Date: 19-06-2025

MINUTES OF THE MEETING OF THE FIFTH BOARD OF STUDIES

The 5Th Board of Studies Meeting of the EEE Department was conducted through circulation on 19-06-2025. BoS members reviewed and finalized the syllabus for BEE, BEE Lab, FEE, FEE Lab, and LR23 Open Electives: BNES, FECM, FPE, and BEI&S.

Members:

Sl No.	Name of the BoS Member	External/ Internal	Signature
1	Dr Ch. Santhan Kumar Professor & Head, EEE, LIET	Chairperson	
2	Prof. G Yesuratnam Professor, Dept. of EE, College of Engineering, OU, Hyderabad	External Member (OU Nominee)	
3	Dr Sukanth T Associate Professor, Dept. of EEE, CBIT, Hyderabad	External Member (Academic Expert)	
4	Dr Nagasekhar Reddy Associate Professor & Head, Dept. of EEE, Stanley College of Engineering, Hyderabad.	External Member (Academic Expert)	
5	Dr Vijender Busi Reddy Sci/Engr-SF, Advanced Data Processing Research Institute	External Member (Industry Expert)	
6	Mr Ahzam Zobairi R&D Engineer, Ericsson Global	External Member (Alumnus)	
7	Mr R. Venkata Krishna Assistant Professor, EEE, LIET	Internal Member	
8	Mr J P Balaji Assistant Professor, EEE, LIET	Internal Member	
9	Dr R. K. Singh, Professor, ECE, Principal, LIET	Permanent Invitee	

AGENDA:

1. Confirmation of last BoS Minutes held on 28-03-2024
2. Action taken report on last BoS meeting
3. Approval of LR24 FEE Theory and Lab syllabus for Mechanical and Civil
4. Approval of LR24 BEE theory and lab Syllabi
5. Approval of LR23 V & VII Semester Open Electives
6. Ratification and approval of Question Papers Setters, Examiners and Evaluators.

Dr Ch. Santhan Kumar, BoS Chairperson and HOD (EEE) welcomed all the members of the Board of Studies, Principal and other faculty members to the meeting. This was followed by the discussion on the agenda points mentioned above:

The following deliberations were made as per the agenda and resolutions were listed below:

Item No.1: Confirmation of minutes of Last BoS held on 28-03-2024

Deliberation:

- BoS Chairperson presented the minutes of the previous BoS meeting, all the members approved the minutes.

Resolution:

- The BoS Chairperson obliged the suggestions given by members and the course structure is modified accordingly.

Item No.2: Action Taken Report on Last BoS meeting

Deliberation:

- BOS Chairperson presented the Action Taken Report on the last BOS meeting held on 28-03-2024

Resolution:

- After elaborated discussion the action taken report on the last BoS meeting is approved and attached as an Annexure I.

Item No.3: Review of LR24 FEE Theory and Lab syllabus for Mechanical and Civil

Deliberation:

LR24 FEE Service subject for Civil and Mechanical:

- All the members approved the syllabus.

LR24 BEE Theory and Lab Syllabi:

- All the members suggested approved the syllabus

LR23 V & VI Sem Open Electives

- All the members approved the syllabus.

Resolution:

- The BoS Chairperson obliged the suggestions given by members, the syllabus is modified accordingly and attached as an Annexure II.

Item No.4: Approval and Ratification of Question Paper Setters, Examiners & Evaluators
Deliberation:

- BoS **Chairperson** presented the Question Paper Setters, Examiners & Evaluators of B.E Program

Resolution:

- Approved and Ratified.

BoS Chairperson is authorized to present the resolutions made before Academic Council for further discussions and Approval.

BoS Chairperson conveyed a vote of thanks to all the BOS members for spending their valuable time in reviewing the syllabi, department faculty members for the support in designing the syllabus for I Year BEE and II Year Service Courses and LR23 V & VI Sem Open Electives and the Principal for continuous guidance and the Management for constant encouragement and support.

Dr. Ch. Santhan Kumar
M.Tech., Ph.D.
Professor and Head
Chairperson, Board of Studies
Department of Electrical & Electronics Engineering
Lords Institute of Engineering & Technology (Autonomous)
Hyderabad - 500091, T.S.

Dr Ch. Santhan Kumar
BoS Chairperson & Head
Department of Electrical and Electronics Engineering
Lords Institute of Engineering and Technology (Autonomous)
Hyderabad

ANNEXURE I

Sl.No.	Resolution	Action Taken
1	VII Semester Courses Suggested modifications in syllabus of course EHV, AED, CA,PQ& FACTS, HVDC Transmission, Smart Grid and DSP&ES	The suggestions are incorporated and syllabus is modified as per the discussions
2	VIII Semester Courses Suggested modifications in syllabus of course AITEE, DCS, IES	The suggestions are incorporated and syllabus is modified as per the discussions
3	LR21 Open Electives and LR23 Open Electives	The suggestions are incorporated and syllabus is modified as per the discussions
4	Approval of LR23 FEE Service Subject for Civil and Mechanical	The suggestions are incorporated and FEE syllabus is modified as per the discussions
5	Approval of LR-24 BEE Theory and BEE Lab Syllabus Suggested modifications to add the power concepts.	The suggestions are considered and made changes in BEE theory and lab syllabus

LIET(A), B.E, EEE

Course code	Course title						Core/Elective
U24EE101	**BASIC ELECTRICAL ENGINEERING**						**Core**
Pre-requisites	Contact Hours Per Week				CIE	SEE	Credits
....	L	T	D	P			
	3	-	-	-	40	60	3

Course Objectives

1. To analyze the behavior of different circuit elements R, L and C and the basic concepts of circuit analysis.
2. To understand the concepts of electromagnetism.
3. To analyze the concepts of AC circuits, RMS value, average value phasor analysis etc.
4. To understand the basic principle of operation and construction of DC machines and Transformers.
5. To understand the basic principle of operation and construction of AC machines.

Course Outcomes

On the completion of this course students will be able to

1. To analyze the DC electrical circuits and measures the parameters of electrical energy.
2. To understand the concepts of electromagnetism.
3. To analyze the AC electrical circuits and measures the parameters of electrical energy.
4. To comprehend the working principle and construction of DC machines and transformers.
5. To comprehend the working principle and construction of AC machines namely Induction motor & Synchronous generator.

UNIT-I

DC Circuits

Ohm's Law and Kirchhoff's Laws; Analysis of series, parallel and series-parallel circuits excited by independent voltage sources; Power and energy, analysis of simple circuits with dc excitation. Superposition, Thevenin and Norton Theorems.

UNIT-II

Electromagnetism

Faradays Laws, Lenz's Law, Fleming's Rules, Statically and dynamically induced EMF, Concepts of self-inductance, Mutual inductance and coefficient of coupling; Energy stored in magnetic fields.

UNIT-III

AC Circuits

Representation of sinusoidal waveforms, peak and rms values, phasor representation, Real power, Reactive power, Apparent power, Power factor. Analysis of single-phase ac circuitsconsisting of R, L, C, and RL, RC, RLC combinations (series only), Three phase balanced circuits, Voltage and current relations in star and delta connections.

UNIT IV

DC Machines

Construction and Principle of operation of DC generator, EMF equation, Types of DC generator and its applications, Principle of operation of DC motor, Back EMF, DC motor types and its applications.

Transformers

Principle of operation and construction of single-phase transformers (core and shell types), EMF equation, Ideal and practical transformers, OC and SC test losses and efficiency.

UNIT V AC machines

Induction Motors

Asynchronous machines, Principle of operation of 3-Φ induction motor, Concepts of slip, Construction, Types and its applications, 1-Φ Induction motor, Principle of operation, Construction, Types and its applications.

Synchronous generators

Construction, Principle of operation, Types and applications, OC and SC characteristics.

Text books:

1. D.P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 4th Edition, 2019.
2. MS Naidu and S Kamakshaiah, "Basic Electrical Engineering", Tata McGraw Hill, 2nd Edition, 2008.
3. P. S. Bimbhra, "Electrical Machinery", Khanna Publishers, 2021.
4. I.J. Nagrath and D. P. Kothari, "Electric Machines", McGraw Hill Education, 2017.

LIET(A), B.E, EEE

Course code	Course title						Core/Elective
U24EE1L1	**BASIC ELECTRICAL ENGINEERING LAB (Common for all branches)**						**Core**
Pre-requisites	Contact Hours Per Week				CIE	SEE	Credits
	L	T	D	P			
....	-	-	-	3	25	50	1.5

Course objectives:

1. Understand the basic concepts of ohms law and theorems with DC excitation.
2. Understand the concepts of self and mutual inductance, coefficient of coupling.
3. Identify Sinusoidal steady state response of R-L, and R-C circuits.
4. Understand the different phenomenon for balanced three phase circuit connected in Star and Delta.
5. Understand the characteristics of DC and AC Machine and performance of Single-phase transformer.

Course outcomes:

1. Verify the ohms law and theorems by practical and theoretical calculations.
2. Evaluate of self and mutual inductance, coefficient of coupling.
3. Explain the Sinusoidal steady state response of R-L, and R-C circuits.
4. Analyze the different phenomenon for balanced three phase circuit connected in Star and Delta.
5. Identify the different characteristics of DC and AC Machine and perform tests on Single phase transformer.

Demonstration - 1: Basic safety precautions, Introduction and use of measuring instruments, Voltmeter, Ammeter,Multi-meter, Oscilloscope, Real-life resistors, Capacitors and Inductors.

1. Verification of Ohm's Law, KVL and KCL.
2. Verification of Super position theorem (with DC excitation).
3. Verification of Thevenin's and Norton's theorems (with DC Excitation).
4. Determination of self and mutual inductance, co-efficient of coupling.
5. Sinusoidal steady state response of R-L, and R-C circuits.

Demonstration – 2: Demonstration of cut-out sections of Machines: DC Machine (Commutator- brush arrangement), Transformers, Induction Machine (Squirrel cage rotor), Synchronous Machine (Field winging- slip ring arrangement) and Single-Phase Induction Machine.

1. Measurement of phase voltage/current, line voltage/current and power in a balanced three-phase circuit connected in star and delta.
2. OCC characteristics of DC Generator.
3. Transformers: Observation of the no-load current wave form on an oscilloscope.
4. (Non-sinusoidal wave-shape due to B-H curve non-linearity should be shown along with a discussion about harmonics).
5. O.C test and S.C test on single phase Transformer.
6. Measurement of primary and secondary voltages, currents and power of a single-phase Transformer.
7. Open circuit and short circuit characteristics of an Alternator.
8. Power factor improvement of Induction Motor using static capacitor.

Note: It is mandatory to conduct any 8 experiments from the above list of experiments.

Suggested Readings:

1. D.P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 4th Edition, 2019.
2. MS Naidu and S Kamakshaiah, "Basic Electrical Engineering", Tata McGraw Hill, 2nd Edition, 2008.
3. P. S. Bimbhra, "Electrical Machinery", Khanna Publishers, 2021.
4. I.J. Nagrath and D. P. Kothari, "Electric Machines", McGraw Hill Education, 2017.

LIET (A), B.E. (C.E & M.E)

Course Code	Course Title						Core/Elective
U24EE305	FUNDAMENTALS OF ELECTRICAL ENGINEERING						Core
Pre-requisites	Contact Hours Per Week				CIE	SEE	Credits
Engineering Physics	L	T	D	P			
	3	-	-	-	40	60	3

Course Objectives

The objectives of this course are:

1. To provide an understanding of basics in Electrical circuits.
2. To analyze the concepts of AC circuits, RMS value, average value, power and power factor.
3. To explain the working principles of Electrical Machines and single-phase transformers.
4. To understand the basic principle of operation and construction of AC machines
5. To know the electrical installation and concepts of batteries

Course Outcomes

After the completion of the course, the student will be able to:

1. To analyze Electrical circuits to compute and measure the parameters of Electrical Energy.
2. To analyze the AC electrical circuits and measures the parameters of electrical energy.
3. To comprehend the working principle and construction of DC machines and transformers.
4. To comprehend the working principles of electrical AC machines.
5. To understand the different electrical installations, batteries and working and applications of converter and inverter circuits.

UNIT-I

DC Circuits: Electrical circuit elements (R, L and C), voltage and current sources, Kirchoff current and voltage laws, Analysis of simple circuits with dc excitation. Superposition, Thevenin and Norton Theorems.

UNIT-II

AC Circuits: Representation of sinusoidal waveforms, Peak and rms values, Real power, Reactive power, Apparent power, Power factor. Analysis of single-phase ac circuits consisting of R, L, C, and RL, RC, RLC combinations (series only), Three phase balanced circuits, Voltage and current relations in star and delta connections.

UNIT-III

Transformers: Electromagnetic induction, Faradays laws, statically induced emf, Lenz law, Construction and working of transformer, Losses and efficiency, Auto transformers.

DC Generators: Dynamically induced emf, Construction and principle of operation of DC generator, Emf equation, Types of DC Generators, Applications.

DC Motors: Principle of operation of DC Motor, Types of DC motors, Applications.

UNIT-IV

AC Machines:

Synchronous Machines: Alternators: Construction, Working and applications. Synchronous motors: Construction, Working and applications.

Asynchronous Machines: Construction, Working and applications.

UNIT-V

Electrical Installations: Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries, Elementary calculations for energy consumption, Power factor improvement and battery backup.

Suggested Readings:

1. U.A Bakshi & V.U Bakshi. "Basic Electrical Engineering", 2014.
2. D.P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 4th Edition, 2019.
3. B. L Theraja, A K Theraja "A Textbook of Electrical Technology: Volume 2 AC and DC Machines",S Chand; TwentyThird edition, 2020
4. P. S. Bimbhra, "Electrical Machinery", Khanna Publishers, 2021.

LIET (A), B.E. (M.E)

Course code	Course title						Core/Elective
U24EE3L4	FUNDAMENTALS OF ELECTRICAL ENGINEERING LAB						Core
Pre-requisites	Contact Hours Per Week				CIE	SEE	Credits
Engineering physics	L	T	D	P			
	-	-	-	3	25	50	1.5

Course Objectives:

1. To impart the practical knowledge on analysis of Kirchhoff's Laws and various theorems in DC Circuits.
2. To provide hands on experience on working of single phase and three phase transformers.
3. To impart the practical knowledge on working of DC Motors and characteristics of DC generators

Course Outcomes:

1. Get an exposure to common electrical components and their ratings and comprehend the usage of common electrical measuring instruments.
2. Analyze the Laws and theorems in DC circuits
3. Analyze the voltage and currents in RL, RC and RLC Circuits.
4. Test the basic characteristics of transformers and electrical machines.
5. Analyze the performance of DC Motors and DC Generators.

Demonstration - 1: Basic safety precautions. Introduction and use of measuring instruments – voltmeter, ammeter, multi-meter, oscilloscope. Real-life resistors, capacitors and inductors

1. Verification of Ohm's Law, KVL and KCL.
2. Verification of Superposition theorem (with DC excitation).
3. Verification of Thevinen's and Norton's theorems (with DC Excitation)
4. Verification of Maximum Power Transfer Theorem (with DC Excitation)
5. Sinusoidal steady state response of R-L, and R-C circuits

Demonstration – 2: Demonstration of cut-out sections of Machines: DC Machine (Commutator-brush arrangement), Transformers, Induction Machine (Squirrel cage rotor), Synchronous Machine (Field winging - slip ring arrangement) and Single-Phase Induction Machine.

1. Measurement of phase voltage/current, line voltage/current and power in a balanced three-phase circuit connected in star and delta
2. OCC characteristics of DC Generator
3. Transformers: Observation of the no-load current waveform on an oscilloscope (Non sinusoidal wave-shape due to B-H curve nonlinearity should be shown along with a discussion about harmonics).
4. O.C test and S.C test on single phase Transformer.
5. Measurement of primary and secondary voltages, currents and power of a single phase Transformer:
6. Open circuit and Short circuit characteristics of an Alternator
7. Power factor improvement of Induction Motor using static capacitor

Note: Minimum eight experiments should be conducted in the semester

Suggested Readings:

1. U.A Bakshi & V.U Bakshi. "Basic Electrical Engineering", 2014.
2. D.P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 4th Edition, 2019.
3. B. L Theraja, A K Theraja "A Textbook of Electrical Technology: Volume 2 AC and DC Machines",S Chand; TwentyThird edition, 2020
4. P. S. Bimbhra, "Electrical Machinery", Khanna Publishers, 2021.

LORDS INSTITUTE OF ENGINEERING AND TECHNOLOGY
(An Autonomous Institution)
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
SCHEME OF INSTRUCTIONS& EXAMINATIONS [LR-23]

OPEN ELECTIVE COURSES

* Open elective subjects not offered to the students from own department.

S. No.	Course Code	Category	Course Title
1	U23EE509	OEC 1	Basics of Non Conventional Energy Systems**
	U23EE510		Fundamentals of Energy Conservation and Management**
	U23CS508		Data Base Management Systems
	U23IT506		Data Structures
	U23ME509		Basics of Mechanical Engineering
	U23ME510		Modern Manufacturing Processes
	U23CE510		Disaster Preparedness and Management
	U23CE511		Civil Engineering Principles and Practices
	U23EC507		Principles of Electronic Communication
	U23EC508		Semi Conductor Devices
	U23MB502		Managerial Communication
	U23MB503		Managerial Science and Theory
	U23SH501		History of Science & Technology
	U23SH502		Economic Policies in India

S. No.	Course Code	Category	Course Title
2	U23EE607	OEC 2	Fundamental of Power Electronics**
	U23EE608		Basics of Electrical Installation and Safety**
	U23CS607		Java Programming
	U23IT606		Operating Systems
	U23ME608		Basics of 3-D Printing
	U23ME609		Optimization Methods for Engineers
	U23CE607		Construction Materials
	U23CE608		Engineering Geology
	U23EC607		Principles of Data Communication and Network
	U23EC608		Embedded Systems
	U23MB602		Quality Management
	U23MB603		Innovation Management
	U23SH601		Indian Music System
	U23SH602		Introduction to Art and Aesthetics

S. No.	Course Code	Category	Course Title
3	U23EE713	OEC 3	Introduction to Electrical Vehicles**
	U23EE714		Basic design estimation and costing of Electrical Systems**
	U23CS711		Data Sciences
	U23IT705		Basics of Artificial Intelligence
	U23ME711		Renewable Energy Resources
	U23ME712		Cooling of Electronic Components
	U23CE711		Environmental Systems
	U23CE712		Urban Transportation System
	U23EC703		IOT and its protocols
	U23EC704		Television and Video Engineering
	U23MB702		Logistics Management
	U23MB703		Management of Start Up's
	U23SH701		Display Devices
	U23SH702		Comparative Study of Literature

S. No.	Course Code	Category	Course Title
4	U23EE805	OEC 4	Smart Building Systems**
	U23EE806		Industrial Automation**
	U23CS806		Basics of Machine Learning
	U23IT802		Cloud computing
	U23ME806		Hybrid Vehicle Engineering
	U23ME807		Power Plant Engineering
	U23CE806		Green Building Technology
	U23CE807		Environmental Impact Assessment
	U23EC805		Fundamentals of Wireless Communication
	U23EC806		Fundamental Digital Design using Verilog HDL
	U23MB802		Entrepreneurship
	U23MB803		E-Marketing
	U23SH801		Corrosion Science and Technology
	U23SH802		Introduction To Philosophical Thoughts

Course code	Course title						Core/Elective
U23EE509	**BASICS OF NON-CONVENTIONAL ENERGY SYSTEMS**						**Open Elective**
Pre-requisites	Contact Hours Per Week				CIE	SEE	Credits
Power Systems-I,	L	T	D	P			
	3	-	-	-	40	60	3

Course Objectives

1. To understand the concepts and Importance of renewable energy sources such as solar, wind, biomass, tidal power.
2. To make the students understand the advantages and disadvantages of different renewable energy source
3. To know the solar power resources
4. To discuss the solar thermal power generation
5. To identify the network integration issues

Course Outcomes

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

1. Acquire the knowledge of various components, principle of operation and present scenario of different conventional and non-conventional sources.
2. Able to understand the solar energy operation and its characteristics.
3. To educate the wind energy operation and its types.
4. The student will be able to cope up with upcoming technologies in the energy storage systems.
5. Illustrate the concepts of Direct Energy Conversion systems & their applications.

UNIT-I

Principles of Solar Radiation: Role and potential of new and renewable source, the solar energy option, Environmental impact of solar power - Physics of the sun, the solar constant, extra-terrestrial and terrestrial solar radiation, Solar radiation on titled surface, Instruments for measuring solar radiation and sun shine, solar radiation data.Solar Energy Collection: Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.

UNIT-II

Solar Energy Storage and Applications: Different methods, sensible, latent heat and stratified storage, solar ponds. Solar applications - solar heating/cooling techniques, solar distillation and drying, photovoltaic energy conversion. Wind Energy: Sources and potentials, horizontal and vertical axis windmills, performance characteristics, Betz criteria

UNIT-III

Bio-Mass: Principles of Bio-Conversion, Anaerobic /aerobic digestion, types of Bio-gas digesters, gas yield, combustion characteristics of biogas, utilization for cooking, I.C. Engine operation, and economic aspect

UNIT-IV

Geothermal Energy: Resources, types of wells, methods of harnessing the energy, potential in India. Ocean Energy – OTEC, Principles, utilization, setting of OTEC plants, thermodynamic cycles. Tidaland Wave energy: Potential and conversion techniques, mini-hydel power plants, their economics.

UNIT-V

Direct Energy Conversion: Need for DEC, Carnot cycle, limitations, Principles of DEC. Thermo electric generators, Seebeck, Peltier and Joule Thompson effects, figure of merit, materials, applications, MHD generators, principles, dissociation and ionization, hall effect, magnetic flux, MHD accelerator, MHD engine, power generation systems, electron gas dynamic conversion, economic aspects. Fuel cells, principle, faraday's laws, thermodynamic aspects, selection of fuels and operating conditions.

Suggested Reading:

1. Renewable Energy Resources / Tiwari and Ghosal / Narosa
2. Non- conventional Energy Sources / G.D. Rai/ Khanna Publishers
3. Biological Energy Resources/ Malcolm Fleischer & Chris Lawis/ E&FN Spon

Course code	Course title						Core/Elective
U23EE510	**FUNDAMENTALS OF ENERGY CONSERVATION AND MANAGEMENT**						**Open Elective**
Pre-requisites	Contact Hours Per Week				CIE	SEE	Credits
	L	T	D	P			
	3	-	-	-	40	60	3

Course Objectives

1. Familiarize present energy scenario, and energy auditing methods.
2. Explain components of electrical systems, lighting systems and improvements in performance.
3. Demonstrate different thermal systems, efficiency analysis, and energy conservation methods.
4. Train on energy conservation in major utilities.
5. Instruct principles of energy management and energy pricing.

Course Outcomes

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

1. Explain energy utilization and energy auditing methods.
2. Analyze electrical systems performance of electric motors and lighting systems.
3. Examine energy conservation methods in thermal systems.
4. Estimate efficiency of major utilities such as fans, pumps, compressed air systems, HVAC and D.G.Sets.
5. Elaborate principles of energy management, programs, energy demand and energy pricing.

UNIT-I

Introduction: Energy –Power –Past & Present Scenario of World, National Energy Consumption Data – Environmental Aspects Associated With Energy Utilization –Energy Auditing: Need, Types, Methodology and Barriers. Role of Energy Managers. Instruments for Energy Auditing.

UNIT-II

Electrical Systems: Components Of EB Billing –HT And LT Supply, Transformers, Cable Sizing, Concept of Capacitors, Power Factor Improvement, Harmonics, Electric Motors –Motor Efficiency Computation, Energy Efficient Motors, Illumination –Lux, Lumens, Types of Lighting, Efficacy, LED Lighting And Scope of EconomyIn Illumination.

UNIT-III

Thermal Systems: Stoichiometry, Boilers, Furnaces and Thermic Fluid Heaters –Efficiency Computation and Encon Measures. Steam: Distribution & Usage: Steam Traps, Condensate Recovery, Flash Steam Utilization, Insulators & Refractories.

UNIT-IV

Energy Conservation In Major Utilities: Pumps, Fans, Blowers, Compressed Air Systems, Refrigeration and Air Conditioning Systems –Cooling Towers –D.G. Sets.

UNIT-V

Energy Management: Principles of Energy Management, Energy

Suggested Reading:

1. Energy Manager Training Manual (4 Volumes) Available At www.energymanagertraining.com, A Website Administered By Bureau Of Energy Efficiency (BEE), A Statutory Body Under Ministry Of Power, Government Of India, 2004.
2. Guide books for National Certification Examination for Energy Manager / Energy Auditors Book-1, General Aspects (available online).
3. Witte. L.C., P.S. Schmidt, D.R. Brown, "Industrial Energy Management and Utilisation" Hemisphere Publ, Washington, 1988.
4. Callaghn, P.W. "Design And Management For Energy Conservation", Pergamon Press, Oxford, 1981.
5. Dryden. I.G.C., "The Efficient Use Of Energy" Butterworths, London, 1982

Course code	Course title						Core/Elective
U23EE607	**FUNDAMENTALS OF POWER ELECTRONICS**						**Open Elective**
Pre-requisites	Contact Hours Per Week				CIE	SEE	Credits
Analog Electronics	L	T	D	P			
	3	-	-	-	40	60	3

Course Objectives

1. Understand the performance of various power electronic devices.
2. Analyze the VI characteristics of SCR and TRIAC.
3. Analyze single phase-controlled rectifier circuits.
4. Understand choppers circuits
5. Understand the performance of AC voltage controllers.

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 phase-controlled rectifier circuits.
3. Understand choppers circuits and AC voltage controllers
4. Understand the performance of chopper circuits.
5. Analyze the VI characteristics of SCR and TRIAC.

UNIT-I

Introduction to power electronics, scope and applications, principle and operation of BJT, MOSFET and IGBT

UNIT-II

Power semiconductor switches and their V-I characteristics-diodes, SCR, TRIAC, Thyristor ratings andprotection.

UNIT-III

Principles of single-phase fully-controlled converter with R, RL, and RLE load, Principles of single-phasehalf-controlled converter with RL and RLE load, Single phase dual converters.

UNIT-IV

Introduction, Basic principles of step-down and step-up operation, chopper classification study of Buck, Boost andBuck-Boost regulators

UNIT-V

Introduction, principle of operation of single-phase voltage controllers for R, R-L & R-L-E loads and its applications, Principle of operation of single phase cycloconverters

Suggested Reading:

1. Power Electronics: Circuits, Devices & Applications, M.H.Rashid, Pearson Education India, 2009.
2. Power Electronics: Converters, Applications and Design, N. Mohan and T. M. Undeland, JohnWiley & Sons, 2007.
3. Fundamentals of Power Electronics, R. W. Erickson and D. Maksimovic, Springer Science &Business Media, 2007.
4. Power Electronics, Dr. P.S. Bhimbra, Khanna Publishers, 2009.

Course code	Course title						Core/Elective
U23EE608	BASICS OF ELECTRICAL INSTALLATION AND SAFETY						Open Elective
Pre-requisites	Contact Hours Per Week				CIE	SEE	Credits
Basic Electrical Engineering	L	T	D	P			
	3	-	-	-	40	60	3

Course Objectives

1. Understand the safety and security measures to prevent the electrical shocks
2. Aquire the knowledge on installation of electrical plant.
3. Understand the safety measures on Residential, agriculture and commercial electrical installations
4. Understand the safety measures on hazardous zones and earthing.
5. Aquire the knowledge on IE rules and electrical Acts.

Course Outcomes

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

1. Explain the objectives and precautions of Electrical Safety, effects of Shocks and their Prevention.
2. Summarize the Safety aspects during Installation of Plant and Equipment.
3. Describe the electrical safety in residential, commercial and agricultural installations.
4. Describe the various Electrical Safety in Hazardous Areas, Equipment Earthing and System NeutralEarthing.
5. State the electrical systems safety management and IE rules.

UNIT-I Introduction to Electrical Safety, Shocks and their Prevention:

Terms and definitions, objectives of safety and security measures, Hazards associated with electric current, and voltage, who is exposed, principles of electrical safety, approaches to prevent Accidents, scope of subject electrical safety. Primary and secondary electrical shocks, possibilities of getting electrical shock and its severity, medical analysis of electric shocks and its effects, shocks due to flash/ Spark over's, prevention of shocks, saf ety precautions against contact shocks, flash shocks, burns, residential buildings and shops.

UNIT-II Safety during Installation of Plant and Equipment:

Introduction, preliminary preparations, preconditions for start of installation work, during, risks during installation of electrical plant and equipment, safety aspects during installation, field quality and safety during erection, personal protective equipment for erection personnel, installation of a large oil immersed power transformer, installation of outdoor switchyard equipment, safety during installation of electrical rotating machines, drying out and insulation resistance measurement of rotating machines.

UNIT-III Electrical Safety in Residential, Commercial and Agricultural Installations:

Wiring and fitting, Domestic appliances, water tap giving shock, shock from wet wall – fan firing shock, multi-storied building, Temporary installations, Agricultural pump installation, Do's and Don'ts for safety in the use of domestic electrical appliances.

UNIT-IV Electrical Safety in Hazardous Areas:

Hazardous zones, class 0,1 and 2, spark, flashovers and corona discharge and functional requirements, Specifications of electrical plants, equipment's for hazardous locations, Classification of equipment enclosure for various hazardous gases and vapours, classification of equipment/enclosure for hazardous locations.

Equipment Earthing and System Neutral Earthing: Introduction, Distinction between systemgrounding and Equipment Grounding, Equipment Earthing, Functional Requirement of earthing system, description of a earthing system, neutral grounding (System Grounding), Types of Grounding, Methods of Earthing Generators Neutrals.

UNIT-V Safety Management of Electrical Systems:

Principles of Safety Management, Management Safety Policy, Safety organization, safety auditing, Motivation to managers, supervisors, employees.

Review of IE Rules and Acts and their significance: Objective and scope, ground clearances and section clearances, standards on electrical safety, safe limits of current, voltage, Rules regarding first aid and firefighting facility, The Electricity Act, 2003, (Part1, 2, 3,4 & 5)

Suggested Reading:

1. "Electrical safety, fire safety Engineering and safety management", S. Rao, Prof. H.L. Saluja, , Khanna Publishers. New Delhi, 1988.(units-I to V)1.
2. "Energy management policy, planning and utilization", Pradeep Chaturvedi, Concept Publishing company, New Delhi, 1997.