Microprocessor Systems

1. **Course number and name:** 020SMPES3 – Microprocessor Systems

2. **Credits and contact hours:** 2 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 or 020TEDCI4 – Digital Systems Design

    c. **Required:** Required for EE program

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)