

UNDERGRADUATE PROGRAMME IN ELECTRONICS

Semester-III

EL-5

Analog Electronics-I

Total Periods: 48

Unit- 1

(P -12)

Diode Circuits: Ideal diode, piecewise linear equivalent circuit, dc load line analysis, Quiescent (Q) point. Positive, negative and biased clipper circuits clamping circuits. Half wave rectifier, center tapped and bridge full wave rectifiers, calculation of efficiency and ripple factor.

DC power supply: Block diagram of a power supply, qualitative description of shunt capacitor filter, Zener diode as voltage regulator, temperature coefficient of Zener diode.

Unit- 2

(P -12)

The BJT: Transistor as an amplifier and its operation in different configurations: Common Base (CB), Common Emitter (CE) and Common Collector (CC) , hybrid parameters, regions of operation, dc load line, Q point.

CE amplifier: Self bias arrangement of CE, dc and ac load line analysis. Stability factors S , S' , S'' . Hybrid equivalent of CE, Quantitative study of the frequency response of CE amplifier, effect on gain and bandwidth for cascaded CE amplifier (RC coupled).

Unit -3

(P -12)

Feedback Amplifiers: Concept of feedback, negative and positive feedback, Negative feedback: advantages and disadvantages of negative feedback, voltage (series and shunt), current (series and shunt) feedback amplifiers, derivation of gain, input and output impedances for feedback amplifiers. Positive feedback: Barkhausen criteria for oscillations, Study of phase shift oscillator, Colpitts oscillator and Crystal oscillator.

Unit- 4

(P -12)

The JFET: Different regions of operation, small signal equivalent circuit, Common Source amplifier circuit analysis.

Power Amplifiers: Classification of power amplifiers: A, B, C and AB, analysis of Class B push pull amplifiers (efficiency, power dissipation).

Single tuned amplifiers.

Essential Text:

Unit-1

Chapter-4 , J. Millman and C. C. Halkias, Integrated Electronics, Tata McGraw Hill (2001);

Chapter-15, R. L. Boylestad, L. Nashelsky, Electronic Devices and Circuit Theory, Pearson Education 10th Edition (2009)

Unit-2

Chapter-9 J. Millman and C. C. Halkias, Integrated Electronics, Tata McGraw Hill (2001);

Chapter-4, R. L. Boylestad, L. Nashelsky, Electronic Devices and Circuit Theory, Pearson Education 10th Edition (2009)

Chapter-15 A.Mottershead, Electronic Devices and Circuits, PHI

Unit-3

Chapter-5 ,John D Ryder ,Electronic Fundamental and applications,Vth Edition .PHI, New Delhi.

Chapter-14, R. L. Boylestad, L. Nashelsky, Electronic Devices and Circuit Theory, Pearson Education, 10th Edition (2009)

Unit-4

Chapter-18 ,J. Millman and C. C. Halkias, Integrated Electronics, Tata McGraw Hill (2001);

Chapter-12, R. L. Boylestad, L. Nashelsky, Electronic Devices and Circuit Theory, Pearson Education 10th Edition 2009)

UNDERGRADUATE PROGRAMME IN ELECTRONICS

Suggested Books:

1. D. L. Schilling and C. Belove, Electronic Circuits: Discrete and Integrated, Tata McGraw Hill (2002)
2. Donald A. Neamen, Electronic Circuit Analysis and Design, Tata McGraw Hill (2002)
3. J. Millman and C. C. Halkias, Integrated Electronics, Tata McGraw Hill (2001)
4. J. R. C. Jaegar and T. N. Blalock, Microelectronic Circuit Design, Tata McGraw Hill (2010)
5. J. J. Cathey, 2000 Solved Problems in Electronics, Schaum's outline Series, Tata McGraw Hill (1991)
6. John Ryder, Electronic Devices , V Edition
7. Mottershed, Electronic Devices

EL-5 Practical based on Analog Electronics-I

(At least five experiments to be performed on hardware and software)

1. To study the half wave rectifier and Full wave rectifier.
2. To study power supply using C filter and Zener diode.
3. To study clipping circuits
4. To study clamping circuits
5. To study Fixed Bias, Voltage divider and Collector-to-Base bias Feedback configuration for transistors.
6. To design a Single Stage CE amplifier.
7. To study Class A, B and C Power Amplifier.
8. To study the Colpitt's Oscillator.
9. To study the Phase Shift Oscillator
10. To study the frequency response of Common Source FET amplifier.