

## Course Specification Document

<b>Title</b>	Electronics 1
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<b>Credits</b>	3.5 ECTS
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<b>Aims</b>	This course aims to introduce the student to the basic electronic components: P-N diode, bipolar junction transistor, field effect transistor, along with their characteristics and applications, in addition to transistor amplifiers analysis; in a way that contributes to his study of other specialized courses and later to his work practice.
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### Intended learning outcomes

On successful completion of this course, the student will be able to:

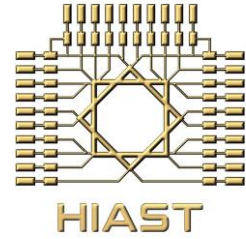
- Understand P-N diodes, bipolar Junction transistors, field effect transistors, along with their characteristics and applications.
- Understand and analyze transistor amplifiers.
- Understand operational amplifier components and its linear and non-linear applications.
- Design and implement diode circuits and transistor amplifiers, having the quiescent point calculated.

### Syllabus

- **P-N Junction (Its working principle, modelisations and basic applications):** Semi-conductors, P-N junction (diodes), diode modeling for small signals and high frequencies, characteristic curves, ideal diodes, diode, special diodes, simulation using Spice program.
- **Bipolar Junction Transistor (Its working principle, modelisations , characteristic curves and basic applications):** Transistor structure, working modes, symbolism, configurations, characteristic curves, modelisation for variable signals, the transistor amplifier, quiescent point, common emitter and common base amplifiers, high-frequency modelisation, band-width and Miller effect simulation using Spice program.
- **Field Effect Transistor (Its working principle, modelisations , characteristic curves and basic applications):** Working principle of MOSFET, characteristic curves, transistor polarization, the transistor as an amplifier, transistor small signal and high frequency modelisation, MOSFET amplifier configurations, simulation using Spice program.
- **Transistor Amplifiers (Basic configurations and linking transistor amplifiers):** MOSFET-BJT transistors comparison, current mirrors, higher cutoff frequencies, common source and common emitter amplifiers, common gate and common base amplifiers, Cascode amplifier, common drain and common collector amplifiers, important configurations.

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- **Differential Amplifier and Operatoional Amplifier:** Differential amplifier (common mode and differential mode amplification), operational amplifier, linear applications of operational amplifier, non-linear applications of operational amplifier.