

## Course Specification Document

<b>Title</b>	Advanced Electronic Circuits
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<b>Credits</b>	3.5 ECTS
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<b>Aims</b>	This course aims to develop the student's capabilities in analyzing and designing analogue and digital electronic circuits and systems, and in designing and analyzing the electronic circuits necessary to form and generate signals and different waveforms for a specific application, in addition to providing him with the knowledge and skills necessary to test and model these circuits and selecting the necessary components to ensure that the circuit specifications are compatible with the application in question.
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### Intended learning outcomes

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

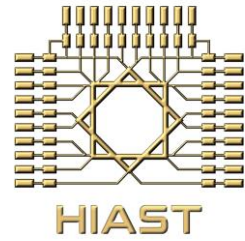
- Understand the operation principle of electronic circuits and draw the signals generated by each node of the circuit.
- Describe the signals generated by different parts of the circuit over time.
- Grasp the methods of power calculations.
- Understand the method of calculating necessary heat sinks.
- Identify the methods for designing electronic circuits necessary to implement the system's block diagram.
- Calculate the practical values of electronic components needed for each stage of the system.
- Perform power and frequency calculations and select the necessary electronic components in accordance with the specifications.
- Design the appropriate circuit for a specific application, including selecting the appropriate electronic components.
- Implement various practical projects in the field of analog and digital signals.

### Syllabus

- **Amplifiers:** Study and analysis of linear amplifiers at audio frequencies (A, B, AB, C), study and analysis of digital amplifiers (D, S, H-bridge), thermal considerations in transistor power amplifiers.
- **Signal generators and signal shaping circuits:** The basic principle of oscillators, R-C oscillators, L-C oscillators, crystal oscillators, modulators, comparators, Schmitt trigger, square and triangular signal generators, generation of standard signals, non-linear signal generation circuits, precision calibration circuits.
- **Filters and amplifiers:** First and second-order filters, second-order filters using Antoniou

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inductance, second-order filters using two complementary loops, quadratic filters using a single amplifier, switched capacitor filters, composite amplifiers, and cascode amplifiers.

- **Modern electronic circuits:** Voltage regulator circuits, analog multiplier circuits and phase-locked loop (PLL) circuits.