	University of East Sarajevo
	Faculty of Electrical Engineering
	Study program:Automation and electronics/ Computer engineering
	Study degree: Bachelor **Year:** IV

Course title	**Intoduction to Microcontrollers**
Department	Automation and electronics
Target group	Ordinary students
Is the course offered to ERASMUS students?	Yes
Language:	English

Course code	Course status	Semester	ECTS
RI-ME0123	Obligatory	VIII	5

Lecturer/Instructor	Prof dr Slobodan Lubura
Course Assistant(s)	BSc Nikola Kukric

Course Meeting Times (weekly)	**L (lecture)**	**T (tutorial)**	**P (lab)**
	2	1	1

Course goals	The focus of this course will be programming microcontrollers to be used in wide area applications. Students will learn some of the fundamentals of microcontrollers as well as relatively sophisticated applications. Students will have an understanding of basic digital electronics. Students will use digital oscilloscopes throughout the course to gain deeper understandings of the analog and digital circuits.
Learning Outcomes	1. Demonstrate knowledge and understanding of the fundamental principles embedded systems design, explain the process and apply it. 2. Demonstrate knowledge and understanding of the microcontroller technology both for hardware and software. 3. Design embedded systems based on microcontrollers. 4. Demonstrate knowledge and understanding of Hardware/Software co-design techniques for microcontroller-based embedded systems, apply techniques in design problems. 5. Program microcontrollers in C using Integrated Development Environments and using debugging techniques. 6. Know and classify microcontrollers' peripherals; know, understand and explain low-power technology and Interrupt mechanisms. 7. Design and implement a complete embedded system as a project.
Admission and requirements	Prerequisite Course: Digital electronics, Introduction to programming in C
Teaching Methods	• Interactive lectures and communication with students • Discussion and Group Works • Presentation • Homework • Project
Course Content per Week	1. Microprocessor and microcontroller architecture 2. Program and memory data organization 3. CPU and ALU unit 4. Instruction set and addressing modes 5. Interrupt technique 6. I/O pert specification 7. Timer modules 8. UART synchronous and asynchronous serial communication module 9. MSSP module (SPI and I2C) for serial synchronous communication 10. CCP and PWM modules 11. A/D conversion and analogue comparator module 12. Microcontrollers oscillator module and reset modes 13. WDT timer; EEPROM module 14. Loops timing and computed GOTO technique. 15. Advanced programming of microcontroller in C; Debugging code.
Quality assessment methods	....
Specific note if any	-

Mandatory Literature			
Author(s)	**Title, Publisher**	**Year**	**Pages**

Milan Verle	PIC microcontrollers Programming in C, MikroElektronika Ltd	2009		all
Martin P. Bates	Programming 8-bit PIC microcontrollers in C, Newnespress	2002		all

Recommended Literature				
Author(s)	**Title, Publisher**	**Year**		**Pages**
Martin P. Bates	Interfacing PIC MicrocontrollersEmbedded Design by Interactive Simulation", Elsevier	2006		all

Method of knowledge assessment Description (%) (Grading)	Activity	Percentage	Activity	Percentage
	Attendance	**5%**	Lab/Practical Exam	**20%**
	Quiz	**-**	Term Paper	**-**
	Homework	**10%**	Class Deliverables	**-**
	Project	**40%**	Presentation	**-**
	Midterm Exam	**-**	**Final Exam**	**25%**

ECTS (ALLOCATED BASED ON STUDENT'S WORKLOAD)			
Activities	**Quantity**	**Duration**	**Workload**
Lecture (15 weeks x Lecture hours per week)	15	3	45
Laboratory / Practice (15 weeks x Laboratory / Practice hours per week)	15	1	15
Assignment / Homework / Project	7	4	28
Seminar / Presentation			0
Preparation for Midterm Examination			0
Preparation for Final Examination	1	35	35
Midterm Examination (1 week)			10
Final Examination (1 week)	1	2	2
Total Workload (ETCS)			**5**
Web page	http://www.etf.ues.rs.ba		
Date			