



Course Specification Document

Title	Digital Control
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Credits	3.5 ECTS
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Aims	This course aims to provide the student with the knowledge and skills related to digital systems and enable him to use the related tools to describe a digital system and control its behavior in several methods.
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Intended learning outcomes

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

- Describe digital systems in the time and frequency domains and study their stability.
- Recognize direct control methods specially RST or indirect ones through interpreted conversion of analog controller on real systems.
- Understand the importance of the choice of sampling period to convert a continuous system into digital one.
- Apply the theoretical concepts in the field of control to real systems.
- Apply mathematical models using the computer to obtain operational models.

Syllabus

- **Introduction to digital control:** Closed-loop control strategy, Z transforms, digital control systems (case study), difference equation resolution.
- **Digital systems analysis:** Transfer function, causality, holder effect, DC gain, temporal response and its modes, frequency response, analytical and algebraic study of stability.
- **Direct Method of digital controller design:** Pole placement method, Bezout's identity, RST method, PID method.
- **Indirect Method of digital controller design by converting an analog controller using interpreted converter:** Zero order holder transform method, bilinear transform method, Euler transform method, matched filter transform method.
- **The choice of sampling time and the practical implementation of digital controllers.**