SYLLABUS

1. Course title:

Measurments in Automatics and Robotics

2. Code:

AR101

3. Cycle of study:

1

4. ECTS credits:

6

5. Type of course:

(•) Mandatory ( ) Elective

6. Prerequisites:

[ESKE001] Fundamentals of Electrical Engineering I, [MAT1] Mathematics I, [MAT2] Mathematics II

7. Class restrictions:

8. Duration / semester:

1 4

9. Weekly contact hours:

9.1. Lectures:	3
9.2. Seminars:	0
9.3. Laboratory/Practice classes:	2

10. Faculty:

Faculty of Electrical Engineering

11. Department/study program:

Electrical Engineering and Computer Science

12. Lecturer:

Phd. Zenan Šehić, full professor

13. Lecturer's e-mail:

zenan.sehic@untz.ba

14. Web site:

15. Course aims:

The aim of the course is to teach students the theory of measurement in automatics and robotics and essential measurement methods. Measurements of electric and nonelectric components. Sensors.

16. Learning outcomes:

Learning outcomes are that students overcome the theory of measurement in automatics and robotics and essential measurement methods. To gain skills in measuring of electric and nonelectric components. Sensors.

17. Course content:

Introduction to measuring technique. Errors of the measurement. Analysis of measurement errors. Analog gauges: basic types and working principles. Measuring Bridges of DC and AC current. Compensators for DC and AC. Electricity metering (measuring frequency, time, energy ...). Oscilloscope. Signal sources. Measurements of digital systems. Management instruments. Digital signal processing of the measurements. Measurement of voltage and current. . Measurement of resistance, inductance and capacity. Measuring of non electrical components by electrical means. Digital measuring instruments. Computer supported measurements. Measurement and signal processing of microsensor signals.
The principles of operation and the division of sensors and transducers due to the physico-chemical properties and flow of matter and energy. (capacitive, inductive, resistive and piezo sensors, temperature sensors, pressure, flow, position sensors, speed, vibration and acceleration, force and torque sensors, level sensors, optoelectronic sensors). Technical specifications of sensors in industrial measurements. Processing and transmission of measurement signals. Conditioning, linearization of the measurement signal and elimination of interference. Fundamentals of intelligent measurement. Visualization of process variables and the entire process. Display and analysis of measurement results, estimation of measurement uncertainty. Examples of design of measuring and test equipment in process automation.

18. Learning methods:

Planned activities: concrete experience, observation and reflection, creation of abstract concepts and active experimentation. Preferred learning styles are: visual style, auditory, verbal, kinesthetic, logical-mathematical, social and independent. The most important learning methods are:
- Lectures with the use of multimedia resources, active learning techniques and with student's active participation and discussion;
- Auditive exercises;
- Preparation and presentation of group and individual seminar papers

19. Assessment methods:

The exam is conducted orally and in writing. The written exam is a combination of theoretical issues and computational examples done on lectures and laboratory exercises. The final exam is oral exam consisting of theoretical issues.

20. Assessment components:

Student's obligations	Points
Attendance at lectures	5
Attendance at exercises	5
Seminar	10
Mini tests	30 (2x15)
Total preexam obligations	50
Final exam up to	50

21. Required reading list:

N.Peric, I.Petrovic, Procesna mjerenja, Zavod za APR, FER Zagreb, 1999.

22. Web sources:

23. Applicable starting from the academic year:

2016/2017

24. Adopted in the Faculty/Academy session:

04.04.2016