



SATHYABAMA

**INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)**

Accredited "A" Grade by NAAC | 12B Status by UGC | Approved by AICTE

www.sathyabama.ac.in

Department of Electrical and Electronics

Number of programmes where syllabus revision was carried out

SL. NO.	COURSE CODE	COURSE OFFERED
1	SEEA1101	Electrical Technology
2	SEEA1102	Electrical Technology
3	SEEA2101	Electrical Engineering Lab
4	SEEA2102	Electrical Engineering Lab

SEEA1101	ELECTRICAL TECHNOLOGY	L	T	P	Credits	Total Marks
		3	*	0	3	100

COURSE OBJECTIVES

- To understand and analyze the magnetic circuit.
- To study the fundamental principle of electrical machines using the concepts of electro-mechanical energy conversion.
- To learn the principle of operation and performance characteristics of D.C./A.C. Machines and Transformers.

UNIT 1	MAGNETIC CIRCUITS	8 Hrs.
Definition of MMF, Flux and Reluctance - Leakage Factor - Reluctances in Series and Parallel (Series and Parallel Magnetic Circuits) - Electromagnetic Induction - Fleming's Rule - Lenz's Law - Faraday's laws - statically and dynamically induced EMF - Self and mutual inductance - Analogy of Electric and Magnetic.		
UNIT 2	DC MACHINES	10 Hrs.
Construction, Principles of operation of DC Machines - Types - EMF Equation - Performance Characteristics, of Series and Shunt Generators - DC Motor - Torque - Speed - Torque Characteristics of Series and Shunt Motors - Speed Control and Applications.		
UNIT 3	TRANSFORMERS	10 Hrs.
Constructional Details and Principle of operation of Single Phase Transformer - EMF Equation - Phasor Diagram on No Load and Loaded Transformer - Equivalent Circuit - Open Circuit and Short Circuit Test on Transformer - Regulation and Efficiency-Auto Transformer.		
UNIT 4	INDUCTION MOTORS (QUALITATIVE TREATMENT ONLY)	8 Hrs.
Constructional Details of Three Phase Induction Motor - Slip Ring and Squirrel Cage Rotor- Principle of operation- Torque Equation - Torque / Slip Characteristics - Starters - Applications Introduction to Single Phase Induction Motors - Capacitor Start Capacitor Run Motor - Shaded Pole Motor.		
UNIT 5	SYNCHRONOUS MACHINES AND SPECIAL MACHINES (QUALITATIVE TREATMENT ONLY)	9 Hrs.
Principles of Alternator - Construction Details - Types Special Machines: Stepper motor- AC and DC Servomotor -Universal Motor - Hysteresis Motor -Permanent Magnet Synchronous Motor - Switched Reluctance Motor - Brushless D.C Motor - Construction, Working And Applications.		

Max. 45 Hrs.**COURSE OUTCOMES**

On completion of the course, student will be able to

- CO1 - Understand the basic concepts of magnetic circuits.
 CO2 -Describe the basics of electrical machines and analyse the characteristics of DC machines.
 CO3 -Understand and implement speed control techniques for practical applications.
 CO4 - Describe the working of transformer, autotransformer and assess the regulation and efficiency of transformer.
 CO5 - Explain the working concept of single phase, three phase induction motor and analyse the operating behaviour of induction motor.
 CO6 - Understand the basics of alternator, synchronous machines, and special electrical machine and have knowledge to choose particular special electrical machines for their applications.

TEXT / REFERENCE BOOKS

1. B.L. Theraja & A.K. Theraja, "A Text Book of Electrical Technology, Vol II", S.Chand & Company Ltd., 2009.
2. J.B. Gupta, "Theory and Performance of Electrical Machines", S.K. Kataria & Sons, 4th Edition, 2006.
3. R.K. Rajput, "Electrical Engineering" Lakshmi Publications Pvt Limited, 4th Edition, 2008.
4. S.K. Bhattacharya, "Electrical Machines" Tata Mc Graw Hill Company Ltd, 3rd Edition, 2008.
5. D.P. Kothari & I.J. Nagrath, "Electrical Machines", Tata Mc Graw Hill Company Ltd, 3rd Edition, 2004, Twelfth Reprint.
6. Hughes "Electrical and Electronic Technology" Pearson Education 10th Edition 2011.

END SEMESTER EXAMINATION QUESTION PAPER PATTERN**Max. Marks: 100****Exam Duration: 3 Hrs.****PART A:** 10 Questions of 2 marks each-No choice**20 Marks****PART B:** 2 Questions from each unit of internal choice; each carrying 16 marks**80 Marks**

	Insertion
	Deletion

SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY

SCHOOL OF ELECTRICAL AND ELECTRONICS

SEEA1102	ELECTRICAL TECHNOLOGY	L	T	P	Credits	Total Marks
		3	*	0	3	100

COURSE OBJECTIVES

- To understand the Electricity Standards.
- To impart knowledge on analysis of Magnetic Circuit.
- To study the fundamental principle of electrical machines using the concepts of electro-mechanical energy conversion.
- To learn the principle of operation of transformers and Special Machines.

UNIT 1 INTRODUCTION TO ELECTRICAL STANDARDS 8 Hrs.

Indian Standard Electricity Rules - Domestic Wiring - Wiring Materials and Accessories - Staircase Wiring - Fluorescent Tubes – Earthing - Types of Earthing - Benefits of Earthing.

UNIT2 MAGNETIC CIRCUITS 9 Hrs.

Definition of MMF, Flux and Reluctance - Leakage Factor - Reluctances in Series and Parallel (Series and Parallel Magnetic Circuits) - Electromagnetic Induction - Fleming's Rule - Lenz's Law - Faraday's laws - statically and dynamically induced EMF - Self and mutual inductance - Analogy of Electric and Magnetic.

UNIT3 DC GENERATORS 9 Hrs.

Construction, Principles and Working operation of DC Generators - EMF Equation – Types of Generators - Performance Characteristics of Series and Shunt Generators – Applications.

UNIT4 DC MOTORS 9 Hrs.

Construction, Principles and Working of operation of DC Motors – Torque Equation – Back EMF - Types of DC Motors - Torque - Speed Characteristics of Series and Shunt Motors - Speed Control of DC Motors - Applications.

UNIT5 TRANSFORMERS AND SPECIAL MACHINES (QUALITATIVE TREATMENT ONLY) 10 Hrs.

Constructional, Principle and Working of operation of Single-Phase Transformer - EMF Equation – Applications - Auto Transformer - Special Machines: Stepper motor- Permanent Stepper Motor – Variable Reluctance Stepper Motor – Servomotor - AC Servomotor - DC Servomotor – Stepper Motor Selection and Control: An Industrial Case Study.

Max. 45 Hrs.

COURSE OUTCOMES

On completion of the course, student will be able to

- CO1 - Understand the basic concepts of Electrical Wiring.
- CO2 - Analyze the Magnetic Circuits
- CO3 - Describe the basics of electrical machines and analyze the characteristics of DC Generators.
- CO4 - Understand and implement speed control techniques of DC Motors for practical applications.
- CO5 - Describe the working of Transformer and Autotransformer
- CO6 - Understand the basics of Special Electrical Machine and have knowledge to choose particular Special Electrical Machines for desired applications.

TEXT / REFERENCE BOOKS

1. B.L.Theraja & A.K.Theraja, "A Text Book of Electrical Technology, Vol II", S.Chand & Company Ltd., 2010.
2. J.B. Gupta, "Theory and Performance of Electrical Machines", S.K.Kataria & Sons, 14th Edition, 2013.
3. R.K. Rajput, "Electrical Engineering" Lakshmi Publications Pvt Limited, 5th Edition, 2012.
4. S.K.Bhattacharya, "Electrical Machines" Tata Mc Graw Hill Company Ltd, 3rd Edition, 2008.
5. D.P.Kothari & I.J.Nagrath, "Electrical Machines", Tata Mc Graw Hill Company Ltd, 3rd Edition, 2004, Twelfth Reprint.
6. Hughes "Electrical and Electronic Technology" Pearson Education 10th Edition 2011.

**END SEMESTER EXAMINATION QUESTION PAPER
PATTERN**

Max. Marks: 100**PART A:** 10 Questions of 2marks each-No choice**PART B:** 2 Questions from each unit of internal choice; each carrying 16 marks**Exam Duration: 3 Hrs.****20 Marks****80 Marks**



SEEA2101	ELECTRICAL ENGINEERING LAB	L	T	P	Credits	Total Marks
		0	0	4	2	100

COURSE OBJECTIVES

- To Give a Introduction to Electrical machines.
- To explain how electrical power is converted in to mechanical Power.
- To explain how Mechanical power is converted in to Electrical Power.
- To explain the importance of load test on the electrical machines.

SUGGESTED LIST OF EXPERIMENTS

1. Open circuit characteristics of separately excited dc shunt generator.
2. Load characteristics of self- excited dc shunt generator.
3. Load characteristics of dc Compound generator.
4. Load characteristics of dc shunt motor.
5. Speed control of dc shunt motor.
6. Load characteristics of dc series motor.
7. Open circuit and short circuit test on single phase transformer.
8. Load test on single phase transformer.
9. Brake load test on three phase squirrel cage induction motor.
10. Load test on single phase Induction motor.
11. Wiring circuits for
 - a. Calling bell.
 - b. Stair case.
 - c. Fluorescent lamp.
 - d. Basic household wiring using switches, fuses, Indicator – lamps etc.,

COURSE OUTCOMES

On completion of the course, student will be able to

- CO1 - Understand the electrical power conversion in to mechanical and vice versa.
- CO2 - Find the efficiency of the electrical apparatus.
- CO3 - Examine Effect of load on the electrical machines.
- CO4 - Increase and decrease the Speed of the motor.
- CO5 -Construct a control mechanism for the output voltage of the generator.
- CO6 -Rule on the connection of all the meters and electrical machines to perform a test on the machines.

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. marks: 100

Exam Duration:3 Hrs

CAE	Evaluation of Regular Lab class	30 Marks	50 Marks
	Model practical exam	20 Marks	
ESE	University Practical exam		50 Marks



SEEA2102	ELECTRICAL ENGINEERING LAB	L	T	P	Credits	Total Marks
		0	0	4	2	100

COURSE OBJECTIVES

- To give an introduction to Electrical machines.
- To explain how electrical power is converted into mechanical Power.
- To explain how Mechanical power is converted into Electrical Power.
- To explain the importance of load test on the electrical machines.

SUGGESTED LIST OF EXPERIMENTS

1. Wiring circuits for
 - a. Calling bell.
 - b. Stair case.
 - c. Fluorescent lamp.
 - d. Basic household wiring using switches, fuses, Indicator – lamps etc.
2. Open circuit characteristics of separately excited dc shunt generator.
3. Load characteristics of self- excited dc shunt generator.
4. Load characteristics of dc Compound generator.
5. Load characteristics of dc shunt motor.
6. Speed control of dc shunt motor.
7. Load characteristics of dc series motor
8. Load test on single phase transformer

COURSE OUTCOMES

On completion of the course, student will be able to

CO1 - Understand the electrical power conversion in to mechanical and vice versa.

CO2 - Find the efficiency of the electrical apparatus.

CO3 - Examine Effect of load on the electrical machines.

CO4 - Increase and decrease the speed of the motor.

CO5 - Construct a control mechanism for the output voltage of the generator.

CO6 - Rule on the connection of all the meters and electrical machines to perform a test on the machines.

END SEMESTER EXAM QUESTION PAPER PATTERN**Max. marks: 100****Exam Duration:3 Hrs**

CAE	Evaluation of Regular Lab class	30 Marks	50 Marks
	Model practical exam	20 Marks	
ESE	University Practical exam		50 Marks

 Insertion

 Deletion