain the behavior of electric field across a boundary between a conductor and dielectric and between two different dielectrics.

5. Explain the behavior of magnetic fields and magnetic materials.

6. Assess time varying fields and propagation of waves in different media.

Course Name	Operational Amplifiers & Linear IC's	Course Code	15EE46

1.Explain the basics of linear ICs.

2.Design circuits using linear Ics.

3.Demonstrate the application of Linear Ics.

4. Use ICs in the electronic projects.

Course Name	Electrical Machines Lab-II	Course Code	15EEL47

1.Test dc machines to determine their characteristics.

2. Control the speed of dc motor.

3. Pre-determine the performance characteristics of dc machines by conducting suitable tests.

4. Perform load test on single phase and three phase induction motor to assess its performance.

5.Conduct test on induction motor to pre-determine the performance characteristics.

6.Conduct test on synchronous motor to draw the performance curves.

Course Name	Operational Amplifiers & Linear IC's Lab	Course Code	15EEL48

1. To conduct experiment to determine the characteristic parameters of OP-Amp.

2. To design test the OP-Amp as Amplifier, adder, subtractor, differentiator and integrator.

3. To design test the OP-Amp as oscillators and filters.

4. Design and study of Linear IC's as multivibrator power supplies.

Course Name	ManageEEnt And Entrepreneurship	Course Code	15EE51

1. Explain the field of management, task of the manager, planning and the need of proper staff, recruitment and selection process.

2. Discuss work allocation, the structure of organization, the modes of communication and importance of managerial control in business.

3. To explain need of coordination between the manager and staff in exercising the authority and delegating duties.

4. To explain the social responsibility of business and leadership.

5. Explain the concepts of entrepreneurship and the role and importance of the entrepreneur in economic development.

6. Show an understanding of the role and importance of Small Scale Industries, business plan and its presentation.

7. Discuss the concepts of project management, capitol building process, project feasibility study, project appraisal and project financing.

8. Discuss the state /central level institutions / agencies supporting business enterprises.

Course Name	Microcontroller	Course Code	15EE52

1. Discuss the history of the 8051 and features of other 8051 family members and the internal architecture of the 8051.

2. Explains the use of an 8051 assembler, the stack and the flag register, loop, jump, and call instructions.

3. Discuss 8051 addressing modes, accessing data and I/O port programming, arithmetic, logic instructions, and programs.

4. Develop 8051C programs for time delay, I/O operations, I/O bit manipulation, logic and arithmetic operations, data conversion and data serialization

5. Discuss the hardware connection of the 8051 chip, its timers, serial data communication and its interfacing of 8051to the RS232.

6. Discuss in detail 8051 interrupts and writing interrupt handler programs

7. Interface 8051 with real-world devices such as LCDs and keyboards, ADC, DAC chips and sensors.

8. Interface 8031/51 with external memories, 8255 chip to add ports and relays, opt isolators and motors.

Course Name	Power Electronics	Course Code	15EE53

1. Explain application area of power electronics, types of power electronic circuits and switches their characteristics and specifications.

2. Explain types of power diodes, their characteristics, and the effects of power diodes on RL circuits.

3.Explain the techniques for design, operation and analysis of single phase diode rectifier circuits

4. Explain steady state, switching characteristics and gate control requirements of different power transistors and their limitations.

5. Discuss different types of Thyristors, their operation, gate characteristics and gate control requirements.

6.Explain designing, analysis techniques and characteristics of thyristor controlled rectifiers

7.Discuss the principle of operation of single phase and three phase DC - DC, DC –AC converters and AC voltage controllers.

Course Name	Signals And Systems	Course Code	15EE54

1. Classify the signals and systems. Explain basic operations on signals and properties of systems

2.Use convolution in both continuous and discrete domain for the analysis of systems given the impulse response of a system.

3. Evaluate response of a given linear time invariant system

4. Provide block diagram representation of a linear time invariant system.

5.Apply continuous time Fourier transform representation to study signals and linear time invariant systems.

6. Apply discrete time Fourier transform representation to study signals and linear time invariant systems

7.Use Z-transform and properties of Z transform for the analysis of discrete time systems.

Course Name	Estimating & Costing	Course Code	15EE553

1. Explain the purpose of estimation and costing.

2. Discuss market survey, estimates, purchase enquiries, preparation of tenders, comparative statements and payment of bills.

3. Discuss Indian Electricity act and Indian Electricity rules.

4. Discuss distribution of energy in a building, wiring and methods of wiring, cables used in internal wiring, wiring accessories and fittings, fuses and types of fuses.

5. Discuss design of lighting points and its number, total load, sub-circuits, size of conductor.

6. Discuss types of service mainsand estimation of service mains and power circuits.

7. Discuss estimation of overhead transmission and distribution system and its components.

8. Discuss main components of a substation, preparation of single line diagram of a substation and earthing of a substation.

Course Name	Programmable Logic Controller	Course Code	15EE562

1. Discuss history of PLC, its sequence of operation, advantages and disadvantages, main parts and their functions.

2. Describe the hardware components of PLC: I/O modules, CPU, memory devices, other support devices, operating modes and PLC programming.

3. Describe field devices Relays, Contactors, Motor Starters, Switches, Sensors, Output Control Devices, Seal-In Circuits, and Latching Relays commonly used with I/O module.

4. Convert relay schematics and narrative descriptions into PLC ladder logic programs

5. Analyze PLC timer and counter ladder logic programs

6. Describe the operation of different program control instructions

7. Discuss the execution of data transfer instructions, data compare instructions and the basic operation of PLC closed-loop control system.

8. Describe the operation of mechanical sequencers, bit and word shift registers, processes and structure of● control systems and communication between the processes.

Course Name	Renewable Energy Sources	Course Code	15EE563

1. Discuss causes of energy scarcity and its solution, energy resources and availability of renewable energy.

2. Discuss energy from sun, energy reaching the Earth's surface and solar thermal energy applications.

3. Discuss types of solar collectors, their configurations, solar cell system, its characteristics and their applications.

4. Discus generation of energy from hydrogen, wind, geothermal system, solid waste and agriculture refuse

5. Discuss production of energy from biomass, biogas

6. Discuss tidal energy resources, energy availability and power generation

7. Discuss power generation sea wave energy and ocean thermal energy

Course Name	Microcontroller Lab	Course Code	15EEL57

1. Write assembly language programs for data transfer, arithmetic, Boolean and logical instructions.

2. Write ALP for code conversions.

3. Write ALP using subroutines for generation of delays, counters, configuration of SFRs for serial communication and timers.

4. Perform interfacing of stepper motor and dc motor for controlling the speed.

5. Generate different waveforms using DAC interface

6. Work with a small team to carryout experiments using microcontroller concepts and prepare reports that present lab work.

Course NaEE	Powerc Electronics Lab	Course Code	15EEL58

1. Obtain static characteristics of semiconductor devices to discuss their performance.

2. Trigger the SCR by different methods.

3. Verify the performance of single phase controlled full wave rectifier and AC voltage controller with R and RL loads.

4. Control the speed of a dc motor, universal motor and stepper motors.

5. Verify the performance of single phase full bridge inverter connected to resistive load.

6. Perform commutation of SCR by different methods.

Course Name	Control System	Course Code	15EE61

1. Discuss the effects of feedback and types of feedback control systems.

2. Evaluate the transfer function of a linear time invariant system.

3. Evaluate the stability of linear time invariant systems.

4. Apply block diagram manipulation and signal flow graph methods to obtain transfer function of systems.

5. Demonstrate the knowledge of mathematical modeling of control systems and components.

6. Determine transient and steady state time response of a simple control system.

7. Investigate the performance of a given system in time and frequency domains.

8. Discuss stability analysis using Root locus, Bode plots and Nyquist plots.

9. Determine the controller or compensator configuration and parameter values relative to how it is connec ted to the controlled process given the design specifications.

Course Name	Power System Analysis - I	Course Code	15EE62

1. Show understanding of per unit system, its advantages and computation.

2. Show the concept of one line diagram and its implementation in problems.

3. Perform short circuit analysis on a synchronous machine and simple power system to select a circuit breaker for the system.

4. Evaluate symmetrical components of voltages and currents in un-balanced three phase circuits.

5. Explain the concept of sequence impedance and sequence networks of power system components and power system.

6. Analyze three phase synchronous machine and simple power systems for different unsymmetrical faults using symmetrical components.

7. Discuss the dynamics of synchronous machine, stability and types of stability

8. Discuss equal area criterion for the evaluation of stability of a simple system under different fault conditions.

Course Name	Digital Signal Processing	Course Code	15EE63

1. Compute the DFT of various signals using its properties and linear filtering of two sequences.

2. Apply fast and efficient algorithms for computing DFT and inverse DFT of a given sequence

3. Design infinite impulse response Butterworth digital filters using impulse invariant / bilinear transformation technique.

4. Design infinite impulse response Chebyshev digital filters using impulse invariant or bilinear transformation technique.

5. Realize a digital IIR filter by direct, cascade, parallel and ladder methods of realization

6. Discuss different window functions and frequency sampling method used for design of FIR filters

7. Design FIR filters by use of window function or by frequency sampling method.

8. Realize a digital FIR filter by direct, cascade, and linear phase form.

Course Name	Electrical Machine Design	Course Code	15EE64

1.Discuss design factors, limitations, modern trends in design, manufacturing of electrical machines and properties of materials used in the electrical machines.

2. Derive the output equations of transformer, DC machines and AC machines.

3.Discuss selection of specific loadings and magnetic circuits of different electrical machines.

4. Design the field windings of DC machine and Synchronous machine.

5. Design stator and rotor circuits of a DC and AC machines.

6. Estimate the number of cooling tubes, no load current and leakage reactance of core type transformer.

7. Discuss short circuit ratio and its effects on performance of synchronous machines.

8. Design salient pole and non-salient pole alternators for given specifications.

Course Name	Computer Aided Electrical Drawing	Course Code	15EE651

1. Discuss the terminology and types of DC and AC armature windings.

2. Develop armature winding diagram for DC and AC machines.

3. Develop a layout for substation using the standard symbols for substation equipment.

4.Draw sectional views of core and shell types transformers using the design data.

5. Draw sectional views of assembled DC machine or its parts using the design data or the sketches.

6. Draw sectional views of assembled alternator or its parts using the design data or the sketches.

Course Name	Sensors & Transducers	Course Code	15EE662

1.Discuss need of transducers, their classification, advantages and disadvantages.

2.Show an understanding of working of various transducers and sensors

3.Discuss recent trends in sensor technology and their selection

4. Discuss basics of signal conditioning and signal conditioning equipment

5. Discuss configuration of Data Acquisition System and data conversion.

6. Show knowledge of data transmission and telemetry.

7.Explain measurement of non-electrical quantities -temperature, flow, speed, force, torque, power and

viscosity.

Course Name	Control System Lab	Course Code	15EEL67

1. Use software package or discrete components in assessing the time and frequency domain reposes of a given second order system.

2. Design and analyze Lead, Lag and Lag – Lead compensators for given specifications.

3.Determine the performance characteristics of ac and dc servomotors and synchro-transmitter receiver pair used in control systems.

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.

5. Write a script files to plot root locus, bode plot, Nyquist plots to study the stability of the system using a software package.

6. Work with a small team to carryout experiments and prepare reports that present lab work.

Course Name	Digital Signal Processing Lab	Course Code	15EEL68

1. Give physical interpretation of sampling theorem in time and frequency domains.

2. Evaluate the impulse response of a system.

3.Perform convolution of given sequences to evaluate the response of a system.

4.Compute DFT and IDFT of a given sequence using the basic definition and/or fast methods.

5.Provide a solution for a given difference equation.

6. Design and implement IIR and FIR filters.

7. Conduct experiments using software and prepare reports that present lab work.

Course Name	Power System Analysis - II	Course Code	15EE71

1. Discuss optimal scheduling for hydro-thermal system, power system security and reliability.

2. Analyze short circuit faults in power system networks using bus impedance matrix.

3. Perform numerical solution of swing equation for multi-machine stability.

Course Name	Power System Protection	Course Code	15EE72

1. Discuss performance of protective relays, components of protection scheme and relay terminology overcurrent protection.

2. Explain the working of distance relays and the effects ofarc resistance, power swings, line length and source impedance on performance of distance relays.

3. Discuss pilot protection; wire pilot relaying and carrier pilot relaying

4. Discuss construction, operating principles and performance of differential relays for differential protection.

5. Discuss protection of generators, motors, Transformer and Bus Zone Protection.

6. Explain the principle of circuit interruption in different types of circuit breakers.

7. Describe the construction and operating principle of different types of fuses and to give the definitions of different terminologies related to a fuse.

8. Discuss protection against Overvoltages and Gas Insulated Substation (GIS).

Course Name	High Voltage Engineering	Course Code	15EE73

1. Explain conduction and breakdown phenomenon in gases, liquid dielectrics.

2. Explain breakdown phenomenon in solid dielectrics.

3. Explain generation of high voltages and currents.

4. Discuss measurement techniques for high voltages and currents.

5. Discuss overvoltage phenomenon and insulation coordination in electric power systems.

6. Discuss non-destructive testing of materials and electric apparatus andhigh-voltage testing of electric apparatus

Course Name	Advanced Control System	Course Code	15EE741

1. Discuss state variable approach for linear time invariant systems in both the continuous and discrete time systems.

2. Develop of state models for linear continuous – time and discrete – time systems

3.Apply vector and matrix algebra to find the solution of state equations for linear continuous – time and discrete – time systems.

4. Define controllability and observability of a system and test for controllability and observability of a given system.

5. Design pole assignment and state observer using state feedback.

6. Develop the describing function for the nonlinearity present to assess the stability of the system.

7. Develop Lyapunov function for the stability analysis of nonlinear systems.

Course Name	Advanced Control System	Course Code	15EE742

1. Discuss electric heating, air-conditioning and electric welding. Explain laws of electrolysis, extraction and refining of metals and electro deposition.

2. Explain the terminology of illumination, laws of illumination, construction and working of electric• lamps.

3. Design interior and exterior lighting systems- illumination levels for factory lighting- flood lighting street lighting.

4. Discuss systems of electric traction, speed time curves and mechanics of train movement.

5. Explain the motors used for electric traction and their control.

6. Discuss braking of electric motors, traction systems and power supply and other traction systems.

7. Explain the working of electric and hybrid electric vehicles.

Course Name	Testing and commissioning of power system apparatus	Course Code	15EE752

1 Describe the process to plan, control and implement commissioning of electrical equipment's.

2. Differentiate the performance specifications of transformer and induction motor.

3. Demonstrate the routine tests for synchronous machine, induction motor, transformer & switchgears.

4. Describe corrective and preventive maintenance of electrical equipment's.

5. Explain the operation of an electrical equipment's such as isolators, circuit breakers, induction motor and synchronous machines.

Course Name	Power system simulation laboratory	Course Code	15EEL76

1. Develop a program in MATLAB to assess the performance of medium and long transmission lines.

2.Develop a program in MATLAB to obtain the power angle characteristics of salient and non-salient pole alternator.

3. Develop a program in MATLAB to assess the transient stability under three phase fault at different locations in a of radial power systems.

4. Develop programs in MATLAB to formulate bus admittance and bus impedance matrices of interconnected power systems.

5. Use Mi-Power package to solve power flow problem for simple power systems

6. Use Mi-Power package to study unsymmetrical faults at different locations in radial power systems

7. Use of Mi-Power package to study optimal generation scheduling problems for thermal power plants.

Course Name		Course Code	15EEL77

1. Experimentally verify the characteristics of over current, over voltage, under voltage and negative sequence relays both electromagnetic and static type

2. Experimentally verify the characteristics of microprocessor based over current, over voltage, under voltage relays and distance relay.

3. Show knowledge of protecting generator, motor and feeders.

4. Analyze the spark over characteristics for both uniform and non-uniform configurations using High AC and DC voltages.

5. Measure high AC and DC voltages and breakdown strength of transformer oil

6. Draw electric field and measure the capacitance of different electrode configuration models

7.Show knowledge of generating standard lightning impulse voltage to determine efficiency, energy of• impulse generator and 50% probability flashover voltage for air insulation

Course Name	Power system operation and control	Course Code	15EE81

1. Describe various levels of controls in power systems, the vulnerability of the system,components, architecture and configuration of SCADA.

2. Solve unit commitment problems.

3. Explain issues of hydrothermal scheduling and solutions to hydro thermal problems.

4. Explain basic generator control loops, functions of Automatic generation control, speed governors.

5. Develop and analyze mathematical models of Automatic Load Frequency Control.

6. Explain automatic generation control, voltage and reactive power control in an interconnected power system.

7. Explain reliability, security, contingency analysis, state estimation and related issues of power systems

Course Name	Course Code	15EE82

1. Explain the advantages and choice of electric drive.

2. Explain dynamics and different modes of operation of electric drives.

3. Suggest a motor for a drive and control of dc motor using controlled rectifiers.

4. Analyze the performance of induction motor drives under different conditions.

5. Control induction motor, synchronous motor and stepper motor drives.

6. Suggest a suitable electrical drive for specific application in the industry.

Course Name	Operation and maintenance of solar electric systems	Course Code	15EE835

1. Discuss basics of solar resource data, its acquisition and usage.

2. Explain PV technology, buying the PV modules and connecting the modules to form arrays.

3.Explain the use of inverters, other system components, cabling used to connect the components and mounting methods of the PV system.

4. Assess the site for PV system installation.

5. Design a grid connected system and compute its size.

6. Explain installation, commissioning, operation and maintenance of PV systems.

7. Explain the types of financial incentives available, calculation of payback time.

Course Name	Internship / professional practice	Course Code	15EE84

1. Gain practical experience within industry in which the internship is done.

2. Acquire knowledge of the industry in which the internship is done.

3. Apply knowledge and skills learned to classroom work.

4. Develop a greater understanding about career options while more clearly defining personal career goals.

5 Experience the activities and functions of professionals.

6. Develop and refine oral and written communication skills.

7. Identify areas for future knowledge and skill development

8. Expand intellectual capacity, credibility, judgment, intuition.

9. Acquire the knowledge of administration, marketing, finance and economics.

Course Name	Internship / professional practice	Course Code	15EE84

1. Present the project and be able to defend it.
2. Make links across different areas of knowledge and to generate, develop and evaluate ideas and information so as to apply these skills to the project task.
3. Habituated to critical thinking and use problem solving skills.
4. Communicate effectively and to present ideas clearly and coherently in both the written and oral forms.
5. Work in a team to achieve common goal.
6. Learn on their own, reflect on their learning and take appropriate actions to improve it.