**20EE31E3 – PULSE AND DIGITAL CIRCUITS**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course category:** | Professional Elective | **Credits:** | 3 |
| **Course Type:** | Theory | **Lecture - Tutorial - Practical:** | 3 - 0 - 0 |
| **Pre-requisite:** | Knowledge in active & passive components and mathematical representation of different waves. | **Sessional Evaluation :**  **External Evaluation:**  **Total Marks:** | 40  60  100 |

|  |  |  |
| --- | --- | --- |
| **Course**  **Objectives** | Students undergoing this course are expected to understand: | |
| 1. Design of wave shaping circuits. 2. Functioning of Switching Circuits. 3. Concept of multi-vibrators. 4. Principle and operation of time base generators. 5. various Power Amplifiers and their operation 6. LC tuned amplifiers. | |
| **Course Outcomes** | Upon successful completion of the course, the students will be able to: | |
| CO1 | Design RC circuits for triggering |
| CO2 | Understand Switching circuits (BJT Inverter, NMOS, PMOS and CMOS switching circuits) |
| CO3 | Design a Multi-vibrator and Schmitt trigger |
| CO4 | Analyse Voltage/ Current Sweep Circuits |
| CO5 | Categorize Power Amplifiers and understand the essence |
| CO6 | Understand principle and operation of a Tuned amplifiers |
| **Course**  **Content** | **UNIT-I**  **WAVE SHAPING CIRCUITS**: Types of waveforms, RC low pass and high pass circuits, rise time, tilt.  **UNIT-II**  **REVIEW OF SWITCHING CIRCUITS**: Diode as a switch,BJT as a switch and switching times, Diode clippers and clampers.  **UNIT-III**  **MULTIVIBRATORS:** Analysis and Design of Bistable, Monostable, Astable Multivibrators and Schmitt trigger using transistors, triggering methods.  **UNIT-IV**  **TIME BASE GENERATORS:** RC sweep circuits, constant current Miller and Bootstrap time base generators using BJT’s and UJT relaxation oscillator.  **UNIT-V**  **TUNED AMPLIFIERS:** Introduction, Q-factor, small signal tuned amplifiers, effect of cascading single tuned amplifier on bandwidth and stagger-tuned amplifiers.  **UNIT-VI**  **POWER AMPLIFIERS:** Classification of Power Amplifiers, Class-A, Transformer coupled Class-A, cross over distortion, Class-B push-pull amplifier, Distortions in amplifiers. | |
| **Text Books &**  **Reference Books** | **TEXT BOOKS:**   1. “Pulse & Digital switching waveforms” by J. Milliman& H. Taub McGraw-Hill, 3rd edition 2017. 2. Millman and Halkias,”Integrated Electronics”, McGraw-Hill Co 2nd Ed, 2017.   **REFERENCE BOOKS:**   1. Solid State Pulse Circuits, by David A. Bell, PHI.4th edition 2008. 2. Boylestad, Louis Nashelsky “Electronic devices and circuits” 11th ed., 2012 PH. | |
| **E-Resources** | 1. http://nptel.ac.in/cources 2. https:// iete-elan.ac.in 3. <https://freevideolectures.com/university/iit> | |