

31565 – RT-DSP (Real-Time Digital Signal Processing)

Lecturers: Dr. Samuel Kosolapov

Credits: 2.5 points

Hours: 2 lecture, 1 tutorial

Grade Composition:

CMW – Class Micro-Works

HW1 – Home work #1 , HW2 – Home work #2 , HW3 – Home work #3

MP1 – Micro Project #1 , MP2 – Micro Project #2

$$A = 0.05*HW1 + 0.1*HW2 + 0.15*HW3 + 0.3*MP1 + 0.4*MP2$$

$$\text{Final Grade} = G = \text{MAX} (0.2*CMW + 0.8*A , A)$$

Prerequisites: 31410 Networks and discrete systems

31616 Introduction to Computer Systems and C

Course Description:

This course is about real-time acquisition and processing of the analog signals by using specialized DSP microcontrollers and adapted to digital signal processors algorithms like ring buffers, double buffers, digital filters, FFT. Home works and Micro projects are executed by using software defined signal generators and DSP microcontroller development boards.

Course Content:

1. Basic analog and digital signals. Examples of medical signals.
2. Practical aspects of signal acquisition by using ADC: pre-amplifiers, anti-aliasing filters. Usage of timers and interrupts.
3. Basic DSP algorithms and their practical implementation: filtration by convolution and by using FFT, normalized correlation, autocorrelation, median filtration.

Bibliography:

1. Dogan Ibrahim. *Practical Digital Signal Processing using Microcontrollers*. Elektor International Media BV (2013)
2. Paul Horowitz, Winfield Hill. *The Art of Electronics*. Cambridge University Press. (2015)

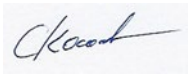
Learning Outcomes:

After learning the theory provided in the lectures and tutorials, and after executing home works and micro projects, the student will be able to implement DSP algorithms as a firmware for the DSP microcontrollers.

Consultation hours: Wednesday 11:30 – 12:30, EM425

Note: This is not a contract. Written and verbal instructions may override any part of this course outline.

Last Update: March 2019

Signature of Lecturer  Date 2019-04-03

Signature of Head of Department _____ Date _____