**19EC2101 – ELECTRONIC CIRCUITS**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course Category:** | Program core | **Credits:** | 3 |
| **Course Type:** | Theory | **Lecture - Tutorial - Practical:** | 3 - 0 – 0 |
| **Prerequisite:** | Knowledge in electronic devices and its operations with various applications. | **Sessional Evaluation :****External Evaluation:****Total Marks:** | 4060100 |

|  |  |
| --- | --- |
| **Course****Objectives** | Students undergoing this course are expected to understand: |
| 1. The concept of rectifiers and other Diode applications
2. The Hybrid model, Small signal analysis of single stage BJT amplifiers
3. The FET biasing schemes, high frequency response.
4. The types of coupling, Darlington and Bootstrap circuits.
5. The hybrid π model at high frequency.
6. Different types of feedback circuits as well as Sinusoidal oscillators
 |
| **Course Outcomes** | Upon successful completion of the course, the students will be able to: |
| CO1 | Understand the concept of rectifiers and other applications of diodes. |
| CO2 | Analyze the stability and biasing concepts of BJT and to design Single Stage amplifiers. |
| CO3 | Design a FET amplifier and compare with BJT |
| CO4 | Know different methods of coupling and able to design multistage amplifiers |
| CO5 | Represent the Hybrid π model at high frequency. |
| CO6 | Design feedback amplifiers and able to understand oscillators. |
| **Course****Content** | **UNIT I****RECTIFIERS:** Half Wave, Full Wave & Bridge Rectifiers, Analysis of FWR with filters (L, C, LC) & regulation.**UNIT II****TRANSISTOR BIASING AND STABILITY:** Operating Point, Bias Stability against variation in ICO, VBE & β, fixed bias, Collector to Base Bias, Self-Bias, Thermal runaway, Compensation Methods.**UNIT III****SINGLE STAGE AMPLIFIERS:** BJT Amplifier, h-parameter model, analysis of common emitter, common collector and common base amplifier using exact model & Approximate model, Millers Theorem and its Dual.**FET AMPLIFIERS:** FET Equivalent model, Analysis of Common Source, Common Drain Amplifiers.**UNIT IV****MULTISTAGE AMPLIFIERS:** Methods of Coupling, Analysis of Two Stage RC Coupled Amplifier, High Input Impedance Circuits: Boot strap & Darlington amplifier.**UNIT V****HIGH FREQUENCY ANALYSIS:** Transistor at High Frequency, Hybrid π CE Model, Determination of High Frequency Parameters, CE Short circuit Current Gain, Current Gain with Resistive Loads, Cut-off Frequencies, Frequency Response, parameters fT and fβ. Analysis of CS amplifier at High Frequency.**UNIT VI****FEEDBACK AMPLIFIER:** Feedback Concept, Types of Feedback, Feedback Topology, Characteristics, Analysis of Feedback Amplifiers. |
| **Text Books and Reference Books** | **TEXT BOOKS:**1. Allen Mottershead, “Electronic Devices and Circuits-An Introduction‟, PHI, 18th Reprint, 2006.
2. Millman and Halkias, “Integrated Electronics”, McGraw- Hill Co 2nd Ed, 2017.

**REFERENCES:**1. Boylestad, Louis Nashelsky “Electronic devices and circuits” 11th ed., 2012 PH.
2. David. A. Bell. “Electronic Devices and circuits”, Oxford, 5th Ed., 2008.
 |
| **E-Resources** | 1. https://nptel.ac.in/courses
2. https://iete-elan.ac.in
3. [https://freevideolectures.com/university/iit](https://freevideolectures.com/university/iitm)
 |

|  |
| --- |
| 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 | 2 | - | - | - | - | - | - | 2 | 3 | 3 |
| CO2 | 3 | 3 | 3 | 2 | 2 | - | - | - | - | - | - | 2 | 3 | 3 |
| CO3 | 3 | 3 | 3 |  2 |  2 |  - |  - |  - |  - |  2 |  - |  2 |  3 |  3 |
| CO4 | 3 | 3 | 2 | 2 | 2 | 1 | - | - | - | 2 | - | 2 | 3 | 3 |
| CO5 | 3 | 3 | 2 | 2 | 2 | 1 | - | 1 | - | 2 | - | 2 | 3 | 3 |
| CO6 | 3 | 3 | 2 | 2 | 2 | - | - | - | - | - | - | 2 | 3 | 3 |