

CURRICULUM PLAN 2025-2026 (Even Semester) Prof. Monika Bassi

DSC-12: ANALOG ELECTRONICS

Unique Paper Code: 2222012403

B.Sc. (HONS.) PHYSICS PART II, Semester IV

No. of Periods per week = 2

| Name of Paper & Code | Allocation of Lectures | Month wise schedule followed by the Department | Tutorial/assignment/ Presentation etc. |
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| DSC-12, ANALOG ELECTRONICS UPC: 2222012403 | | | |
| Unit 1: Two-terminal Devices and their Applications: IV characteristics of a diode and its application as rectifier (half-wave and full wave rectifier), IV characteristics of a zener diode and its use as voltage regulator, principle, structure and characteristics of (1) LED, (2) Photodiode and (3) Solar Cell | 5 | February | <ul style="list-style-type: none">• Derivations• Related problems• Problem solving• Assignments• Class Tests• Practice Examinations• Discussion of Practice Examinations |
| Unit 2: Bipolar Junction Transistors: n-p-n and p-n-p transistors, IV characteristics of CB and CE configurations, active, cut-off and saturation regions, current gains α and β , relations between α and β , physical mechanism of current flow | 4 | March | <ul style="list-style-type: none">• Derivations• Problem solving• Assignments• Students' difficulties• Class Test |
| Unit 3: Amplifiers and sinusoidal oscillators: Load line analysis of transistor, DC load line and Q-point, fixed bias and voltage divider bias, transistor as 2-port network, h-parameter equivalent circuit of a transistor, analysis of a single-stage CE amplifier using hybrid model (input and output impedance, current and voltage gain) Sinusoidal Oscillators: General idea of positive and negative feedback, Barkhausen's criterion for self-sustained oscillations, RC phase shift oscillator, determination of frequency, Hartley and Colpitts oscillators | 11 | March-April | <ul style="list-style-type: none">• Derivations• Related problems• Problem solving• Revisions• Class Tests• Practice Examinations• Discussion of Practice Examinations• Tips for Final exams |
| Unit 4: Operational Amplifiers (Black Box approach) Characteristics of an ideal and practical Op-Amp (IC 741), open-loop and closed-loop gain, frequency response, CMRR, slew rate and concept of virtual ground. Applications of Op-Amps: (1) Inverting and non-inverting amplifiers, (2) Adder, (3) Subtractor, (4) Differentiator, (5) Integrator, (6) Comparator and Zero crossing detector (7) Wein bridge oscillator | 10 | January-February | <ul style="list-style-type: none">• Syllabus Overview• Reference Books• Derivations• Problem solving• Assignments• Revisions• Class Tests• Practice Examinations• Students' difficulties |