

Analog Electronic Circuits (UEC301)

By



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Analog Electronic circuits(301): Course Introduction and Materials

❖ **Introduction:** This course actually introduces students to the analysis and design of basic transistor amplifier circuits, oscillator and wave shaping circuits.

❖ **Who is this course:**

- ✓ This course is design for ECE and ENC students that is comfortable with the fundamental concepts of electrical and electronic components viz. resistors, capacitors, transistors etc.
- ✓ You will need to know Ohm's law and the relationship between power, voltage and current.
- ✓ I hope that you are comfortable with the basic theory of Bipolar transistor and MOSFET.



❖ What Will You Learn ?

Here is the syllabus of this course : When you complete this course, you will have been exposed to nearly all of the most common analog electronic circuits and design problems.

Unit I (Transistor Biasing and Thermal Stabilization): The Operating Point, Biasing Stability, Self-Biasing or Emitter Bias, Stabilization against Variations in I_{co} , V_{BE} , and β , General Remarks on Collector-Current Stability, Bias Compensation, Thermal Runaway, Thermal Stability, The FET Small-Signal Model, The metal-oxide-semiconductor FET (MOSFET), The low-frequency common-source and common-drain amplifiers, Biasing FET.

Unit II (Transistor at Low and High Frequencies): Low frequency h-parameter model of BJT, The Hybrid-pi Common-emitter Transistor Model, Hybrid-pi conductance, The Hybrid-pi Capacitances, Variation of Hybrid-pi parameters, The CE short-circuit current gain, The gain-bandwidth product.

Unit III (Multistage Amplifiers): Classification of amplifiers, Distortion in amplifiers, Frequency response of an amplifier, Step Response of an amplifier, Band pass of cascaded stages, The RC-coupled amplifier, Low-frequency response of an RC-coupled stage, Effect of an emitter Bypass capacitor on low-frequency response.

Unit IV (Power Amplifiers): Class A, B, AB, Push pull & Class C amplifiers, Comparison of their Efficiencies, Types of distortion.

Unit V (Feedback Amplifiers): Classification of Amplifiers, The feedback concept, The transfer gain with feedback, General characteristics of negative-feedback amplifiers, Input resistance, Output resistance, Method of Analysis of a Feedback Amplifier, Voltage-series feedback, Current-series feedback, Current-shunt feedback, Voltage-shunt feedback.

Unit VI (Stability and Oscillators): Sinusoidal Oscillator, The phase-shift oscillator, Resonant-circuit oscillators, A General form of oscillator circuit, The Wien Bridge oscillator, Crystal oscillator, Frequency Stability.

Unit VII (Wave shaping circuits): Multi-vibrators (Astable, Mono-stable, Bi-Stable), High pass and low pass filters using R-C Circuits & their response to step input, Pulse input, Square input and Ramp Input, Schmitt Trigger.



Books: *Here are a list of reference books that you may either already have, can purchase, or borrow from a friend or download a soft copy.*

- ✓ *Jacob Milman & and C.C.Halkias, “Integrated Electronics Analog and Digital Circuit and Systems” Second Edition.*
- ✓ *Adel S. Sedra & K. C. Smith, “Micro Electronic Circuits Theory and Application” Fifth Edition.*
- ✓ *Robert L. Boylestad & L. Nashelsky, “Electronic Devices and Circuit Theory” Eleventh Edition.*



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Thank You

