



## Course Specification Document

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| <b>Title</b> | Electric Circuit Fundamentals |
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| <b>Credits</b> | 2.5 ECTS |
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| <b>Aims</b> | This course aims to prepare the student to study electronic circuits, electrotechnics and power electronics, and for deeper studies in electrical engineering by developing his basic methods and tools for analyzing linear electrical circuits with direct and alternating current and electrical circuits with interconnected sources and independent sources. |
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### Intended learning outcomes

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

- Understand how to use some basic tools to analyze linear electrical circuits with direct and alternating current and electrical circuits with connected sources and independent sources.
- Solve electrical circuits using phasers.
- Solve alternating current electrical circuits and draw the vector diagram of the circuit.
- Understand and analyze magnetically interconnected electrical circuits.
- Apply theoretical concepts in the field of specialization to industrial practices.
- Perform power calculations, correct the power factor in the simple linear case, and understand some applications of electrical circuits in practical life.
- Find the transfer function of the electrical network.

### Syllabus

- **Methods of analyzing direct current electrical circuits:** Identifying methods of solving direct current electrical circuits with independent and connected sources.
- **Circuit theory and power calculations:** Direct current circuits and the principle of energy conservation.
- **First-order circuits:** Solving first-order circuits, transient and stable response with connected sources, total response.
- **Second-order circuits:** Solving second-order circuits, transient and stable response with connected sources, total response.
- **Alternating current circuits:** Phases, stable response, resonant circuits, power calculations, power factor correction.
- **Magnetically coupled circuits:** single-phase transformers, solving electrical circuits with a single-phase transformer.