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|  | **NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY**  **(An Autonomous under VTU)**  **DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGG.**  2nd Semester 2019-2020  **COURSE HANDOUT** |

**Course Code :** 19ELN25

**Course Title :** Basic Electronics

**Course Teachers :** Dr.Nagesh K N, Mr. Harish V, Ms. Hemalatha B

& Mrs. Souparnika Jadhav

**Course Co-ordinator : Mr. Harish V**

**1. COURSE DESCRIPTION**

The Course covers fundamental principles of Electronics and Communication. The main topics covered are Semiconductor Diodes and Applications, Bipolar Junction Transistors, Digital Electronics, Operational Amplifiers and Communication Systems.

**2. COURSE OBJECTIVE:**

* Understand the working of semiconductor diodes, zener diodes and its applications.
* Describe the working of transistors and oscillators.
* Learn the basics of number systems and digital electronic fundamentals.
* Design the working of op-amps and their applications.
* Understand the basic principles of communication system.

**3. COURSE PLAN:**

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| **Class**  **Sl No** | **Module and Title**  **/ Page No.** | **Topics to be covered** | **% of portions covered** | |
| **Covered in the chapter** | **Cumulative** |
|  | **Module III**  **Digital Electronics Fundamentals**  **T2 page no**  **10.2 – 11.19** | Difference between analog and digital signals, Number system(decimal, binary) | 20% | 20% |
|  | Number system (octal, hexadecimal) |
|  | Addition and Subtraction using 1’s and 2’s complement |
|  | Boolean Algebra, De Morgan’s theorem |
|  | Basic and universal gates |
|  | Half and Full adder |
|  | **Module IV**  **Operational Amplifiers**  **T2 page no**  **6.2 – 6.12** | Introduction to OP-AMP, Differential amplifier Configurations, | 20% | 40% |
|  | Pin configuration of OP-AMP. Ideal characteristics of OP-AMP, OP-AMP parameters |
|  | Applications: Inverting and Non Inverting OP-AMP circuits |
|  | OP-AMP applications: Voltage Follower, Adder, Subtractor |
|  | Integrator, Differentiator, Comparator |
|  | Numerical examples as applicable. |
|  | **Module V**  **Communication Systems**  **T3 page no**  **1 – 35** | Introduction, Elements of Communication Systems | 20% | 60% |
|  | Modulation, Need for modulation, Amplitude Modulation |
|  | Spectrum Power, frequency modulation |
|  | Comparison of AM and FM |
|  | Numerical examples as applicable. |
|  | **Module I**  **Semiconductor Diodes and Applications**  **T1 page no**  **34 – 77** | PN-junction diode, equivalent circuit of a diode, | 20% | 80% |
|  | Zener diode, Zener diode as voltage regulator |
|  | Rectification: HWR and numerical |
|  | FWR and numerical |
|  | Bridge rectifier |
|  | Numerical examples as applicable. |
|  | **Module II**  **BJT and applications**  **T1 page no**  **144 – 158**  **T2 page no**  **7.3 – 7.10** | Construction and working of transistor, Transistor configuration(CE) | 20% | 100% |
|  | Transistor configuration(CC,CB) |
|  | BJT as a switch and amplifier,  Feedback amplifiers: principle properties, |
|  | Advantages of negative feedback and Oscillator |
|  | Barkhausen’s criteria and RC phase shift oscillators, Numerical examples as applicable. |

**4. TEXT BOOK:**

**T1.**David A Bell: “Electronic Devices and Circuits”, (Chapters 1-3), Oxford University Press, New Delhi, 5th Edition, 2008, ISBN: 9780195693409.

**T2.** Kothari. D.P., and I. J. Nagrath: “Basic Electronics”, (Chapters 4,5), McGraw Hill Education (India) Private Limited, 1st Edition, 2014, ISBN: 9789332901582.

**T3.**George. Kennedy: “Electronic Communication Systems”, TMH, 4th Edition, 1993, ISBN: 0074636820.

**5. REFERENCE BOOKS:**

**R1**. Boylestad .R.L., and Louis. Nashlesky: “Electronic Devices and Circuit Theory”, Pearson Education, 10th Edition, 2012, ISBN: 9788131764956.

**R2**. Thomas L. Floyd: “ Digital Fundamentals”, 3rd  edition, UBS , 2001, ISBN-81:9788185274591

**6. EVALUATION SCHEME:**

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| **Component** | **Weightage** | **Date** |
| CIE 1 | 10% |  |
| CIE 2 | 10% |  |
| MakeupCIE | 10% |  |
| AAT-1(Surprise Test ) | 5% |  |
| AAT-2(Open Book Test ) |  |
| Integrated LAB | 25% |  |
| SEE | 50% |  |

**7. COURSE OUTCOMES:**

On successful completion of this module, students should be able to:

* Analyze the characteristics and working of semiconductor diode and analyze its use in rectification and regulation.
* Describe the operation of BJT as an Amplifier/Switch and its use in various circuits.
* Identify different number systems, convert from one base to another base, understand the working of different logic gates and design logic circuits using them.
* Analyze and design OP-AMP circuits for basic mathematical operations.
* Apply the principles of amplitude modulation, frequency modulation.

**Course Teacher HOD**

Dr. Nagesh K. N Dr. Nagesh K. N

Mr. Harish V

Mrs. Souparnika Jadhav

Ms. Hemalatha B