COURSE TITLE:	**Digital Signal Processing**
Institute/Division:	Department of Automation and Computer Engineering Faculty of Electrical and Computer Engineering
Course code:	E-DSP
Erasmus subject code:	06.2
Number of contact hours:	45
Course duration:	1 semester (Spring/Summer)
ECTS credits:	6
Course description:	The course covers the basics of the operation and construction of digital filters. The objective is to familiarize students with digital signals and systems and basic digital signal processing (DSP) techniques. The main topics are the convolution and Borel's convolution theorem, signal sampling, digital filter realizations, and filter design. More advanced topics also cover adaptive filters design and application. Lecture topics include: Discrete Fourier transform. Impulse response and convolution. Cyclic convolution The z-Transform. Digital Filter Realizations- general DSP block diagrams. Time and frequency characteristics of digital filters. Digital modeling of continuous-time systems. FIR IIR digital filters, their classification, and application. Butterworth and Chebyshev filters design. Additional topics cover adaptive filtering with noise reduction and echo cancellation. As part of laboratory exercises and individual projects, students use the acquired knowledge to design and implement a filter that performs a given task.
Course type:	Lectures (20h), Laboratory (20h), Project (5h)
Literature:	Li Tan and Jean Jiang, *Digital Signal Processing Fundamentals and Applications*, Academic Press; 2nd edition (February 22, 2013) Zoher Z. Karu, *Signals and Systems Made Ridiculously Simple*, Zizi Pr; 1st edition (January 1, 1995) Richard Lyons, *Understanding Digital Signal Processing*, Pearson; 3rd edition (November 1, 2010)
Prerequisites:	Knowledge of the theory of differential and difference equations. Knowledge of the basics of linear algebra: matrix theory and systems of linear equations. Basic knowledge of harmonic analysis.
Assessment method:	Laboratory exercises, project and tests
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