UNIVERSITY OF PRIZREN
FACULTY OF COMPUTER SCIENCE

PROGRAM: TIT - BOS

Curriculum - – SYLLABUS							
Level of studies	Bachelor	***Program***	TIT-Bos	***Academic year***	2018/2019		
SUBJECT	Sensors and interfaces						
Year	**I**	***Status Of the subject***	Obligatory	***Code***		***ECTS credits***	6
Semester	II						
Teaching weeks	15	***Hours teaching***		***Lectures***	***Exercises***		
				2	2		
Teaching Methodology	**Lectures, exercises, consultations, tests, case studies**						
Consultation	**1 hour a week**						
The teacher	Fadil Novalić	***E-mail:***	fadilnovalic@gmail.com				
		Tel.:	+ 381 69 232 89 56				
Assistant	**Edis Pajaziti**	***E-mail:***	edis.pajaziti@gmail.com				
		Tel.:	+ 377 44 34 94 09				

Study goal and table of content	**Benefits of student**
Students should be familiar with the meaning of the terms Sensors and Interfaces, as well as their division and application. Stuednti will learn how to transfer data to computer interfaces. It will study examples of the application of sensors connected to computer interfaces.	After the course, it is expected that each student can: Explain how the sensor works Provide examples of using the sensor Write simple programs for sensor management and connect to PC interfaces.

Methodology for the implementation of educational topics:
Learning outcomes are achieved through a combination of lectures, supervised practical work and independent study/practice. PowerPoint presentations are used in lectures. Practical application of sensors and interface programming are realized at the exercises.
Conditions for realization of educational topics:
• Classroom equipped with computer and projector; • Computer laboratory with Internet connection

Ways of assessing of the student (in %) :	**Evaluation in%**	**Final grade**
• **50% from 2 Lab. Projects** • **50% Final exam**	0-50	5 (five)
	51-60	6 (six)
	61-70	7 (seven)
	71-80	8 (eight)
	81-90	9 (nine)
	91-100	10 (ten)
	0-50	5 (five)
Total	**100.00 %**	

Obligations of student:	
Lectures	**Exercises**
74	76

Activities	Hour/ weeks	Days/Weeks	
Lectures	2	15	30
Laboratory exercises	2	15	30
Contacts with teachers / consultations	1	15	15
Practical work	2	5	10
Projects, presentations, etc.	0,5	10	5
Own study time	3	14	42
Preparation for final exam	2	6	12
Time spent in the assessment (tests, final exam, etc.)	2	3	6
Notice: 1 ECTS credits= 25 hour commitment, e.g. if the subject has 6 ECTS credits student must have 150 hours during the semester commitment.		**Total load:**	**150**

Week	Lectures Topic	Hour	Exercises Topic	Hour
1	BASICS OF THE SENSOR TECHNIQUE - Means for obtaining information in automatic control systems - Sensor classification Literature: Popović, M. (2004). *Senzori i merenja*. Istočno Sarajevo: Zavod za udžbenike i nastavna sredstva	2	The exercises are followed by topics covered in lectures, with the writing of programs for sensor management and communication control over the interface. Literature: Monk, S. (2017). Arduino: uvod u programiranje. Beograd: Mikroknjiga. Warwick, S. A. (2017). C programiranje za Arduino. Beograd: Agencija EHO. Web sources	2
2	BASICS OF THE SENSOR TECHNIQUE - Physical principles of operation of the sensor - Sensor structure Literature: Popović, M. (2004). *Senzori i merenja*. Istočno Sarajevo: Zavod za udžbenike i nastavna sredstva.	2	The exercises are followed by topics covered in lectures, with the writing of programs for sensor management and communication control over the interface. Literature: Monk, S. (2017). Arduino: uvod u programiranje. Beograd: Mikroknjiga. Warwick, S. A. (2017). C programiranje za Arduino. Beograd: Agencija EHO. Web sources	2
3	DIGITAL SENSORS - Working principle - The way of building digital sensors Literature: Nenad Kojić, Web design, Univerzitet Singidunum, Beograd, 2017.	2	The exercises are followed by topics covered in lectures, with the writing of programs for sensor management and communication control over the interface. Literature: Monk, S. (2017). Arduino: uvod u programiranje. Beograd: Mikroknjiga. Warwick, S. A. (2017). C programiranje za Arduino. Beograd: Agencija EHO. Web sources	2
4	DIGITAL SENSORS - Choice of code and code carrier - Expanding the functional capabilities of the sensor Literature: Popović, M. (2004). *Senzori i merenja*. Istočno Sarajevo: Zavod za udžbenike i nastavna sredstva.	2	The exercises are followed by topics covered in lectures, with the writing of programs for sensor management and communication control over the interface. Literature: Monk, S. (2017). Arduino: uvod u programiranje. Beograd: Mikroknjiga. Warwick, S. A. (2017). C programiranje za Arduino. Beograd: Agencija EHO. Web sources	2
5	INTELLIGENT SENSORS AND MODULES - Sensors as part of the measuring system - Trends of development (intelligent sensors and intelligent measuring modules) Literature: Popović, M. (2004). *Senzori i merenja*. Istočno Sarajevo: Zavod za udžbenike i nastavna sredstva.	2	The exercises are followed by topics covered in lectures, with the writing of programs for sensor management and communication control over the interface. Literature: Monk, S. (2017). Arduino: uvod u programiranje. Beograd: Mikroknjiga.	2

			Warwick, S. A. (2017). C programiranje za Arduino. Beograd: Agencija EHO. Web sources	
6	INTELLIGENT SENSORS AND MODULES - SENSOR NETWORKS • IEEE-1451 family of standards for connecting measuring converters • Sensor network architecture • Wireless sensor networks Literature: Popović, M. (2004). *Senzori i merenja*. Istočno Sarajevo: Zavod za udžbenike i nastavna sredstva	2	The exercises are followed by topics covered in lectures, with the writing of programs for sensor management and communication control over the interface. Literature: Monk, S. (2017). Arduino: uvod u programiranje. Beograd: Mikroknjiga. Warwick, S. A. (2017). C programiranje za Arduino. Beograd: Agencija EHO. Web sources	2
7	INTELLIGENT SENSORS AND MODULES - Examples of intelligent sensors and measuring modules Literature: Popović, M. (2004). *Senzori i merenja*. Istočno Sarajevo: Zavod za udžbenike i nastavna sredstva.	2	The exercises are followed by topics covered in lectures, with the writing of programs for sensor management and communication control over the interface. Literature: Monk, S. (2017). Arduino: uvod u programiranje. Beograd: Mikroknjiga. Warwick, S. A. (2017). C programiranje za Arduino. Beograd: Agencija EHO. Web sources	2
8	DEFINITION OF INTERFACE TYPES OF INTERFACE - Operating memory interface, - interface processor - channel, - input - output interface (channel - peripheral controller), - peripheral unit interface Literature: Marčićević, Ž. (2010). *Osnovi informaciono komunikacionih tehnologija*. Novi Sad: Visoka poslovna škola strukovnih studija.	2	Colloquium I	2
9	BASIC PARALLEL PORT - Parallel port - Parallel port modes - Connectors Literature: Milanović, V. (2009). *PC interfejsi*. Beograd: Agencija EHO	2	The exercises are followed by topics covered in lectures, with the writing of programs for sensor management and communication control over the interface. Literature: Monk, S. (2017). Arduino: uvod u programiranje. Beograd: Mikroknjiga. Warwick, S. A. (2017). C programiranje za Arduino. Beograd: Agencija EHO. Web sources	2
10	INTERFACE ON THE PARALLEL PORT - Ways to connect the interface - Three-channel interface - 16 channel interface - 12bit D / A converter - 12bit A / D converter - Matrix LED display 7x5 Literature: Milanović, V. (2009). *PC interfejsi*. Beograd: Agencija EHO	2	The exercises are followed by topics covered in lectures, with the writing of programs for sensor management and communication control over the interface. Literature: Monk, S. (2017). Arduino: uvod u programiranje. Beograd: Mikroknjiga. Warwick, S. A. (2017). C programiranje za Arduino. Beograd: Agencija EHO. Web sources	2
11	BASICS OF SERIAL PORT - Serial data transfer	2	The exercises are followed by topics covered in lectures, with the writing of	2

	- Serial Port Registers Literature: Milanović, V. (2009). *PC interfejsi*. Beograd: Agencija EHO.		programs for sensor management and communication control over the interface. Literature: Monk, S. (2017). Arduino: uvod u programiranje. Beograd: Mikroknjiga. Warwick, S. A. (2017). C programiranje za Arduino. Beograd: Agencija EHO. Web sources	
12	INTERFACE ON THE SERIAL PORT - How to connect the interface to the serial port - Simple single channel interface without external power supply - Three-channel interface - Osmokanal interface - Four-channel interface Literature: Milanović, V. (2009). *PC interfejsi*. Beograd: Agencija EHO.	2	The exercises are followed by topics covered in lectures, with the writing of programs for sensor management and communication control over the interface. Literature: Monk, S. (2017). Arduino: uvod u programiranje. Beograd: Mikroknjiga. Warwick, S. A. (2017). C programiranje za Arduino. Beograd: Agencija EHO. Web sources	2
13	I2C COMMUNICATION - I2C data transfer - Interfaces on the I2C highway - 8 channel interface with PCF8574 circuit - 4 channel A / D converter Literature: Milanović, V. (2009). *PC interfejsi*. Beograd: Agencija EHO.	2	The exercises are followed by topics covered in lectures, with the writing of programs for sensor management and communication control over the interface. Literature: Monk, S. (2017). Arduino: uvod u programiranje. Beograd: Mikroknjiga. Warwick, S. A. (2017). C programiranje za Arduino. Beograd: Agencija EHO. Web sources	2
14	USB PORT - USB communication - USB protocols - USB types of packages - USB functions - LCD display on USB port - Two-channel relay interface Literature: Milanović, V. (2009). *PC interfejsi*. Beograd: Agencija EHO.	2	The exercises are followed by topics covered in lectures, with the writing of programs for sensor management and communication control over the interface. Literature: Monk, S. (2017). Arduino: uvod u programiranje. Beograd: Mikroknjiga. Warwick, S. A. (2017). C programiranje za Arduino. Beograd: Agencija EHO. Web sources	2
15	Presentation of seminar papers by students	2	Colloquium II	2

LITERATURE:

1. Popović, M. (2004). *Senzori i merenja*. Istočno Sarajevo: Zavod za udžbenike i nastavna sredstva.
2. Milanović, V. (2009). *PC interfejsi*. Beograd: Agencija EHO.
3. Marčićević, Ž. (2010). *Osnovi informaciono komunikacionih tehnologija*. Novi Sad: Visoka poslovna škola strukovnih studija.
4. Monk, S. (2017). *Arduino: uvod u programiranje*. Beograd: Mikroknjiga.
5. Warwick, S. A. (2017). *C programiranje za Arduino*. Beograd: Agencija EHO.

6. E-document “Programming with Arduino”, preuzeto sa http://www.centropiaggio.unipi.it
7. E-document “Introduction to Arduino”, preuzeto sa https://dlnmh9ip6v2uc.cloudfront.net

NOTICE:

Students will receive instructional material in the Bosnian language for each topic. Lectures and exercises will also be in Bosnian language. PowerPoint presentations will be used for lectures

Notice for the student:

Students are required to attend lectures and exercises, to participate in project and practical tasks and to come atregular consultations. This will enable them to easily master teaching materials and achieve a high level of knowledge.