

**Faculty of Engineering & Technology**  
**KAKATIYAUNIVERSITY, WARANGAL - 506009**  
**Department of Electrical & Electronics Engineering**

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**Vision:**

To be nationally and internationally recognized in providing Electrical and Electronics Engineering education and training candidates to become well-qualified engineers who are capable of addressing the challenges and making valuable contributions to their profession and carrying out higher studies successfully.

**Mission:**

- To offer high quality education in the field of Electrical and Electronics Engineering, to train students to be successful both in professional career as well as higher studies and to promote excellence in teaching, research, collaborative activities and contributions to the society.
- To promote inter disciplinary innovative techniques in the field of Electrical and Electronics Engineering with the help of state of art curricula.
- To impart practical training to face real life case studies and ensure engineering education an enjoyable learning experience through challenging tutorials, mini-projects, assignments and laboratory exercises.
- To strengthen and update the laboratory facilities to meet the advanced technology.
- To build project team spirit for professional working environment with high ethical values.

**Program Education Objectives:**

- ❖ To educate students with analytical and design skills in Electrical and Electronics Engineering applicable to power generation, transmission and distribution systems.
- ❖ To strengthen the basic knowledge in mathematical science and applied science with orientation in engineering applications.
- ❖ To develop overall personality and character with team spirit, professionalism, integrity, moral and ethical values with the support of humanities, social sciences and physical educational courses.
- ❖ To equip the students with laboratory training leading to solving real life practical problems and project analysis of Electrical appliances through hands on practice, case-studies, seminars, mini-projects, internships and main projects.

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**B.Tech (EEE), III-SEMESTER**

Sl. No.	Category	Course Code	Course Title	Period/Week			Credits
				L	T	P	C
1	BSC	BSC105	Mathematics - III	3	0	0	3
2	PCC	EE211	Electrical Circuits - I	3	1	0	4
3	PCC	EE212	Electrical Machines - I	3	1	0	4
4	PCC	EE213	Power Systems -I	3	1	0	4
5	PCC	EE214	Electromagnetic Fields	3	1	0	4
6	PCC	EE215	Analog Electronics	3	0	0	3
7	PCC	EE216L	Analog Electronics Laboratory	0	0	2	1
8	PCC	EE217L	Computer Aided Electrical Drawing Laboratory	0	0	2	1
9	MC	MC210	Environmental Sciences	2	0	0	0
			<b>TOTALCREDITS</b>	<b>20</b>	<b>5</b>	<b>4</b>	<b>24</b>

[L = Lectures, T = Tutorials, P = Practical, C = Credits]

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B. Tech. (EEE), III – Semester (BSC-105)  
**MATHEMATICS-III**  
**(Statistics, Probability & Numerical Techniques)**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	0	0	3	External Marks: 70

**Course Objectives:**

- Apply general methodology to solve linear first order and second order partial differential equations with applications in engineering.
- To provide an overview of probability and statistics to engineers.
- To study the classification of second order partial differential equations and solve them by using separation of variables methods.
- To introduce a few numerical methods to solve non-linear equations and system of linear equations.
- To provide the necessary basic concepts of numerical differentiation, numerical integration and differential equations.

**Course Outcomes:**

After completing this course, the student will be able to:

- ✓ Solve field problems in engineering involving PDEs.
- ✓ They can also formulate and solve problems involving random variables and apply Statistical methods for analyzing experimental data.
- ✓ Find solutions of the heat equation, wave equation, and the Laplace equation subject to boundary conditions.
- ✓ Solve non-linear equations, system of linear equations and differential equations numerically.
- ✓ Perform numerical differentiation and numerical integration.

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B. Tech. (EEE), III – Semester (MC – 210)

**ENVIRONMENTAL SCIENCES**

Teaching Scheme				Examination Scheme	
L	T	P	C	CIE	ESE
0	0	2	0	30 Marks	70 Marks

**Course Objectives:**

- To create awareness and impart basic knowledge about the environment and its allied problems.
- To know the functions of ecosystems.
- To understand importance of biological diversity.
- To study different pollution and their impact on environment.
- To know social and environment related issues and their preventive measures.

**Course Outcomes:**

After completing this course, the student will be able to:

1. Adopt environmental ethics to attain sustainable development.
2. Develop an attitude of concern for the environment.
3. Conservation of natural resources and biological diversity.
4. Creating awareness of green technologies for nation's security.
5. Imparts awareness for environmental laws and regulations.

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B. Tech. (EEE) III – Semester (EE-211)

**ELECTRICAL CIRCUITS – I**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	1	0	4	External Marks: 70

**Course Objectives:**

- To inculcate the basic concepts of Electrical Engineering in terms of KCL, KVL, Mesh, and Nodal Analysis.
- To inculcate among the students about the representation of 1- $\phi$  AC parameters and concept resonance in Electrical circuits.
- To introduce the application of network theorems in electrical circuits analysis.
- To introduce the basic concepts of 3- $\phi$  Circuits and the relations between line and phase quantities for star, delta connections, and also importance of mutual inductance between the inductive coils.
- To obtain output response of circuits in transient periods.

**Course Outcomes:**

At the end of the course students will be able to

1. Familiar about the minimum basics of Electrical parameters.
2. Analyze the Single phase AC circuits and their applications.
3. Analyze network theorems in electrical circuit's analysis.
4. Familiar about Three phase circuits and their mathematical relations.
5. Obtain the transient response of basic circuits.

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B. Tech. (EEE), III-Semester (EE-212)

**ELECTRICAL MACHINES-I**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	1	0	4	External Marks: 70

**Course Objectives:**

- To understand the concepts of electromechanical energy conversion with magnetic circuits.
- To understand electrical principle, laws, and working of DC machines.
- To understand the construction and characteristics and application of various types of DC generators and motors.
- To understand the characteristics, applications and speed control methods of DC motors.
- To measure the losses, Testing, and Efficiency of DC Machines.

**Course Outcomes:**

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

1. Analyze the electromechanical energy conversion with magnetic circuits.
2. Understand electrical principle, laws, and working of DC machines.
3. Understand the construction and characteristics and application of various types of DC generators.
4. Knows the construction, characteristics and application of various types of DC motors and Testing of motors.
5. To measure the performance of DC Machines.

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B. Tech. (EEE) III – Semester (EE-213)

**POWER SYSTEMS-I**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	1	0	4	External Marks: 70

**Course Objectives:**

The course is designed...

- To understand the economics power generation and power distribution system.
- To study the description of steam and hydel power stations.
- To understand the power generation with Nuclear Power Plants and various non-conventional energy sources.
- To understand the design concepts of transmission lines and cables.
- To estimate the inductance and capacitance of Transmission Lines.

**Course Outcomes:**

After successful completion of the course the students will be able to...

1. Acquire the knowledge of economics of power generation and structure of power distribution systems.
2. Well aware of steam and hydel power generation.
3. Understand nuclear power generation and the importance of non-conventional energy sources.
4. Acquire knowledge regarding the design concepts of Transmission lines and cables.
5. Analyze the inductance and capacitance of transmission lines.

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B. Tech. (EEE) III–Semester (EE-214)

**ELECTROMAGNETIC FIELDS**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	1	0	4	External Marks:70

**Course Objectives:**

- Review of Vector Calculus
- Application and apply the various laws of static electrical and magnetic fields
- Understand the time varying the electrical and magnetic fields
- Understand the propagation of EM waves.

**Course Outcomes:**

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

1. Understand the vector calculus for electromagnetism.
2. Obtain the electric fields for simple configurations under static conditions.
3. Analyses and apply the static magnetic fields.
4. Understand Maxwell's equation in different forms and different media.
5. Understand the propagation of EM waves.



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B. Tech. (EEE) III – Semester (EE-215)

**ANALOG ELECTRONICS**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	0	0	3	External Marks: 70

**Course Objectives:**

The course is designed...

- To study the characteristics of diode in forward and reverse bias and applications of diodes.
- To describe the construction and working of Bipolar Junction Transistor in various modes and JFET.
- To Familiarize with feedback concepts and identify various types of feedback amplifiers.
- To study the importance of power amplifiers and Oscillators.
- To understand the operation and applications of Op-amps.

**Course Outcomes:**

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

1. Interpret the characteristics and apply diode models to analyze various applications of diodes.
2. Discriminate the BJT configurations to recognize appropriate transistor configuration for any given application and design the biasing circuits with good stability.
3. Analyses and compare feedback amplifiers.
4. Distinguish various classes of Power Amplifiers.
5. Analyses the operation of OP AMP and its applications.

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B. Tech. (EEE) III-Semester (EE-216L)

**ANALOG ELECTRONIC LABORATORY**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 25
0	0	2	1	External Marks: 50

**Course Objectives:**

- Designing basic circuits of rectification with and without filters using diodes
- Designing wave shaping circuit using diodes.
- Designing of single and multistage amplifier circuits.
- Demonstrate negative feedback in amplifier circuits and positive feedback in Oscillators.
- Design of Integrator and Differentiator controllers.

**Course Outcomes:**

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

1. Calculate ripple factor, efficiency and % regulation of rectifier circuits
2. Analyses feedback amplifiers and op-amp oscillator circuits
3. Design single, and multi-stage amplifier, wave shaping and controller circuits
4. Understand the characteristics of electronics devices
5. Design of Integrator and Differentiator using op-amps.

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B. Tech. (EEE) III–Semester (EE-217L)

**COMPUTER AIDED ELECTRICAL DRAWING LABORATORY**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 25
0	0	2	1	External Marks: 50

**Course Objectives:**

- Identify and draw different components of electrical systems.
- Draw different control and wiring diagrams.
- Draw winding diagrams of electrical machines.
- Draw different starter diagrams of A.C and D.C machines.
- Acquire knowledge on various Electrical Engineering Soft wares.

**Course Outcomes:**

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

1. Identify and draw different components of electrical systems.
2. Draw different control and wiring diagrams.
3. Draw winding diagrams of electrical machines.
4. Draw different starter diagrams of A.C and D.C machines.
5. Acquire knowledge on various Electrical Engineering Soft wares.

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**B.Tech (EEE), IV–SEMESTER**

Sl. No.	Category	Course Code	Course Title	Periods/Week			Credits
				L	T	P	C
1	PCC	EE221	Electrical Circuits - II	3	1	0	4
2	PCC	EE222	Electrical Machines - II	3	1	0	4
3	PCC	EE223	Power System - II	3	1	0	4
4	PCC	EE224	Power Electronics	3	1	0	4
5	PCC	EE225	Digital Electronics and Logic Design	3	0	0	3
6	PCC	EE226L	Electrical Circuits Laboratory	0	0	2	1
7	PCC	EE227L	Electrical Machines Laboratory - I	0	0	2	1
8	PCC	EE228L	Digital Electronics and Logic Design Laboratory	0	0	2	1
9	MC	MC-220	Constitution of India	2	0	0	0
			<b>TOTAL CREDITS</b>	<b>17</b>	<b>4</b>	<b>6</b>	<b>22</b>

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B. Tech. (EEE), IV–Semester (MC-210)

**CONSTITUTION OF INDIA**

Course code	MC				
Category	Mandatory Course				
Course Title	CONSTITUTION OF INDIA				
Scheme and Credits	L	T	P	Credits	Internal marks = 30
	2	0	0	0	External Marks = 70

**Course Objectives:**

This course is designed to...

- Understand the premises informing the twin themes of liberty and freedom from a civil rights perspective.
- To address the growth of Indian opinion regarding modern Indian intellectuals' constitutional role and entitlement to civil and economic rights as well as the emergence of nationhood in the early years of Indian nationalism.
- To address the role of socialism in India after the commencement of the Bolshevik Revolution in 1917 and its impact on the initial drafting of the Indian Constitution.

**Course Outcomes:**

Students will be able to...

- ✓ Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
- ✓ Discuss the intellectual origins of the framework of argument that informed the Conceptualization of social reforms leading to revolution in India.
- ✓ Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution
- ✓ Discuss the passage of the Hindu Code Bill of 1956.

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B. Tech. (EEE) IV–Semester (EE-221)

**ELECTRICAL CIRCUITS - II**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	1	0	4	External Marks: 70

**Course Objectives:**

The course is designed...

1. To introduce the importance of Fourier Series in Electrical circuit analysis.
2. To inculcate the applications of Laplace transforms and their importance in Electrical circuits analysis and Synthesis
3. To introduce the needs and applications of two port network parameters.
4. To import the topological concepts in network analysis.
5. To introduce the concepts of network functions and their importance in network synthesis.

**Course Outcomes:**

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

1. Analyze the performance of Electrical circuits using Fourier Series expansion.
2. Analyze the Electrical circuits using Laplace transforms.
3. Analyze and obtain the performance of Two-Port networks.
4. Obtain the equivalent topological representation and analyses the electrical circuits.
5. Synthesize the network performance using their network functions.

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B. Tech. (EEE) IV–Semester (EE-222)

**ELECTRICAL MACHINES - II**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	1	0	4	External Marks: 70

**Course Objectives:**

The course is designed...

- To describe the features and applications of single phase transformers.
- To study the operation and applications of Three phase transformers
- To study the construction, principle of operation, performance characteristics and testing of Three phase induction motor.
- To understand the starting and speed control methods of three phase induction motor.
- To inculcate the types and applications of single phase motors.

**Course Outcomes:**

After completing this course, the student will be able to...

1. Explain the rating, testing and applications of single phase, three phase transformers
2. Acquire the knowledge of Rotating magnetic field theory, Double field revolving theory
3. Develop equivalent circuit diagram of transformer, three phase induction motor and single phase induction motor.
4. Develop Slip-torque characteristics of single phase and three phase induction motors
5. Demonstrate knowledge of Starting methods, Speed control methods and applications of single and three phase induction motors.

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B. Tech. (EEE) IV–Semester (EE-223)

**POWER SYSTEMS - II**

Teaching Scheme				Examination Scheme	
L	T	P	C	Internal Marks	External Marks
3	1	0	4	30	70

**Course Objectives:**

To expose the students to...

- Learn and understand the types of transmission lines and their applications.
- Comprehend the analysis of symmetrical and unsymmetrical faults in the power system.
- Inculcate the various voltage control components and techniques.
- Travelling wave theory concepts in power sector.

**Course Outcomes:**

On successful completion of the course, the students would be able to...

1. Acquire modeling of different short, medium and long transmission lines.
2. Understand the impact of different types of faults on overhead transmission lines and Calculation of fault currents and their significance.
3. Explain the reasons for voltage variation, importance of maintaining constant voltage in Power system and different voltage control methods.
4. Acquire the knowledge of natural impedance of transmission line and significance in the operation of power system network.



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B. Tech. (EEE) IV–Semester (EE-224)

**POWER ELECTRONICS**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	1	0	4	External Marks: 70

**Course Objectives:**

The course is designed...

1. Understand the characteristics and performance of various power electronic devices.
2. Analyze single and three phase controlled rectifier circuits.
3. Understand choppers circuits and AC voltage controllers
4. Understand the performance of single phase and three phase inverter circuits.

**Course Outcomes:**

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

1. Understand the characteristics and performance of various power electronic devices.
2. Analyze single and three phase controlled rectifier circuits.
3. Understand choppers circuits and AC voltage controllers
4. Understand the performance of single-phase inverter circuits.
5. Analyze the operation of three phase voltage source inverters.

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B. Tech. (EEE) IV–Semester (EE-225)

**DIGITAL ELECTRONICS AND LOGIC DESIGN**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	0	0	3	External Marks: 70

**Course Objectives:**

The course is designed...

1. To learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems.
2. To understand common forms of number representation in digital electronic circuits and to be able to convert between different representations.
3. To implement and design logical operations using combinational logic circuits and sequential logic circuits.
4. To impart to student the concepts of sequential circuits, enabling them to analyze sequential systems in terms of state machines.
5. To implement synchronous state machines using flip-flops.

**Course Outcomes:**

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

- ✓ Understand working of logic families and logic gates.
- ✓ Design and implement Combinational and Sequential logic circuits.
- ✓ Understand the process of Analog to Digital conversion and Digital to Analog conversion.
- ✓ Use PLDs to implement the given logical problem.

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B. Tech. (EEE) IV–Semester (EE-226L)

**ELECTRICAL CIRCUITS LABORATORY**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 25
0	0	2	1	External Marks: 50

**Course Objectives:**

The course is designed...

- To inculcate the practical analysis of Electrical circuits in terms of KCL, KVL, Mesh, and Nodal Analysis.
- To Train the Students for acquiring practical knowledge in time response and frequency Response of series / parallel RC, RL and RLC Circuits.
- To prepare the students to find out parameters of a given two port networks.
- To make the students for understanding the practical verification of theorems in electrical circuit analysis.
- To introduce the basic concepts of 3- $\phi$  Circuits and the relations between line and phase quantities for star and delta connections.

**Course Outcomes:**

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

1. Familiar about the basics of Electrical circuit analysis and practical verification of results.
2. Able to validate the network theorems in electrical circuit's analysis.
3. Able to find various parameters of a two-port network.
4. Familiar about Three phase circuits and their mathematical relations.
5. Able to obtain the transient response of basic circuits.

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B. Tech. (EEE) IV–Semester (EE-227L)

**ELECTRICAL MACHINES LABORATORY - I**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 25
0	0	2	1	External Marks: 50

**Course Objectives:**

The course is designed...

- To expose the students to the operation of DC Generator
- To expose the students to the operation of DC Motor.
- To examine the self-excitation in DC generators.
- To examine the testing of DC Machines.

**Course Outcomes:**

After completion of this lab the students will be able to...

- ✓ Start and control the Different DC Machines.
- ✓ Assess the performance of different machines using different testing methods
- ✓ Identify different conditions required to be satisfied for self - excitation of DC Generators.
- ✓ Separate iron losses of DC machines into different components.

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B. Tech. (EEE) IV–Semester (EE-228L)

**DIGITAL ELECTRONICS AND LOGIC DESIGN LABORATORY**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 25
0	0	2	1	External Marks: 50

**Course Objectives:**

The course is designed...

- To learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems.
- To understand common forms of number representation in digital electronic circuits and to be able to convert between different representations.
- To implement and design logical operations using combinational logic circuits and sequential logic circuits.
- To impart to student the concepts of sequential circuits, enabling them to analyze sequential systems in terms of state machines.
- To implement synchronous state machines using flip-flops.

**Course Outcomes:**

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

- ✓ Understand working of logic families and logic gates.
- ✓ Design and implement Combinational and Sequential logic circuits.
- ✓ Understand the process of Analog to Digital conversion and Digital to Analog conversion.
- ✓ Use PLDs to implement the given logical problem.

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**B.Tech (EEE), V-SEMESTER**

S. No.	Course Code	Course Title	Scheme of Instruction			Lectures/ week	Scheme of Examination		Credits
			L	T	P		H	CIE	
1	PC3101EE	Linear Control Systems	3	1	0	4	30	70	4
2	PC3102EE	Electrical Machines-III	3	1	0	4	30	70	4
3	PC3103EE	Linear IC Applications	3	0	0	3	30	70	3
4	PE-I	Professional Elective-I	3	0	0	3	30	70	3
5	PC3107EE	Measurements and Instrumentation	3	1	0	4	30	70	4
6	HSMC3108	Managerial Economics and Accountancy	3	0	0	3	30	70	3
8	PC3109EE	Electrical Machines-II Laboratory	0	0	2	2	25	50	1
10	PC3110EE	Measurements and Instrumentation Laboratory	0	0	2	2	25	50	1
		<b>Total</b>	<b>18</b>	<b>3</b>	<b>4</b>	<b>25</b>	<b>230</b>	<b>520</b>	<b>23</b>

[L = Lectures, T = Tutorials, P = Practical, C = Credits]

**PE-I    Course Code    Professional Elective-I**

1.    PE3104EE    Utilization of Electrical Energy
2.    PE3105EE    High Voltage Engineering
3.    PE3106EE    Electric Machine Design

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B. Tech. (EEE) V–Semester (PC3101EE)

**LINEAR CONTROL SYSTEMS**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	1	0	4	External Marks: 70

**Course Objectives:**

The course will introduce the students...

- To inculcate the basic needs of control systems and their classifications based on applications in modern technology.
- About various control system components and tools.
- To measure the performance of physical systems using stability analysis.
- About the importance of control system analysis and design methods.
- To understand and develop the state space representation of control systems.

**Course Outcomes:**

After completing this course, the student will be able to...

- ✓ Understand the concept of control systems, feedback, Mathematical modeling of Electrical and Mechanical systems.
- ✓ Explain the time domain and frequency response analysis of control systems.
- ✓ Acquire the knowledge of various analytical techniques used to determine the stability of control systems.
- ✓ Able to understand the importance of design of compensators.
- ✓ Able to demonstrate controllability and observability of modern control systems.

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B. Tech. (EEE), V–Semester (PC3102EE)

**ELECTRICAL MACHINES-III**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	1	0	4	External Marks: 70

**Course Objectives:**

The course will introduce the students...

- To study the construction, working principle, performance characteristics and testing of Synchronous machine.
- To study the characteristics of Synchronous generator and its applications.
- To analyze the parallel operation of synchronous machines.
- To understand the concept of circle diagrams of synchronous motor.
- To understand the construction, principle and performance characteristics of fractional Horse power motors.

**Course Outcomes:**

After completing this course, the student will be able to...

1. Explain the rating, testing and applications of Synchronous Generator, Synchronous Motors.
2. Acquire the knowledge of Parallel operation of Synchronous machines.
3. Develop equivalent circuit diagram of transformer, three phase induction motor and single-phase induction motor.
4. Develop Slip-torque characteristics of single phase and three phase induction motors.
5. Demonstrate knowledge of Starting methods, Speed control methods and applications of single and three phase Synchronous machines.



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B. Tech. (EEE) V-Semester (PC3103EE)

**LINEAR IC APPLICATIONS**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	0	0	3	External Marks: 70

**Course Objectives:**

The course will introduce the students...

- Analyze the behavior of Linear and non-linear wave shaping circuits
- Analyze and design of Multi vibrators
- Understand the operation of OP-AMP and its internal circuits
- Analyze the applications of OPAMP and 555 Timer
- Explain the operation of various data converter circuits and PLL.

**Course Outcomes:**

After completing this course, the student will be able to...

1. Construct different linear networks and analyze their response to different input signals
2. Understand, Analyze and design multi vibrators and sweep circuits using transistors.
3. Distinguish different types of rectifying circuits and amplifier circuits and their Performance parameters.
4. Analyze DC and AC characteristics for Single/Dual input Balanced/Unbalanced output configurations using BJTs.
5. Distinguish various linear and non-linear applications of Op-Amp. Analyze the operation of the most commonly used D/A and A/D converter types.

B. Tech. (EEE) V- Semester (PC3104EE)

**UTILIZATION OF ELECTRICAL ENERGY**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	0	0	3	External Marks: 70

**Course Objectives:**

The course is introduced ...

- To understand the utilization of electrical energy for various applications like industrial heating, welding etc.
- To study the schematic Utilization and Connection Diagrams for Motor Control.
- To understand the concept of illumination, and know the applications of various lamps to Factory lighting, street lighting etc.
- To understand the concept of electrification of traction system.
- To inculcate the basic concepts of lighting and details of batteries used in trains.

**Course Outcomes:**

After completing this course, the student will be able to...

1. Understand the various methods of electrical heating.
2. Acquire the knowledge of connection diagrams for motor control.
3. Understand the concepts of illumination and various discharge lamps.
4. Acquire the knowledge of electric traction, traction motors and train lighting.
5. Acquire the knowledge of constructional details of batteries and their applications.

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B. Tech. (EEE) V- Semester (PC3105EE)

**HIGH VOLTAGE ENGINEERING**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	0	0	3	External Marks: 70

**Course Objectives:**

The course is designed...

- To deal with the detailed analysis of Breakdown occurring in gaseous, liquids and solid Dielectrics.
- To inform about generation and measurement of High voltages and currents.
- To introduce High voltage testing methods.
- To analyze the reasons for lightning and switching overvoltages.
- To understand various standards for HV Testing of electrical apparatus.

**Course Outcomes:**

After completion of this course, the student will be able to...

- ✓ Acquire knowledge on, basics of high voltage engineering
- ✓ Understand break-down phenomenon in different types of dielectrics
- ✓ Understand generation and measurement of high voltages and currents
- ✓ Understand the phenomenon of over-voltages, concept of insulation co-ordination
- ✓ Know testing of various materials and electrical apparatus used in high voltage Engineering.

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B.Tech. (EEE) V- Semester (PC3106EE)

**ELECTRIC MACHINE DESIGN**

Teaching Scheme				Examination Scheme
L	T	P	C	InternalMarks:30
3	0	0	3	ExternalMarks:70

**Course Objectives:**

The course is designed...

- To deal with the major requirements and consideration of machine design.
- To analyze the design parameters of transformers.
- To analyze the design parameters of induction motors based on performance characteristics.
- To analyze the design parameters of synchronous machines.
- To synthesize the limitations (assumptions) of traditional designs and needs for CAD analysis and synthesis of hybrid methods.

**Course Outcomes:**

After completion of this course, the student will be able to...

- ✓ Understand the major requirements and consideration of machine design.
- ✓ Analyze the design parameters of transformers.
- ✓ Analyze the design parameters of induction motors based on performance characteristics.
- ✓ Analyze the design parameters of synchronous machines.
- ✓ Synthesize the limitations (assumptions) of traditional design methods electrical machines.

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B.Tech. (EEE) V- Semester (PC3107EE)

**MEASUREMENTS AND INSTRUMENTATION**

Teaching Scheme				Examination Scheme
<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	Internal Marks: 30
3	1	0	4	External Marks: 70

**Course Objectives**

The objective of this course is to impart the knowledge...

- To learn and understand the fundamental concepts, principle of operation and applications of various electrical measuring instruments.
- To understand various types of Bridges in measurement of resistance, inductance, Capacitance and frequency.
- To understand the operation and applications of Ballistic Galvanometer, Flux meter and DC/AC Potentiometer.
- To understand the application of CRO for measurement of Amplitude, Phase and frequency of sinusoidal signals.

**Course Outcomes:**

After completing this course, the student will be able to...

- ✓ Choose the suitable instrument like Ammeter, Voltmeter for AC/DC applications.
- ✓ Select suitable Bridge for measurement of electrical parameters and quantities.
- ✓ Use CRO for measurement of Amplitude, Phase and frequency of sinusoidal signals.
- ✓ Use the instrument transformer in high rating measurements.
- ✓ Use suitable measuring instruments in different applications.

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B.Tech. (EEE) V- Semester (HSM3108)

**MANAGERIAL ECONOMICS AND ACCOUNTANCY**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	0	0	3	External Marks: 70

**Course Objectives:**

The course will introduce the students...

- To provide basic understanding of Financial and Accounting aspects of a business unit.
- To provide understanding of the accounting aspects of business.
- To provide understanding of financial statements.
- To provide the understanding of financial system.
- To provide inputs necessary to evaluate the viability of projects.
- To provide the skills necessary to analyze the financial statements.

**Course Outcomes:**

After successful completion of the course the students will be able to...

- ✓ Evaluate the financial performance of the business unit.
- ✓ To take decisions on selection of projects.
- ✓ Take decisions on procurement of finances.
- ✓ Analyze the liquidity, solvency and profitability of the business unit.
- ✓ Evaluate the overall financial functioning of an enterprise.

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B.Tech. (EEE) V- Semester (PC3109EE)

**ELECTRIC MACHINES-II LAB**

Teaching Scheme				Examination Scheme
L	T	P	C	InternalMarks:25
0	0	2	1	ExternalMarks:50

**Course Objectives:**

This course is designed to...

- Impact the knowledge of learning the operation and performance characteristics of induction machines by conducting various experiments and tests practically.
- Understand the operation and performance characteristics of synchronous machines by Conducting various experiments and tests.
- Analyze the performance of breaking system in electrical machines.
- Analyze the speed control of electrical machines.

**Course Outcomes:**

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

- ✓ Understand Performance characteristics of single-phase induction motor.
- ✓ Understand the importance of Voltage regulation of an alternator.
- ✓ Explain different methods used to measure the voltage regulation of an alternator.
- ✓ Identify the faults, if any, in the electrical machines.

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B.Tech. (EEE) V- Semester (PC3110EE)

**MEASUREMENTS AND INSTRUMENTATION LAB**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 25
0	0	2	1	External Marks: 50

**Course Objectives:**

This course is designed to...

- To train the students for acquiring practical knowledge for measuring resistance, inductance and capacitance using various bridges.
- To train the student for the usage of A.C. and D.C. Potentiometer.
- To make the student understand the operation of CRO and its usefulness in finding the amplitude, phase and frequency of wave forms.
- To train the students to measure electrical parameters in different loading conditions.

**Course Outcomes:**

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

- ✓ Measure the inductance, capacitance and resistance using various bridges.
- ✓ Measure resistance and calibrate ammeter, voltmeters and wattmeter using A.C. and D.C potentiometers.
- ✓ Have hands on experience on the operation of CRO.
- ✓ Synthesize the measurements in different loading conditions of measuring instruments.



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**B. Tech. (EEE) VI-SEMESTER**

S. No.	Course Code	Course Title	Scheme of Instruction			Lecture s/week	Scheme of Examination		Credits
			L	T	P	H	CIE	SEE	
1	PC3201EE	Power Semiconductor Drives	3	1	0	4	30	70	4
2	PC3202EE	Switch Gear and Protection	3	0	0	3	30	70	3
3	PC3203EE	Power System Operation and Control	3	1	0	4	30	70	4
4	PE-II	Professional Elective-II	3	0	0	3	30	70	3
5	PC3208EE	Signals and Linear Systems	3	0	0	3	30	70	3
6	PC3209EE	Microprocessor Systems	3	0	0	3	30	70	3
7	PC3210EE	Microprocessor Systems Laboratory	0	0	2	2	25	50	1
8	PC3211EE	Linear Control Systems Laboratory	0	0	2	2	25	50	1
	Summer Internship (Six weeks during summer vacation)		--	--	--	--	--	--	--
	<b>Total</b>		<b>18</b>	<b>2</b>	<b>4</b>	<b>24</b>	<b>230</b>	<b>520</b>	<b>22</b>

**PE-II Professional Elective - II**

1. PE3204EE Electrical Distribution System
2. PE3205EE Electrical Energy Conservation and Auditing
3. PE3206EE Hybrid electric vehicles
4. PE3207EE MOOCS Course\*

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B.Tech. (EEE) VI- Semester (PC3201EE)

**POWER SEMICONDUCTOR DRIVES**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	1	0	4	External Marks: 70

**Course Objectives:**

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

- Understand and analysis the operation and performance of DC Drives.
- Understand and analysis the operation and performance of AC Drives
- Familiarize the various power semiconductor drives employing for various motor.
- Understand various control techniques used in the Electrical machines.

**Course Outcomes:**

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

1. Acquire knowledge and understanding various drive system mechanisms, operating modes, characteristic.
2. Analyze various drives and identify the merits, demerits and the difference between AC and DC drives.
3. Apply power converters knowledge for control of different drives.
4. Apply drives Knowledge for control of advanced electrical machines and energy conservation.
5. Engage independent learning to evaluate the motor and power converter for a specific application.

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B.Tech. (EEE) VI- Semester (PC3202EE)

**SWITCH GEAR AND PROTECTION**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	0	0	3	External Marks: 70

**Course Objectives:**

The course is designed ....

- To understand the need of protection of electric equipment and their protection schemes.
- To understand operations & characteristics of various electromagnetic and static relays.
- To understand the operations of various types of circuit breakers and their ratings.
- To understand the unit protection and over voltage protection of different apparatus in power system.
- To find the location of placing the relays and circuit breakers in power system.

**Course Outcomes:**

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

1. Explain the working of different types of switchgear equipment's like circuit breakers and relays.
2. Design the ratings for fuses according to the requirement.
3. Elucidate various protection schemes of various power system components like alternators, transformers and bus-bars.
4. Explain various methods of over voltage protection in power systems.
5. Know the applications of relays and circuit breakers in Electrical power systems.

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B.Tech. (EEE) VI- Semester (PC3203EE)

**POWER SYSTEM OPERATION AND CONTROL**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :30
3	1	0	4	External Marks :70

**Course Objectives:**

This course is designed...

- To impart the knowledge of economical conditions of operation of power system.
- To impart the knowledge of optimization techniques used in the power system and Load Frequency Control (LFC).
- To provide a solid foundation in mathematical and engineering fundamentals required to control the governing system in Turbine models.
- To provide the knowledge of Hydrothermal scheduling, reactive power control.
- To introduce the Computer Control techniques of Power Systems.

**Course Outcomes:**

After completing this course, the student will be able to...

1. To make students express Economic operation of power system and importance of LFCcontrol.
2. To allow students discuss about thermal and hydro power plants operation in meeting the load demand optimally. (State and central wide installation). Also expressing importance of reactive power control through seminars.
3. To improve student's ability in solving problems (numerical problems at present)related to Economic Load Dispatch, Load Frequency Control and reactive power control.
4. Apply their knowledge in PSOC for competitive exams like GATE, IES, and Public sector etc.
5. Ability to discuss single area load frequency control and two area load frequency control.

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B.Tech. (EEE) VI- Semester (PC3204EE)

**ELECTRICAL DISTRIBUTION SYSTEM**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :30
3	0	0	3	External Marks :70

**Course Objectives:**

The objectives of this course is to impart knowledge of ...

- Understanding the concepts and Importance of different load characteristics.
- Analyzing the concepts and of design of Sub-Transmission Lines, Sub-Stations and Feeders.
- Making the students to understand the Power Quality issues and applications of capacitors in distribution systems.
- Power loss calculations in distribution systems.
- Understanding the concepts and importance of distribution automation and SCADA.

**Course Outcomes:**

After completing this course, the student will be able to...

1. Understand the concept of different factors used in design of distribution system components.
2. Explain the different types of secondary distribution systems and their performances.
3. Acquire the knowledge of various components, functions and applications of Distribution automation and SCADA.
4. Design the optimal locations and ratings of shunt capacitors used in radial feeder for different loading conditions.
5. Analyze the power loss calculations and efficiency of the system.

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B.Tech. (EEE) VI- Semester (PC3205EE)

**ELECTRICAL ENERGY CONSERVATION AND AUDITING**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :30
3	0	0	3	External Marks :70

**Course Objectives:**

The course is designed...

- To understand the energy scenario and energy conservation Act-2001 and its features.
- To understand the concepts of basic energy and various forms of energy.
- To understand the energy management and need of energy audit.
- To understand the energy efficiency technologies.
- To realize the needs of efficient energy utilization.

**Course Outcomes:**

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

1. Familiar about the current energy scenario and importance of energy conservation.
2. Know the concepts of energy management.
3. Realize the methods of improving energy efficiency in different electrical systems.
4. Acknowledge the concepts of different energy efficient devices.
5. Acquire the knowledge of different forms of utilization of electrical energy.

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B.Tech. (EEE) VI- Semester (PC3206EE)

**HYBRID ELECTRIC VEHICLES**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :30
3	0	0	3	External Marks :70

**Course Objectives:**

This advanced course is designed to...

- Know the history of electric hybrid electric vehicles (EV & HEV) and emphasize the need and importance of EV-HEV for sustainable future.
- Introduce the fundamental concepts and principles of hybrid electric vehicle drive topologies.
- Develop a thorough understanding of the key elements of EV/HEV Electric Machines for Propulsion Applications and Energy Source.
- Provide the knowledge of Electric Vehicles Charging Stations.

**Course Outcomes:**

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

1. To identify and describe the history and involvement of electric & hybrid electric vehicles to emphasize on the need and importance of EV/HEV for sustainable future.
2. To identify and describe the principles of various EV/HEVs drive train topologies along with their power flow control and fuel efficiency estimation.
3. To design and select electric propulsion system components for EV/HEV drives suitability for the desirable performance and control.
4. To compare and evaluate various energy sources and energy storage components for EV and HEV applications.
5. To acquire the knowledge of Electric Vehicle Charging Stations.

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B.Tech. (EEE) VI- Semester (PC3208EE)

**SIGNALS AND LINEAR SYSTEMS**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :30
3	0	0	3	External Marks :70

**Course Objectives:**

The course is introduced...

- To understand the classification of continuous-time and discrete-time signals and systems.
- To solve systems represented by differential equations and difference equations using analytical methods and Laplace and Z-transforms.
- To acquire the knowledge of representing the signals in frequency domain using Fourier series and Fourier transform.
- To focus on possible domains of evaluation of signals and their applications.

**Course Outcomes:**

After successful completion of the course the students will be able to...

1. Classify and analyze the continuous time signals and discrete time signals and systems.
2. Generate discrete time signals through sampling process and reconstruct them.
3. Determine the responses of continuous and discrete-time systems which are represented by differential equations and difference equations.
4. Analyze continuous time systems with the help of Laplace transform and discrete time system with Z-transform.
2. Analyze the continuous and discrete-time systems in frequency domain with the help of Fourier series and Fourier Transform.



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B.Tech. (EEE) VI- Semester (PC3209EE)

**MICROPROCESSOR SYSTEMS**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :30
3	0	0	3	External Marks :70

**Course Objectives:**

The course is introduced to ...

- To understand about 8086 microprocessor architecture, Instruction set and addressing modes.
- To know the use of interfacing devices and process of interfacing.
- To understand about 8051 microcontroller architecture, and programming.
- To understand about 8051 microcontroller interrupts, Timers/Counters.

**Course Outcomes:**

After completing this course, the student will be able to...

1. Understand 8086 microprocessor architecture and its operation.
2. Write assembly language program for a given task.
3. Interface memory and I/O devices to 8081 using peripheral devices.
4. Understand uses of microcontrollers and their applications.
5. Write microcontroller programs and interface devices.

B.Tech. (EEE) VI- Semester (PC3210EE)

**MICROPROCESSOR SYSTEMS LAB**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :25
0	0	2	1	External Marks :50

**Course Objectives:**

The course is introduced to...

- Developing of assembly level programs and providing the basics of the processors.
- To provide solid foundation on interfacing the external devices to the processor according to the user requirements to create novel products and solutions for the real time problems.
- To assist the students with an academic environment needed for a successful professional career.

**Course Outcomes:**

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

1. Familiarize with the assembly language programming.
2. Write programs for given task using different addressing modes.
3. Interface various IO devices using 8086 & 8085 Processor
4. Write programs using various interrupts.
5. Interface the microcontroller for some real-life applications.

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B.Tech. (EEE) VI- Semester (PC3211EE)

**LINEAR CONTROL SYSTEMS LAB**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :25
0	0	2	1	External Marks :50

**Course Objectives:**

This laboratory course is designed ...

- To meet the real time applications of control system components.
- To develop transfer function of various control systems through experimental analysis.
- To inculcate the needs of controllers and their basic features.
- To introduce the MATLAB simulations.
- To analyze the programming of control system concepts using MATLAB.

**Course Outcomes:**

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

1. Analyze the characteristics of servo motors and synchros.
2. Understand the performance of P, PI and PID Controllers.
3. Acquire the knowledge of Data acquisition system and Industrial process control.
4. Develop PLC programs for certain applications.
5. Learn the MATLAB programming and simulations.

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B.Tech. (EEE) VI- Semester

**SUMMER INTERNSHIP**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 00
0	0	Six Weeks	0	External Marks: 00

**Course Objectives:**

This course is introduced to make the student to undergo industrial visit...

- To give an experience to the students in solving real life practical problems with all its constraints.
- To give an opportunity to integrate different aspects of learning with reference to real life problems.
- To enhance the confidence of the students while communicating with industry engineers and give an opportunity for useful interaction with them and familiarize with work culture and ethics of the industry.

**Course Outcomes:**

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

1. Design/develop a small and simple product in hardware or software.
2. Complete the task or realize a pre-specified target, with limited scope, rather than taking up a complex task and leave it.
3. Learn to find alternate viable solutions for a given problem and evaluate these alternatives with reference to pre-specified criteria.
4. Implement the selected solution and document the same.
5. Able to write a technical report and present it to appropriate audience.

## ANNEXURE

L	:	Lectures
T	:	Tutorials
P	:	Practical's
CIE	:	Continuous InternalEvaluation
SEE	:	Semester EndExamination
PC	:	ProfessionalCourse
PE	:	ProfessionalElective
OE	:	OpenElective
HS	:	Humanities& SocialSciences

\*Student is required to complete the MOOCS course in electrical and electronics engineering offered by the following agencies. The student is required to take prior approval from the Department, before registering for any course. Unless the student submits a pass certificate, he/she shall not be eligible for the award of degree.

SWAYAM: [www.swayam.gov.in](http://www.swayam.gov.in) ,  
NPTEL: [www.onlinecourse.nptel.ac.in](http://www.onlinecourse.nptel.ac.in)

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**B.Tech(EEE) VII-SEMESTER**

S. No.	Course Code	Course Title	Scheme of Instruction			Lectures /week	Scheme of Examination		Credits
			L	T	P	H	CIE	SEE	C
<b>Theory</b>									
1	PC-4101EE	Power System Analysis	3	1	0	4	30	70	4
<b>Professional Elective-III</b>									
2	PE-4102EE	Flexible AC Transmission System	3	0	0	3	30	70	3
	PE-4103EE	Industrial Electrical Systems							
	PE-4104EE	Power System Reliability							
<b>Professional Elective-IV</b>									
3	PE-4105EE	Digital Control System	3	0	0	3	30	70	3
	PE-4106EE	HVDC Transmission System							
	PE-4107EE	Power Quality Engineering`							
<b>Open Elective-I</b>									
4	OE-4108HS	Disaster Management	3	0	0	3	30	70	3
	OE-4109EC	Computer Organization							
	OE-4110EC	Digital Signal Processing							
	OE-4111EC	VLSI Design							
<b>Practical</b>									
5	PC-4112EE	Power Systems Laboratory	0	0	2	2	25	50	1
6	PC-4113EE	Power Electronics and Drives Laboratory	0	0	2	2	25	50	1
7	PW-4114EE	Project Stage-I	0	0	2	2	50	--	1
<b>Total</b>			<b>12</b>	<b>1</b>	<b>6</b>	<b>19</b>	<b>220</b>	<b>380</b>	<b>16</b>

L : Lectures  
T : Tutorials  
P : Practical's  
CIE : Continuous Internal Evaluation  
SEE : Semester End Examination  
PC : Professional Course  
HS : Humanities and Social Sciences

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B.Tech. (EEE) VII- Semester (PC-4101EE)

**POWER SYSTEMS ANALYSIS**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	1	0	4	External Marks: 70

**Course Objectives:**

This course is designed...

1. To understand the concepts power network topology with elementary graph theory.
2. To evaluate the power network matrices to form respective bus matrix.
3. To do Load flow analysis of Electrical power systems.
4. To introduce fault analysis in the interconnected power networks.
5. To make the students to understand reactive Power Control and Stability of Power networks.

**Course Outcomes:**

After completing this course, the student will be able to...

1. Learn Elementary graph theory and its importance.
2. Solve load flow by appropriate modeling of the given power system and formulation of Y-bus.
3. Evaluate Load flow analysis using different iterative methods.
4. Do fault analysis in the interconnected power networks..
5. Do transient analysis and power system stability with different concepts.

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B.Tech. (EEE) VII- Semester (PE-4102EE)

**FLEXIBLE AC TRANSMISSION SYSTEMS**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	0	0	3	External Marks: 70

**Course Objectives:**

This course is designed...

- To introduce the reactive power control techniques
- To educate on static VAR compensators and their applications
- To provide knowledge on Thyristor controlled series capacitors
- To understand the fundamentals of FACTS Controllers, Importance of controllable parameters and types of FACTS controllers & their benefits
- To recall the objectives of Shunt and Series compensation
- To explain control of STATCOM and SVC and their comparison And the regulation of STATCOM
- To analyze the functioning and control of GCSC, TSSC and TCSC.

**Course Outcomes:**

After completing this course, the student will be able to...

1. Know the application of FACTS devices in Power Transmission system.
2. Choose proper controller for the specific application based on system requirements.
3. Understand various systems thoroughly and their requirements.
4. Analyze the control circuits of Shunt Controllers SVC & STATCOM for various functions viz. Transient stability Enhancement, voltage instability prevention and power oscillation damping.
5. Detect the Power and control circuits of Series Controllers GCSC, TSSC and TCSC.



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B.Tech. (EEE) VII- Semester (PE-4103EE)

**INDUSTRIAL ELECTRICAL SYSTEMS**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	0	0	3	External Marks: 70

**Course Objectives:**

This course is introduced to make the student to...

- Introduce various safety components used in electrical systems.
- Educate about the requirements of residential and commercial wiring systems, general rules and guidelines for installation.
- Introduce various methods of effectively and efficiently utilizing Electrical Energy for different and desired applications.
- Design different lighting schemes for residential and commercial premises, various Electrical Lighting principles and their applications.
- Inculcate specifications of different Breakers, MCB and other LT panel components.

**Course Outcomes:**

After completing this course, the student will be able to...

1. Understand the electrical wiring systems for residential, commercial and industrial consumers, representing the systems with standard symbols and drawings, SLD.
2. Understand various components of industrial electrical systems.
3. Analyze and select the proper size of various safety components in electrical systems.
4. Design different lighting schemes for residential and commercial premises, various Electrical Lighting principles and their applications.
5. Define the specifications of different Breakers, MCB and other LT panel components.

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B.Tech. (EEE), VII- Semester (PE-4104EE)

**POWER SYSTEM STABILITY**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	0	0	3	External Marks: 70

**Course Objectives:**

The objectives of this course are...

- To introduce probability theory and its importance in electrical systems.
- To introduce Reliability as a tool for decision support for design, operation and planning of electric power system.
- To estimate daily load representation, merging generation and load models.
- To evaluate bulk power system reliability.
- To introduce the methods of estimating the system reliability of simple and complex systems.
- To evaluate distribution power system reliability.

**Course Outcomes:**

After completing this course, the student will be able to...

1. Realize the probability theory and its importance in electrical systems.
2. Realize the concepts of reliability to design secure and reliable networks.
3. Carry out planning and reliability for generation, transmission, and distribution system.
4. Analyze and select the proper size of various electrical system components.
5. Estimate daily load representation, merging generation and load models.
6. Evaluate distribution power system reliability.

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B.Tech. (EEE) VII- Semester (PE-4105EE)

**DIGITAL CONTROL SYSTEM**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	0	0	3	External Marks: 70

**Course Objectives:**

The objectives of this course are...

- To impart the needs of discrete- time control system.
- To review on the different transform techniques for digital control system design.
- To impart knowledge on the techniques to analyze the system performance in the discrete-time domain.
- To review the needs of digital controller and its design.
- To impart knowledge in discrete state space controller design.

**Course Outcomes:**

After completing this course, the student will be able to...

1. Understand the various issues related to digital control systems such as effects of sampling, quantization, discrete time signals and models.
2. Represent a discrete-time control system using state space technique.
3. Design discrete control systems via pole placement.
4. Design observers for discrete control systems.
5. Analyze the stability of a discrete-time control system.

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B.Tech. (EEE) VII- Semester (PE-4106EE)

**HVDC TRANSMISSION SYSTEM**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	0	0	3	External Marks: 70

**Course Objectives:**

The objectives of this course are...

- To introduce basics of HVDC Transmission system and its applications.
- To familiarize with the HVDC converters and their control system.
- To inculcate reactive power requirements and its control in HVDC systems.
- To compare power flow analysis in AC/DC systems.
- To expose the harmonics and fault occurrences in the system and their prevention.

**Course Outcomes:**

After completing this course, the student will be able to...

1. Distinguish HVDC Transmission and EHVAC transmission system.
2. Analyze HVDC transmission with Current Source Converters and Voltage Source Converters.
3. Evaluate performance metrics for HVDC converter configuration.
4. Synthesize controllers for Voltage Source Converters based HVDC under DC fault conditions.
5. Get aware of harmonics and fault occurrences in the system and their prevention.

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B.Tech. (EEE) VII- Semester (PE-4107EE)

**POWER QUALITY ENGINEERING**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	0	0	3	External Marks: 70

**Course Objectives:**

This course is introduced to...

- Acquire the importance of power quality, different power quality issues and their effects in power system network.
- Investigate long and short interruptions in power engineering.
- Analyze single and Three Phase Voltage Sag Characterization in radial and non-radial systems.
- Investigate power quality considerations in Industrial Power Systems.
- Improve equipment immunity, different events and mitigation methods of Interruptions and Voltage Sags.

**Course Outcomes:**

After completing this course, the student will be able to...

1. Describe the different PQ disturbances and remedies to improve PQ.
2. Determine voltage sag for different network configurations.
3. Demonstrate the effect of power quality issues and voltage sags on operation of various electrical machines.
4. Evaluate harmonic levels in distribution systems.
5. Describe power quality monitoring and measuring techniques in industrial power systems.
6. Analyze the equipment immunity, different events and mitigation methods of interruptions and Voltage Sags.

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B.Tech. (EEE) VII- Semester (OE-4108HS)

**DISASTER MANAGEMENT**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	0	0	3	External Marks: 70

**Course Objectives:**

The objectives of this course are...

- To introduce basic Principles of Disaster Management and its national policy.
- To inculcate prevention preparedness and mitigation measures of disaster.
- To introduce sustainable development, climate change, risk rendition, financial management of disaster and related losses.
- To inculcate role of Technology in Disaster Management, like multimedia technology in disaster risk management and training.
- To expose Disaster profile of India, and National Guidelines and Plans on Disaster Management.

**Course Outcomes:**

After completing this course, the student will be able to...

- ✓ Acquire basic Principles of Disaster Management and its national policy.
- ✓ Understand the prevention preparedness and mitigation measures of disaster.
- ✓ Know the idea of sustainable development, climate change, risk rendition, financial management of disaster and related losses.
- ✓ Acquire the knowledge about the role of multimedia technology in disaster risk management and training.
- ✓ Gets an idea about Disaster profile of India, and National Guidelines and Plans on Disaster Management.

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B.Tech. (EEE) VII- Semester (OE-4109EC)

**COMPUTER ORGANIZATION**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	0	0	3	External Marks: 70

**Course Objectives:**

The objectives of this course are...

- To introduce basic knowledge of CPU architecture.
- To familiarize with the design of data path and restoring and non- restoring algorithms.
- To inculcate the basic control design concepts of hardwired control unit.
- To inculcate the memory organization and the importance of RAM, ROM and DRAM.
- To expose communication methods and advancements in Computer Organization.

**Course Outcomes:**

After completing this course, the student will be able to...

- ✓ Gain the basic knowledge of CPU architecture.
- ✓ Familiarize with the design of data path and restoring and non- restoring algorithms.
- ✓ Get the basic control design concepts of hardwired control unit.
- ✓ Gain the memory organization and the importance of RAM, ROM and DRAM.
- ✓ Analyze the communication methods and pipeline mechanism in Computer Organization.

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B.Tech. (EEE) VII- Semester (OE-4110EC)

**DIGITAL SIGNAL PROCESSING**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	0	0	3	External Marks: 70

**Course Objectives:**

This course is designed ...

- To review the Discrete Time Fourier Transforms and introduce the concept of frequency in continuous and discrete time signals.
- To introduce the FIR digital filters, their properties and design techniques.
- To inculcate IIR digital filter design techniques, bilinear transformation and comparison with FIR digital filters.
- To introduce the applications of Multirate signal processing.
- To introduction fixed point Digital Signal Processors, architecture, addressing modes, And their applications.

**Course Outcomes:**

After completing this course, the student will be able to...

- ✓ To review the Discrete Time Fourier Transforms and introduce the concept of frequency in continuous and discrete time signals.
- ✓ To introduce the FIR digital filters, their properties and design techniques.
- ✓ To inculcate IIR digital filter design techniques, bilinear transformation and comparison with FIR digital filters.
- ✓ To introduce the applications of Multirate signal processing.
- ✓ To introduction fixed point Digital Signal Processors, architecture, addressing modes, and their applications.



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B.Tech. (EEE) VII- Semester (OE-4111EC)

**VLSI DESIGN**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	0	0	3	External Marks: 70

**Course Objectives:**

The objectives of this course are...

- To introduce the basics of IC Technology and their Electrical properties.
- To familiarize with the designs and layout diagrams of VLSI circuit processes.
- To inculcate gate level design with logic gates.
- To introduce Shifters, data path subsystems and their design process.
- To expose on Programmable Logic Devices, CMOS Testing, need for testing and test principles.

**Course Outcomes:**

After completing this course, the student will be able to...

- ✓ Understand the basics of IC Technology and their Electrical properties.
- ✓ Familiarize with the designs and layout diagrams of VLSI circuit processes.
- ✓ Analyze gate level design with logic gates.
- ✓ Know Shifters, data path subsystems and their design process.
- ✓ Gain the knowledge on Programmable Logic Devices, CMOS Testing, need for testing and test principles.

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B.Tech. (EEE) VII- Semester (PC-4112EE)

**POWER SYSTEMS LAB**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
0	0	2	1	External Marks: 70

**Course Objectives:**

This course is introduced to...

- To determine regulation & efficiency of short, medium and long transmission lines and to calculate A, B, C, D constants.
- To understand the importance of protective relays in power system such as Different protection of transformer DMT Characteristics of over current relay, Buchholz relay and static relays.
- To understand the procedure to determine sequence parameters of transformer and alternator.

**Course Outcomes:**

After completing this course, the student will be able to...

1. Determine ABCD constants of transmission lines, evaluate regulation and efficiency.
2. Acquire knowledge in relay setting for safe operating of power system.
3. Determine the sequence parameters of transformer and alternator.
4. Determine the time constant of an alternator.
5. Determine the dielectric strength of oil and calculate the efficiency of string insulators.

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B.Tech. (EEE) VII- Semester (PC-4113EE)

**POWER ELECTRONICS AND DRIVES LAB**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
0	0	2	1	External Marks: 70

**Course Objectives:**

- To be able to understand various power switching devices, trigger circuits, characteristics and applications by conducting the experiments.
- To learn and understand the rectifiers, choppers and inverters principle of operation, characteristics and applications.
- To simulate open loop or closed loop speed control of 3-phase induction motor using V/f control and using sine PWM.

**Course Outcomes:**

After completing this course, the student will be able to...

1. Practically analyze the performance of speed control of motors by using controlled rectifier.
2. Understand the applications of cycloconverters.
3. Simulate single-phase half wave converter with different loads.
4. Simulate different power electronic devices using MATLAB.

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B.Tech. (EEE) VII- Semester (PC-4114EE)

**PROJECT STAGE-1**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 50
0	0	2	1	External Marks: --

**Course Objectives:**

- To enhance practical and professional skills.
- To familiarize tools and techniques of systematic literature survey and documentation.
- To expose the students to industry practices and team work.
- To encourage students to work with innovative and entrepreneurial ideas.

**Course Outcomes:**

After completing this course, the student will be able to...

1. Able Demonstrate the ability to synthesize and apply the knowledge and skills acquired in the academic program to the real-world problems.
2. Evaluate different solutions based on economic and technical feasibility
3. Effectively plan a project and confidently perform all aspects of project management
4. Demonstrate effective written and oral communication skills.

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**B.Tech (EEE) VIII- Semester**

S. No.	Course Code	Course Title	Scheme of Instruction			Lectures /week	Scheme of Examination		Credits
			L	T	P		CIE	SEE	
<b>Theory</b>									
<b>Professional Elective-V</b>									
1	PE-4201EE	Non-Conventional Energy Sources	3	0	0	3	30	70	3
	PE-4202EE	Special Electrical Machines							
	PE-4203EE	AI Techniques in Electrical Engineering							
<b>Professional Elective-VI</b>									
2	PE-4204EE	Smart Grid Technologies	3	0	0	3	30	70	3
	PE-4205EE	Machine Modeling and analysis							
	PE-4206EE	Modern Power Electronics							
<b>Open Elective-III</b>									
3	OE-4207ME	Optimization Techniques	3	0	0	3	30	70	3
	OE-4208EC	Embedded System Design							
	OE-4209CS	Information Security							
	OE-4210HS	Start-up Entrepreneurship							
<b>Practical</b>									
4	PC-4211EE	Electrical Simulation Lab	0	0	2	2	25	50	1
5	PW-4212EE	Project Stage-II	0	0	10	10	150	100	5
<b>Total</b>			<b>9</b>	<b>0</b>	<b>12</b>	<b>21</b>	<b>265</b>	<b>360</b>	<b>15</b>

L : Lectures  
P : Practical  
T : Tutorials  
CIE : Continuous Internal Evaluation  
SEE : Semester End Examination  
PC : Professional Course  
HS : Humanity Science

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B.Tech. (EEE) VIII-Semester (PE-4201EE)

**NON-CONVENTIONAL ENERGY SOURCES**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	0	0	3	External Marks: 70

**Course Objectives:**

This course is designed...

- To bring awareness about important renewable energy resources and the technologies for harnessing these resources within the framework of a broad range of simple to state-of-the-art energy systems.
- To educate the needs of solar energy and its measurements.
- To introduce wind energy and principles of wind energy conversion systems.
- To inculcate energy extraction from the oceans with Ocean Thermal Electric Conversion methods.
- To revise energy extraction from Biomass and to introduce advanced Biomass conversion technologies.

**Course Outcomes:**

After completing this course, the student will be able to...

1. Demonstrate the generation of electricity from various Non-Conventional sources of energy, have a working knowledge on types of fuel cells.
2. Estimate the solar energy, its utilization, principles involved in solar energy collection and its conversion into electricity energy.
3. Explore the concepts involved in wind energy conversion system by studying its Components, types and performance.
4. Acquire the knowledge on geothermal energy.
5. Know the energy extraction from Biomass and advanced Biomass conversion technologies.

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B.Tech. (EEE) VIII- Semester (PE-4202EE)

**SPECIAL ELECTRICAL MACHINES**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	0	0	3	External Marks: 70

**Course Objectives:**

This course is designed...

- To explain theory of operation and control of switched reluctance motor.
- To explain the performance and control of stepper motors, and their applications.
- To describe the operation and characteristics of permanent magnet dc motor.
- To distinguish between brush dc motor and brush less dc motor.
- To explain the theory of travelling magnetic field and applications of linear motors.

**Course Outcomes:**

After completing this course, the student will be able to...

1. Explain theory of operation and control of switched reluctance motor.
2. Explain the performance and control of stepper motors, and their applications.
3. Describe the operation and characteristics of permanent magnet dc motor.
4. Distinguish between brush dc motor and brush less dc motor.
5. Explain the theory of travelling magnetic field and applications of linear motors.

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B.Tech. (EEE) VIII- Semester (PE-4203EE)

**AI TECHNIQUES IN ELECTRICAL ENGINEERING**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	0	0	3	External Marks: 70

**Course Objectives:**

This course is designed...

- To understand the basics of Artificial Neural Networks & Fuzzy based systems.
- To understand the ANN based systems for function approximation used in load forecasting.
- To explain the importance of the Fuzzy logic tool and its Membership functions.
- To inculcate the importance of Genetic Algorithms in electrical technology.
- To introduce the Artificial Intelligence techniques in power system load flow analysis.

**Course Outcomes:**

After completing this course, the student will be able to...

1. Understand how the soft computing techniques can be used for solving the problems of Electrical Engineering.
2. Design of ANN based systems for function approximation used in load forecasting.
3. Design of Fuzzy based systems for load frequency control in power systems.
4. Solve problem of Optimization in power systems.
5. Understand the needs of Artificial Intelligence techniques in power system load flow Analysis.



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B.Tech. (EEE) VIII- Semester (PE-4204EE)

**SMART GRID TECHNOLOGIES**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	0	0	3	External Marks: 70

**Course Objectives:**

This course is designed...

- To understand various aspects of smart grid.
- To study various smart transmission and distribution technologies.
- To appreciate distribution generation and smart consumption.
- To know the regulations and market models for smart grid.
- To analyze the communication techniques in smart grids.

**Course Outcomes:**

After completing this course, the student will be able to...

1. Understand technologies for smart grid.
2. Appreciate the smart transmission as well distribution systems.
3. Realize the distribution generation and smart consumption.
4. Know the regulations and market models for smart grid.
5. Understand communication techniques in smart grids.

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B.Tech. (EEE) VIII- Semester (PE-4205EE)

**MACHINE MODELLING AND ANALYSIS**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	0	0	3	External Marks: 70

**Course Objectives:**

This course is designed...

- To identifying the methods and assumptions in modeling of all machines.
- To recognize the different frames for modeling of AC machines.
- To write voltage and torque equations in state-space form for different machines.
- To obtain the voltage and current relations in stator and rotor reference frames of synchronous machines.
- To design the circuit models for three phase synchronous machines.

**Course Outcomes:**

After completing this course, the student will be able to...

1. Develop the mathematical models of various machines like, induction motor, synchronous machines, permanent magnet synchronous motor, and brushless DC motor using modeling equations.
2. Analyze the developed models in various reference frames.
3. Obtain voltage and torque equations in state-space form for different machines.
4. Get the voltage and current relations in stator and rotor reference frames of synchronous machines.
5. Design the circuit models for three phase synchronous machines.

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B.Tech. (EEE) VIII- Semester (PE-4206EE)

**MODERN POWER ELECTRONICS**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	0	0	3	External Marks: 70

**Course Objectives:**

This course is designed...

- To inculcate concepts of High-Power Semiconductor Devices.
- To inculcate the needs of Cascaded H-Bridge Multilevel Inverters and pulse width modulation techniques.
- To understanding the operation of various power converters.
- To explain the concepts of controllers for power electronic converters.
- To classify different resonant converters and their applications.

**Course Outcomes:**

After completing this course, the student will be able to...

1. Explain about High power devices
2. Understand the needs of Cascaded H-Bridge Multilevel Inverters PWM rectifiers.
3. Perform state space modeling of DC-DC converters.
4. Explain the operation of Multi-level inverters.
5. Understand design of various controllers for power electronic systems.

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B.Tech. (EEE) VIII- Semester (OE-4207ME)

**OPTIMIZATION TECHNIQUES**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	0	0	3	External Marks: 70

**Course Objectives:**

This course is introduced in the professional programme to...

- Enumerate the fundamental knowledge of Optimization problems. Linear Programming and Dynamic Programming problems.
- Learn classical optimization techniques and numerical methods of optimization.
- Know the basics of different evolutionary algorithms.
- Explain Integer programming techniques and apply different optimization techniques to solve various models arising from engineering areas.
- Inculcate teaching learning based optimization.

**Course Outcomes:**

After completing this course, the student will be able to...

1. Explain the fundamental knowledge of Linear Programming and Dynamic Programming problems.
2. Use classical optimization techniques and numerical methods of optimization.
3. Describe the basics of different evolutionary algorithms.
4. Enumerate fundamentals of Integer programming technique and apply different techniques to solve various optimization problems arising from engineering areas.
5. Understand the concept of teaching learning based optimization.

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B.Tech. (EEE) VIII- Semester (OE-4208EC)

**EMBEDDED SYSTEM DESIGN**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	0	0	3	External Marks: 70

**Course Objectives:**

This course is introduced in the professional programme to...

- Enable the students to understand embedded-system programming and apply the knowledge to design and develop embedded solutions.
- Introduce the ARM fundamentals and design philosophy.
- Use ARM microcontroller to perform various tasks.
- Utilize Embedded Software Development Tools.
- Introduce Real Time Operating Systems.

**Course Outcomes:**

After completing this course, the student will be able to...

1. Understand the concept of embedded system, microcontroller, different components of microcontroller and their interactions.
2. Get familiarized with programming environment to develop embedded solutions.
3. Program ARM microcontroller to perform various tasks.
4. Understand the key concepts of embedded systems such as I/O, timers, interrupts and interaction with peripheral devices.
5. Use Real Time Operating Systems.

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B.Tech. (EEE) VIII- Semester (OE-4209CS)

**INFORMATIONSECURITY**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	0	0	3	External Marks: 70

**Course Objectives:**

This course is introduced in the professional programme to...

- To understand basics of Information Security.
- To be able to secure a message over insecure channel by various means.
- To learn about how to maintain the Confidentiality, Integrity and Availability of a data.
- To understand various protocols for network security to protect against the threats in the networks.
- To understand the Cryptography Concepts and Techniques.

**Course Outcomes:**

After completing this course, the student will be able to...

1. Provide security of the data over the network.
2. Do analysis in the emerging areas of cryptography and network security.
3. Implement various networking protocols.
4. Protect any network from the threats in the world.
5. Secure a message over insecure channel by various means.

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B.Tech. (EEE) VIII- Semester (OE-4210HS)

**START-UP ENTREPRENEURSHIP**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	0	0	3	External Marks: 70

**Course Objectives:**

This course is introduced in the professional programme to...

- Introduce various qualities required for entrepreneurship
- Explain various entrepreneurship models
- Organize interaction with successful entrepreneurs
- List out the activities to be under taken, with degrees of importance.
- Prepare a risk map and a business plan.

**Course Outcomes:**

After completing this course, the student will be able to...

1. Identify qualities of entrepreneurs
2. Write project proposal
3. Use various entrepreneurship models
4. Understand various schemes supporting entrepreneurship
5. Think creative and innovative way to prepare a risk map and a business plan.

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B.Tech. (EEE) VIII- Semester (PC-4211EE)

**ELECTRICAL SIMULATION LAB**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 25
0	0	2	1	External Marks: 50

**Course Objectives:**

This laboratory course is designed to...

- Use following software packages in the field of Electrical engineering to analyze the computer simulation results with theoretical and practical values.
  - MATLAB/Simulink
  - PSPICE
  - PSIM
  - MIPOWER
  - PSCAD
- To simulate a given electrical circuits in any environment, to analyse its dynamic characteristics and to figure out the stability considerations.

**Course Outcomes:**

After completing this course, the student will be able to...

1. Simulate the concepts of Electrical Circuits, Control Systems and Power Systems and interpret data.
2. Demonstrate the knowledge of programming environment, compiling, debugging, linking and executing variety of programs in MATLAB.
3. Demonstrate Simulink models for various electrical systems.
4. Validate simulated results from programs/Simulink models with theoretical calculations.



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B.Tech. (EEE) VIII- Semester (PW-4212EE)

**PROJECT STAGE-II**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 150
0	0	10	5	External Marks: 100

**Course Objectives:**

- To enhance practical and professional skills.
- To familiarize tools and techniques of systematic literature survey and documentation.
- To expose the students to industry practices and team work.
- To encourage students to work with innovative and entrepreneurial ideas.

**Course Outcomes:**

After completing this course, the student will be able to...

1. Demonstrate the ability to synthesize and apply the knowledge and skills acquired in the academic program to the real-world problems.
2. Evaluate different solutions based on economic and technical feasibility
3. Effectively plan a project and confidently perform all aspects of project management
4. Demonstrate effective written and oral communication skills.