**E.G.S.PILLAY ENGINEERING COLLEGE, NAGAPATTINAM**

**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

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| **COURSE CODE :**  GE 6252 | **TITLE :**  BASIC ELECTRICAL AND ELECTRONICS ENGINEERING |
| **SEMESTER :** 02 | **CLASS :** I YEAR |
| **FACULTY NAME & DESIGNATION :**  V.MOHAN AP/EEE | **MAIL ID & MOBILE NO.:** [veerasamy.mohan@yahoo.com](mailto:veerasamy.mohan@yahoo.com) 9942986674 |
| **COURSE DURATION :**  JAN 2014 – APRIL 2014 | **LECTURE HALL :** |

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| **REQUIRED TEXT BOOKS**:  1. Mittle N., “Basic Electrical Engineering”, Tata McGraw Hill Edition, New Delhi, 1990.  2. Sedha R.S., “Applied Electronics”, S. Chand & Co., 2006.  **REFERENCE BOOKS**:  1. Muthusubramanian R, Salivahanan S and Muraleedharan K A, “Basic Electrical, Electronics and Computer Engineering”, Tata McGraw Hill, Second Edition, (2006).  2. Nagsarkar T K and Sukhija M S, “Basics of Electrical Engineering”, Oxford press (2005).  3. Mehta V K, “Principles of Electronics”, S.Chand & Company Ltd, (1994).  4. Mahmood Nahvi and Joseph A. Edminister, “Electric Circuits”, Schaum’ Outline Series, McGraw Hill, (2002).  5. Premkumar N, “Basic Electrical Engineering”, Anuradha Publishers, (2003). |

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| **RESOURCES** | **PREREQUISITE** |
| 1. [www.scribd.com](http://www.scribd.com) 2. [www.ebookbrowse.com](http://www.ebookbrowse.com) 3. [www.rapidlibrary.com](http://www.rapidlibrary.com) 4. [www.filecrop.com](http://www.filecrop.com) | PHYSICS |

**COURSE OBJECTIVES & OUTCOMES**:

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| **Course objectives** | **Course outcomes** |
| 1. To understand the basics of electrical, electronics and communication engineering.  2. To analyze simple electrical circuits and machines.  3. To understand the construction, characteristics and applications of semiconductor devices.  4. To comprehend the operation of basic digital electronic circuits. | On completion of the course students will be able to  (a) Summarize the basic laws and concepts related to electrical, electronics and communication engineering.  (b) Explain the construction and operation of electrical measuring instruments and electrical machines.  (c) Compute the various electrical parameters of electrical circuits and machines.  (d) Elucidate the construction and operation of semiconductor devices and digital circuits.  (e) Explain the operation of functional blocks of various communication systems. |

**DETAILED LESSON PLAN**:

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| **UNIT I ELECTRICAL CIRCUITS & MEASURMENTS**  Ohm’s Law – Kirchhoff’s Laws – Steady State Solution of DC Circuits – Introduction to AC Circuits –Waveforms and RMS Value – Power and Power factor – Single Phase and Three Phase Balanced Circuits. Operating Principles of Moving Coil and Moving Iron Instruments (Ammeters and Voltmeters), Dynamometer type Watt meters and Energy meters. | | | | | | | | | | |
| **Session No.** | **Topics to be covered** | | **Text book** | **Page No** | **Instruction delivery** | | | **Testing method** | **Instructional Objective** | **Instructional outcome** |
| **Method** | | **Level** |
| 1. | Discussion of course objectives and outcomes, basic electrical quantities, circuit elements & sources | | R5 | 1.2 – 1.8 | Board & chalk | | Knowledge | OHT | 1 | a |
| 2. | Ohms law, resistors in series and parallel connection, problems | | 1.9 – 1.16 | Board & chalk | | Analysis | OHT  THT | 1 & 2 | a & c |
| 3. | Kirchhoff’s Laws, problems | | 1-32 – 1.42 | Board & chalk | | Analysis | OHT  T1 | 1 & 2 | a & c |
| 4. | Source transformation and mesh analysis, problems | | 1.43 – 1.55 | Board & chalk | | Analysis | T1 | 1 & 2 | a & c |
| 5. | Nodal analysis, problems | | 1.61 – 1.71 | Board & chalk | | Analysis | MT | 1 & 2 | a & c |
| 6. | Fundamentals of AC | | 2.1 – 2.9 | Board &chalk | | Understanding | OHT | 1 | a |
| 7. | Problems in average and RMS values | | 2.9 -2.19 | Board & chalk | | Analysis | THT | 2 | a & c |
| 8. | Single phase AC circuits | | 2.22 – 2.42 | Board & chalk | | Understanding | OHT  T1 | 1 | a |
| 9. | Power in AC circuit and problems in AC circuits | | 2.22 – 2.42 | Board & chalk | | Analysis | T1  OHT | 1 & 2 | a & c |
| 10. | Three phase circuits and problems | | 2.46 – 2.54 | Board & chalk | | Analysis | OHT  T1 | 2 | a & c |
| 11. | Measuring instruments – types, analog instruments, operating & control torques. | | 3.1 – 3.12 | PPT | | Understanding | THT | 1 | b |
| 12. | PMMC meters | | 3.12 – 3.14 | PPT | | Understanding | T1 | 1 | b |
| 13. | MI instruments  ( attraction and repulsion type) | | 3.15 -3.20 | PPT | | Understanding | OHT  T1 | 1 | b |
| 14. | Dynamometer type wattmeter and induction type energy meter | | 3.21 – 3.26 | PPT | | Understanding | MT  T1 | 1 | b |
| **UNIT II ELECTRICAL MECHANICS**    Construction, Principle of Operation, Basic Equations and Applications of DC Generators, DC Motors,  Single Phase Transformer, single phase induction Motor. | | | | | | | | | | |
| **Session No.** | **Topics to be covered** | | **Text book** | **Page No** | **Instruction delivery** | | | **Testing method** | **Instructional Objective** | **Instructional outcome** |
| **Method** | | **Level** |  |
| 15. | Construction, Principle of Operation of DC Generators | | R5 | 4.1 – 4.13 | PPT | | understanding | OHT  T1 | 1 | a & b |
| 16. | Types of DC generators – Circuits, Basic Equations and Applications | | 4.13 –4.25 | PPT | | understanding | OHT | 1 | a & b |
| 17. | Problems in DC generators | | 4.13 – 4.26 | Board & chalk | | Analysis | T1  OHT | 2 | c |
| 18. | Construction, Principle of Operation of DC Motors | | 4.27 – 4.30 | PPT | | understanding | MT  T1 | 1 | a & b |
| 19. | Types of DC motors – Circuits, Basic Equations and Applications | | 4.30 – 4.48 | PPT | | understanding | MT  OHT | 1 | a & b |
| 20. | Problems in DC motors | | 4.30 – 4.48 | Board & chalk | | Analysis | MT | 2 | c |
| 21. | Construction, Principle of Operation of Single Phase Transformer | | 4.48 – 4.50 | PPT | | understanding | OHT  T2 | 1 | a & b |
| 22. | Basic Equations and Applications of Single Phase Transformer | | 4.54– 4.70 | PPT | | understanding | T2  OHT | 1 | a & b |
| 23. | Problems in Single Phase Transformer | | 4.54– 4.70 | Board & chalk | | Analysis | T2 | 2 | c |
| 24. | Construction, Principle of Operation of single phase induction Motor | | 4.70 – 4.71 | PPT | | understanding | MT | 1 | a & b |
| 25. | Operation, characteristics and applications of different types of single phase induction Motor | | 4.71 – 4.81 | PPT | | understanding | MT  T2 | 1 | b |
| **UNIT III SEMICONDUCTOR DEVICES AND APPLICATIONS**  Characteristics of PN Junction Diode – Zener Effect – Zener Diode and its Characteristics – Halfwave and Full wave Rectifiers – Voltage Regulation. Bipolar Junction Transistor – CB, CE, CC Configurations and Characteristics – Elementary Treatment of Small Signal Amplifier. | | | | | | | | | | |
| **Session No.** | | **Topics to be covered** | **Text book** | **Chapter No. and**  **Page No** | **Instruction delivery** | | | **Testing method** | **Instructional Objective** | **Instructional outcome** |
| **Method** | | **Level** |
| 26. | | Semiconductors - Introduction | R5 | 5.1 – 5.10 | PPT | | Understanding | OHT | 1 | a |
| 27. | | PN Junction Diode – construction, Characteristics and applications | 5.13 – 5.21 | PPT | | Understanding | T2  OHT  THT | 1 & 3 | a & d |
| 28. | | Avalanche and Zener breakdown.  Zener Junction Diode – construction, Characteristics and applications | 5.23 – 5.24 | PPT | | Understanding | THT  OHT  T2  MT | 1 & 3 | a & d |
| 29. | | Rectifiers - Half  wave and Full wave Rectifiers | 5.24 – 5.34 | PPT | | Understanding | T2  MT | 1 & 3 | a & d |
| 30. | | Voltage Regulators – types, zener regulator | 5.38 – 5.40 | PPT | | Understanding | T2  OHT | 1 & 3 | a & d |
| 31. | | Bipolar Junction Transistor – construction and operation of PNP & NPN transistors and configurations | 5.41 – 5.46 | PPT | | Understanding | T2  OHT | 1 & 3 | a & d |
| 32. | | Bipolar Junction Transistor –  CB configuration | 5.47 – 5.50 | PPT | | Understanding | T2 | 3 | d |
| 33. | | Bipolar Junction Transistor –  CE & CC Configurations | 5.50 – 5.54 | PPT | | Understanding | T2  OHT | 3 | d |
| 34. | | Elementary Treatment of Small Signal Amplifier | 5.54 – 5.57 | PPT | | Understanding | OHT | 1 & 3 | a & d |
| **UNIT IV DIGITAL ELECTRONICS**  Binary Number System – Logic Gates – Boolean Algebra – Half and Full Adders – Flip-Flops –Registers and Counters – A/D and D/A Conversion (single concepts) | | | | | | | | | | |  |  | |  | | |  | |  | |  | **Unit 4: INSULATORS AND CABLES**  Insulators – Types – Voltage distribution in insulator string and grading – Improvement of stringefficiency – Underground cables – Constructional features of LT and HT cables – Capacitance –Dielectric stress and grading – Thermal characteristics |
| **Session No.** | **Topics to be covered** | | **Text book** | **Chapter No. and**  **Page No** | **Instruction delivery** | | | **Testing method** | **Instructional Objective** | **Instructional outcome** |
| **Method** | | **Level** |  |
| 35 | Number Systems and conversions | | R5 | 6.1 – 6.13 | Board & chalk | | understanding | THT | 1 | a |
| 36 | Binary numbers- compliments, addition, subtraction  Logic Gates | | 6.13 – 6.21 | Board & chalk | | understanding | THT  MT | 1 | a |
| 37 | Boolean Algebra and simplification of Boolean expressions. | | 6.22 – 6.25 | Board & chalk | | understanding | MT  THT | 1 | a |
| 38 | Half and Full Adders | | 6.26 – 6.28 | Board & chalk | | understanding | THT  MT | 1 & 4 | a & d |
| 39 | Flip-Flops – RS, clocked RS and D Flip Flops | | 6.29 – 6.32 | Board & chalk | | understanding | ORAL | 1 & 4 | a & d |
| 40 | Flip-Flops – JK, JKMS and T Flip Flops | | 6.33 – 6.37 | Board & Chalk | | understanding | ORAL | 1 & 4 | a & d |
| 41 | Counters- types,  asynchronous counters:  up, down and decade counters | | 6.38 – 6.43 | Board & chalk | | understanding | THT  MT | 1 & 4 | a & d |
| 42 | Synchronous counters:  up, down, decade counters  Ring counters: | | 6.38 – 6.43  6.47 | Board & chalk | | understanding | MT | 1 & 4 | a & d |
| 43 | Shift Registers | | 6.51 – 6.53 | Board & chalk | | understanding | ORAL | 1 & 4 | a & d |
| 44 | ADC –  SAR and Ramp types | | 6.53 – 6.56 | Board & chalk | | understanding | THT | 1 & 4 | a & d |
| 45 | DAC –  Weighted Resistor and R- 2R types | | 6.56 – 6.59 | Board & chalk | | understanding | MT | 1 & 4 | a & d |
| **UNIT V FUNDAMENTALS OF COMMUNICATION ENGINEERING**  Types of Signals: Analog and Digital Signals – Modulation and Demodulation: Principles of Amplitude  and Frequency Modulations. Communication Systems: Radio, TV, Fax, Microwave, Satellite and Optical Fiber (Block Diagram Approach only). | | | | | | | | | | |  | |  | |  |  | |  | |
| **Session No.** | **Topics to be covered** | | **Text book** | **Page No** | **Instruction delivery** | | | **Testing method** | **Instructional Objective** | **Instructional outcome** |
| **Method** | **Level** | |
| 46. | Basic communication system.  Types of Signals  Modulation and Demodulation  Types of modulation | | R5 | 7.1 – 7.5 | Board & chalk | understanding | | MT  THT | 1 | a |
| 47. | Principles of  Amplitude Modulation | | 7.6 – 7.8 | Board & chalk | understanding | | MT  THT | 1 | a |
| 48. | Principles of  Frequency Modulation | | 7.8 – 7.11 | Board & chalk | understanding | | THT | 1 | a |
| 49. | Radio Communication | | 7.15 – 7.24 | PPT | Understanding | | ORAL | 1 | e |
| 50. | TV : Transmitter and receiver | | 7.25 – 7.34 | PPT | Understanding | | MT | 1 | e |
| 51. | Fax | | 7.34 – 7.36 | PPT | understanding | | THT | 1 | e |
| 52. | Microwave Communication | | 7.36 – 7.41 | PPT | understanding | | MT  THT | 1 | e |
| 53. | Satellite Communication | | 7.41 – 7.48 | PPT | understanding | | MT | 1 | e |
| 54. | Fiber Optics Communication | | 7.49 – 7.55 | PPT | understanding | | MT | 1 | e |

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