Microprocessor Systems

1. Course number and name: 020SMPES3 Microprocessor Systems

2. Credits and contact hours: 4 ECTS credits, 2x1.15 contact hours

3. Instructor's or course coordinator's name: Andre Chkeiban

4. Text book:

a. Other supplemental materials:

Technical documents: Microchip 18F2520

5. Specific course information

a. Catalog description:

Difference between microprocessors, microcontrollers and DSP – microprocessor architecture; realization of a basic board – Microcontroller architecture (PIC 18F2520) – Implementation of ROM, RAM and DATA EEPROM memory – special registers – addressing modes – inputs/outputs – interrupts – timers – analog to digital converter – asynchronous serial port – read from program memory – comparators – watchdog – sleep mode – Low Voltage Detect – oscillator – configuration words – Design, simulation and realization of microprocessor systems.

- **b. Prerequisites or co-requisites:** 020TEDNI4 Digital Systems Design or 020TEDCI4 Digital Systems Design
- **c. Required:** Elective for CCE students; required for CCE telecommunication networks option students; required for EE students

6. Specific goals for the course

a. Specific outcomes of instruction:

Outline the differences between a microprocessor, a microcontroller and a DSP.

Analyze the software and hardware operations of a microcontroller.

Design organization charts and implement them by structured programming. Program in assembly.

Analyze microcontroller data sheets and identify their powers and limitations.

Implement inputs/outputs, timers, interrupts, serial port, analog to digital converter, watchdog, sleep mode...

Develop and simulate microcontroller-based applications to meet desired functions and needs.

b. KPI addressed by the course:

KPI	a2	c1	c2	c3	e2	e3	g1	g2	i2	k2	k3
Covered		X	X	X	X	X				X	
Assessed	X	X	X	X	X	X	X	X	X	X	X

Give Feedback						

7. Topics and approximate lecture hours:

Difference between a microprocessor, a microcontroller and a DSP (1 lecture)

Microprocessor internal architecture – realization of a basic board (4 lectures)

PIC 18F2520 internal architecture – program memory, data memory – special registers – addressing modes (3 lectures)

Inputs/outputs – Applications on addressing modes and inputs/outputs (+ simulation using Proteus) (3 lectures)

Interrupts – Applications on interrupts (+ simulation using Proteus) (2 lectures)

Timers – Applications on timers (+ simulation using Proteus) (2 lectures)

Analog to digital converters – Applications on analog to digital converters (+ simulation using Proteus) (2 lectures)

Asynchronous serial port – Applications on asynchronous serial port (+ simulation using Proteus) (2 lectures)

Read from program memory – Applications on program memory (+ simulation using Proteus) (2 lectures)

Comparators – Applications on comparators (+ simulation using Proteus) (2 lectures)

Watchdog – sleep mode – Applications on watchgod and sleep mode (+ simulation using Proteus) (2 lectures)

Low Voltage Detect – oscillator – configuration words (2 lectures)

Course summary; Q&A session (1 lecture)