**19EC2104 – PULSE AND ANALOG CIRCUITS**

(Common to ECE and EEE)

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

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| **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**  **Course**  **Content** | **UNIT-I**  **LINEAR WAVE SHAPING**: Types of waveforms, RC low pass and high pass circuits, rise time, tilt.  **UNIT-II**  **NON LINEAR WAVE SHAPING**: 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.  **OSCILLATORS:** Oscillator Principles, Barkhausan Criteria, RC Phase shift and Wien Bridge Oscillator, Hartley and Colpitts Oscillators, Crystal Oscillator.  **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 and Reference Books** | **TEXT BOOKS:**   1. “Pulse & Digital switching waveforms” by J. Milliman & H. Taub Mc Graw-Hill, 2nd edition 2008. 2. Millman and Halkias,”Integrated Electronics”, McGraw-Hill Co 2nd Ed, 2017.   **REFERENCE:**   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> | |

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| Contribution of Course Outcomes towards achievement of Program Outcomes | | | | | | | | | | | | | | |
|  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| CO1 | 3 | 3 | 2 | 2 | 1 | - | - | - | - | - | - | 2 | 3 | 3 |
| CO2 | 3 | 3 | 2 | 2 | 1 | - | - | - | - | 1 | - | 2 | 3 | 3 |
| CO3 | 3 | 3 | 3 | 1 | 1 | - | - | - | - | 1 | - | 2 | 3 | 3 |
| CO4 | 3 | 3 | 2 | 2 | 1 | - | - | - | - | - | - | 2 | 3 | 3 |
| CO5 | 3 | 3 | 2 | 2 | 1 | - | - | - | - | 1 | - | 2 | 3 | 3 |
| CO6 | 3 | 3 | 2 | 2 | 1 | - | - | - | - | 1 | - | 2 | 3 | 3 |