

GOPALAN COLLEGE OF ENGINEERING AND MANAGEMENT

Electronics and communication Department

Academic Year: 2016-17

Semester : Even

6. COURSE PLAN

Semester: II Subject Code: 15ELE25/CSE/CIVIL

Subject Name: Basic Electrical Engineering

Name of Subject Teacher: Sudha Rani J

Name of Subject Expert (Reviewer): Kavitha M V

For the Period: From: 06-08-16 to 02-06-16

Details of Book to be referred:

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| Text Books | T1: Basic Electrical Engineering, D. C. Kulshreshtha, 1 st Edition, Revised |
| Reference Books | <p>R1: Fundamentals of Electrical, Engineering, Rajendra Prasad PHI Third Edition 2014</p> <p>R2: Basic Electrical Engineering AbhijitChakrabarti, Chandan Kumar Chanda, Sudiptanath</p> |

| Lecture No | Topic Planned | Practical Applications & Brief objectives | Book referred with Pg No. | Planned Date | Executed Date | Deviation Reasons thereof | How Made Good / Reciprocate arrangement | Remarks by HOD | Remarks by Principal |
|------------|--|--|---------------------------|--------------|---------------|---------------------------|---|----------------|----------------------|
| 1 | Introduction to the subject | | | 6/2/2017 | 6/2/2017 | Nil | | | |
| 2 | Module.1: DC Circuits and Electromagnetism Ohm's Law analysis of series, parallel circuits excited by independent voltage sources | Objectives: <ul style="list-style-type: none"> Define fundamental electric and magnetic properties. 2. Comprehend the fundamental laws of electric circuits- ohm's Law and Kirchhoff's laws Analyze dc series, parallel and series-parallel circuits. Design simple circuits for specified power and energy requirements. Distinguish between statistically and dynamically induced emf. Apply Faraday's law and lenz's law in magnetic circuits. Distinguish between statistically and dynamically induced emf. Apply Faraday's law and lenz's law in magnetic circuits. | T1: 2.3 | 7/2/2017 | 7/2/2017 | Nil | | | |
| 3 | Kirchhoff's Laws | | T1: 2.22 | 7/2/2017 | 7/2/2017 | Nil | | | |
| 4 | Power and Energy. | | T1:2.15 | 8/2/2017 | 8/2/2017 | Nil | | | |
| 5 | Illustrative examples on KVL & KCL | | Question Paper | 9/2/2017 | 9/2/2017 | Nil | | | |
| 6 | Illustrative examples on KVL & KCL | | Question Paper | 10/2/2017 | 10/2/2017 | Nil | | | |
| 7 | Illustrative examples on KVL & KCL | | Question Paper | 13/02/17 | 13/02/17 | Nil | | | |
| 8 | Electromagnetism: Review of field around a conductor, coil. Magnetic flux and flux density, magnetomotive force and magnetic field intensity, reluctance and permeability, | | T1:3.1 | 14/02/17 | 14/02/17 | Nil | | | |
| 9 | definition of magnetic circuit and basic analogy | | T1:3.2 | 14/02/17 | 14/02/17 | Nil | | | |

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| 10 | Electromagnetic induction : Definition of Electromagnetic Induction, Faradays Laws, Fleming's right hand rule, Lenz's Law | <p>Applications: DC circuits: Domestic, Automotive, Telecommunication, High-voltage power transmissions etc</p> <p>Electromagnetism: Household appliances, Industrial Applications, Magnetic Levitation Trains, Communication Systems, Medical Systems etc</p> <p>Outcome: Student will Know fundamental electric and magnetic properties. Be able to apply KVL and KCL for several circuits</p> | T1:3.5 | 15/02/17 | 15/02/17 | Nil | | | |
| 11 | Statically and dynamically induced emf. Concept of self-inductance | | T1:3.6 | 16/02/17 | 16/02/17 | Nil | | | |
| 12 | Concept of mutual inductance | | T1:3.15 | 20/02/17 | | | | | |
| 13 | Force on current carrying conductor placed in a magnetic field, Fleming's left hand rule | | T1:3.8 | 20/02/17 | | | | | |
| 14 | Co-efficient of coupling. Energy stored in magnetic field. | | T1:3.16, 3.18 | 21/02/17 | | | | | |
| 15 | Illustrative examples | | Question Paper | 21/02/17 | | | | | |
| 16 | Illustrative examples | | Question Paper | 22/02/17 | | | | | |
| 17 | Illustrative examples | | Question Paper | 23/02/17 | | | | | |
| 18 | Module 2: D.C.Machines : Working principle of D.C. Machine as a generator and a motor | <p>Objectives:</p> <ul style="list-style-type: none"> Understand the working of D.C. Machine as a generator and a motor. Analyze and understand constructional features. Types of armature | T1:9.1 | 27/02/17 | | | | | |
| 19 | Types and constructional features. Types of armature windings | | T1:9.8 | 28/02/17 | | | | | |

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| 20 | Emf equation of generator, relation between induced emf and terminal voltage with an enumeration of brush contact drop and drop due to armature reaction | windings <ul style="list-style-type: none"> Draw phasor diagrams for balanced three-phase star delta systems. | | | | | | | |
| 21 | Illustrative examples | Applications: <ul style="list-style-type: none"> DC motor is used in several industrial and domestic appliances The concept of DC generator is used for generation of electrical DC power Outcome: <ul style="list-style-type: none"> Understand Principle of operation of dynamometer type wattmeter Understand the working of D.C. Machine as a generator and a motor. Know the necessity of a starter for a DC Motor. | T1:9.13 | 28/02/17 | | | | | |
| 22 | Operation of D.C. motor, | | T1:9.14 | 1/3/2017 | | | | | |
| 23 | Types of D.C. motors, characteristics and applications. | | T1:9.21 | 2/3/2017 | | | | | |
| 24 | Necessity of a starter for D.C. motor. | | T1:9.26 | 3/3/2017 | | | | | |
| 25 | Illustrative examples on back emf and torque. | | T1:9.29 | 4/3/2017 | | | | | |
| 26 | Illustrative examples on back emf and torque. | | T1:9.28 | 6/3/2017 | | | | | |
| 27 | Illustrative examples on back emf and torque. | | T1:9.29 | 7/3/2017 | | | | | |
| 28 | Measuring Instruments: Introduction Construction and Principle of operation of dynamometer type wattmeter | | T1:9.31 | 7/3/2017 | | | | | |
| | | T1:7.8 | 8/3/2017 | | | | | | |

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| 29 | Construction and Principle of operation of single phase induction type energy meter. | | T1:7.12 | 13/03/17 | | | | | |
| 30 | Unit Test 1 | | | 14/03/17 | | | | | |
| 31 | Module.3:Single-phase A.C. Circuits: Generation of sinusoidal voltage, frequency of generated voltage | <p>Objectives:</p> <ul style="list-style-type: none"> • Understand the concept of 3Phase AC circuits. • Draw phasor Diagrams for RLC circuits • Analyze RL RC and RLC circuits. • Understand the need of wiring, and how wiring is done for domestic purposes. <p>Applications: AC supply and circuits are used for domestic applications, houses, schools, shops,..</p> <p>Outcomes: Knowledge on Electric shock, and precautions against shock, Earthling, Earth leakage circuit breaker.</p> | T1:4.4 | 15/03/17 | | | | | |
| 32 | definition and numerical values of average value, root mean square value, form factor and peak factor of sinusoidally varying voltage and current | | T1:4.9 | 16/03/17 | | | | | |
| 33 | Phasor representation of alternating quantities. | | T1:4.14 | 17/03/17 | | | | | |
| 34 | Analysis, with phasor diagrams of R, L, C circuits | | T1:4.25 | 20/03/17 | | | | | |
| 35 | Analysis with R-L, R-C and R-L-C circuits | | T1:5.5 | 21/03/17 | | | | | |
| 36 | Analysis of series, parallel and series-parallel circuits | | T1:5.7 | 21/03/17 | | | | | |
| 37 | Real power, reactive power, apparent power and power factor | | T1:5.9 | 22/03/17 | | | | | |

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| 38 | Illustrative examples | | T1:5.11 | 23/03/17 | | | | | |
| 39 | Illustrative examples | | T1:5.12 | 24/03/17 | | | | | |
| 42 | Domestic Wiring: Service mains, meter board and distribution board. | | T1:8.2 | 27/03/17 | | | | | |
| 43 | Brief discussion on concealed conduit wiring. Two3way and three-way control. | | T1:8.5 | 28/03/17 | | | | | |
| 44 | Elementary discussion on Circuit protective devices: fuse and Miniature Circuit Breaker Electric shock, precautions against shock – Earthling, Earth leakage circuit breaker | | T1:8.12 | 28/03/17 | | | | | |
| 45 | Residual current circuit Breaker (RCCB). | | T1:8.6 | 30/03/17 | | | | | |
| 46 | Module .4Three Phase Circuits Necessity and advantages of three phase systems | Objectives: <ul style="list-style-type: none"> Understand the working of three phase power system. Analyze three phase ac generator. Draw phasor diagrams for balanced three-phase star delta systems. Derive expression for | T1:6.1 | 31/03/17 | | | | | |
| 47 | Generation of three phase power | | T1:6.6 | 3/4/2017 | | | | | |
| 48 | Definition of Phase sequence, balanced supply and balanced load. | | T1:6.5 | 4/4/2017 | | | | | |

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| 49 | Relationship between line and phase values of balanced star connection. | <p>three-phase power.</p> <ul style="list-style-type: none"> • Applications: Power consumed measurement, 3phase systems are used in large power consuming industries <p>Outcome:</p> <ul style="list-style-type: none"> • Analyze three phase ac generator. Draw phasor diagrams for balanced three-phase star delta systems. • Implement two wattmeter method for power measurement. • Choose equipment of proper rating for a given application. | T1:6.7 | 4/4/2017 | | | | | |
| 50 | Relationship between line and phase values of balanced delta connection. | | T1:6.10 | 5/4/2017 | | | | | |
| 51 | Power in balanced three phase circuits, | | T1:6.15 | 6/4/2017 | | | | | |
| 52 | Measurement of power by two-wattmeter method | | T1:6.17 | 7/4/2017 | | | | | |
| 53 | Determination power factor using wattmeter readings. | | T1:6.21 | 10/4/2017 | | | | | |
| 54 | Illustrative examples | | T1:6.22 | 11/4/2017 | | | | | |
| 55 | Illustrative examples | | T1:6.23 | 11/4/2017 | | | | | |
| 56 | Synchronous generators: Principle of operation, Types and constructional features | | T1:11.3 | 12/4/2017 | | | | | |
| 57 | Advantages of rotating field type alternator, Synchronous speed, | | T1:11.2 | 20/04/17 | | | | | |
| 58 | Frequency of generated voltage, Emf equation. Concept of winding factor. | | T1:11.14 | 21/04/17 | | | | | |
| 59 | Illustrative examples on emf equation. | | T1:11.15 | 24/04/17 | | | | | |
| 60 | Illustrative examples on emf equation. | | T1:11.17 | 25/04/17 | | | | | |

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| 61 | Unit Test 2 | | | 25/04/17 | | | | | |
| 62 | Module.5: Single Phase Transformers: Necessity of transformer, Principle of operation and | Objectives: <ul style="list-style-type: none"> Understand the need of a transformer. Understand the working of transformer. Derive the emf Equation of 1 phase transformer. Analyze the Condition for maximum efficiency, Voltage regulation and its Significance. A brief knowledge on Three Phase Induction Motors, its working principle. Applications of squirrel - cage and slip – ring motors. Applications: Transformers are used in all electrical systems, and equipments used in day today life to step up and step down the voltage outcomes: After the completion of the topic, the student will be able to predict the behavior of electrical and magnetic | | | | | | | |
| 63 | Construction of single-phase transformers (core and shell types) | | T1:10.4 | 26/05/17 | | | | | |
| 64 | Emf equation, losses, variation losses with respect to load, efficiency | | T1:10.14 | 27/04/17 | | | | | |
| 65 | Condition for maximum efficiency, Voltage regulation and its Significance | | T1:10.5 | 28/04/17 | | | | | |
| 66 | Illustrative problems on emf equation and efficiency only. | | T1:10.21 | 2/5/2017 | | | | | |
| 67 | Three Phase Induction Motors :Principle of operation, Concept and | | T1:10.23 | 2/5/2017 | | | | | |
| 68 | production of rotating magnetic field Synchronous speed, rotor speed, Slip,Types and Constructional features | | T1:12.5 | 3/5/2017 | | | | | |
| 69 | Frequency of the rotor induced emf, Slip and its significance. | | T1:12.7 | 4/5/2017 | | | | | |
| | | | T1:12.8 | 5/5/2017 | | | | | |

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| 70 | Applications of squirrel - cage and slip - ring | circuits realize the requirement of transformers in transmission and distribution of electric power and other applications | T1:12.8 | 8/5/2017 | | | | | |
| 71 | Motors. Necessity of a starter, starting of motor using stars-delta starter. | | T1:12.10 | 9/5/2017 | | | | | |
| 72 | Illustrative Examples | | T1:12.11 | 9/5/2017 | | | | | |
| 73 | Unit Test 3 | | | 10/5/2017 | | | | | |
| 74 | Revision and QP solving | | | 11/5/2017 | | | | | |
| 75 | Revision and QP solving | | | 12/5/2017 | | | | | |
| 76 | Revision and QP solving | | | 18/05/17 | | | | | |
| 77 | Revision and QP solving | | | 19/05/17 | | | | | |
| 78 | Revision and QP solving | | | 22/05/17 | | | | | |

Prepared By: Sudha Rani J

Reviewed by: Kavitha M V

Approved by: Kavitha M V

Date & Sign _____

Date & Sign _____

Date & Sign _____

