

| ANALOG ELECTRONICS [As per Choice Based Credit System (CBCS) scheme] SEMESTER – III (EC/TC) | | | |
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| Subject Code | 15EC32 | IA Marks | 20 |
| Number of Lecture Hours/Week | 04 | Exam Marks | 80 |
| Total Number of Lecture Hours | 50 (10 Hours per Module) | Exam Hours | 03 |
| CREDITS – 04 | | | |
| Course objectives: This course will enable students to: <ul style="list-style-type: none"> • Explain various BJT parameters, connections and configurations. • Explain BJT Amplifier, Hybrid Equivalent and Hybrid Models. • Explain construction and characteristics of JFETs and MOSFETs. • Explain various types of FET biasing, and demonstrate the use of FET amplifiers. • Construct frequency response of BJT and FET amplifiers at various frequencies. • Analyze Power amplifier circuits in different modes of operation. • Construct Feedback and Oscillator circuits using FET. | | | |
| Modules | | | RBT Level |
| Module -1 | | | |
| BJT AC Analysis: BJT Transistor Modeling, The re transistor model, Common emitter fixed bias, Voltage divider bias, Emitter follower configuration. Darlington connection-DC bias; The Hybrid equivalent model, Approximate Hybrid Equivalent Circuit- Fixed bias, Voltage divider, Emitter follower configuration; Complete Hybrid equivalent model, Hybrid π Model. | | | L1, L2,L3 |
| Module -2 | | | |
| Field Effect Transistors: Construction and Characteristics of JFETs, Transfer Characteristics, Depletion type MOSFET, Enhancement type MOSFET. FET Amplifiers: JFET small signal model, Fixed bias configuration, Self bias configuration, Voltage divider configuration, Common Gate configuration. Source-Follower Configuration, Cascade configuration. | | | L1, L2, L3 |
| Module -3 | | | |
| BJT and JFET Frequency Response: Logarithms, Decibels, Low frequency response – BJT Amplifier with RL, Low frequency response-FET Amplifier, Miller effect capacitance, High frequency response – BJT Amplifier, High frequency response-FET Amplifier, Multistage Frequency Effects. | | | L1, L2, L3 |
| Module -4 | | | |

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| Feedback and Oscillator Circuits: Feedback concepts, Feedback connection types, Practical feedback circuits, Oscillator operation, FET Phase shift oscillator, Wien bridge oscillator, Tuned Oscillator circuit, Crystal oscillator, UJT construction, UJT Oscillator. | L1,L2, L3 |
| Module -5 | |
| Power Amplifiers: Definition and amplifier types, Series fed class A amplifier, Transformer coupled class A amplifier, Class B amplifier operation and circuits, Amplifier distortion, Class C and Class D amplifiers. Voltage Regulators: Discrete transistor voltage regulation - Series and Shunt Voltage regulators. | L1, L2, L3 |
| <p>Course Outcomes: After studying this course, students will be able to:</p> <ul style="list-style-type: none"> • Describe the working principle and characteristics of BJT, FET, Single stage, cascaded and feedback amplifiers. • Describe the Phase shift, Wien bridge, tuned and crystal oscillators using BJT/FET/UJT. • Calculate the AC gain and impedance for BJT using re and h parameters models for CE and CC configuration. • Determine the performance characteristics and parameters of BJT and FET amplifier using small signal model. • Determine the parameters which affect the low frequency and high frequency responses of BJT and FET amplifiers and draw the characteristics. • Evaluate the efficiency of Class A and Class B power amplifiers and voltage regulators. | |
| <p>Question paper pattern:</p> <ul style="list-style-type: none"> • The question paper will have ten questions. • Each full question consists of 16 marks. • There will be 2 full questions (with a maximum of Three sub questions) from each module. • Each full question will have sub questions covering all the topics under a module. The students will have to answer 5 full questions, selecting one full question from each module. | |
| <p>Text Book:</p> <p>Robert L. Boylestad and Louis Nashelsky, "Electronics devices and Circuit theory", Pearson, 10th/11th Edition, 2012, ISBN:978-81-317-6459-6.</p> | |
| <p>Reference Books:</p> <ol style="list-style-type: none"> 1. Adel S. Sedra and Kenneth C. Smith, "Micro Electronic Circuits Theory and Application", 5th Edition ISBN:0198062257 2. Fundamentals of Microelectronics, Behzad Razavi, John Wiley ISBN 2013 978-81-265-2307-8 3. J.Millman & C.C.Halkias—Integrated Electronics, 2nd edition, 2010, TMH. ISBN 0-07-462245-5 4. K. A. Navas, "Electronics Lab Manual", Volume I, PHI, 5th Edition, 2015, ISBN:9788120351424. | |

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Dept. Of Electronics & Communication
Alva Institute of Engg & Technology
Mjpr, MOORENUR - 574 225