Course Unit Descriptor

Study Programme: Power, Electronic and Telecommunication Engineering (Power Engineering - Power Electronics and Electric Machines)

Course Unit Title: Measuring in Electronics

Course Unit Code: E140

Name of Lecturer(s): Pejić Dragan

Type and Level of Studies:Bachelor level

Course Status (compulsory/elective): compulsory

Semester (winter/summer): summer

Language of instruction:english

Mode of course unit delivery (face-to-face/distance learning): face-to-face

Number of ECTS Allocated:4

Prerequisites: none

Course Aims:

Acquiring knowledge in the field of electrical measuring.

Learning Outcomes:

Acquiring experience in the laboratory practice. Training in the field of measuring results processing. Mastering the operation principles of the measuring instruments. Studying the measurement methods.

Syllabus:

Measuring instruments. Analog measuring instruments: An instrument with a moving coil. Extending the measuring instrument range by the moving coil. An instrument with a movable iron. Electrodynamic instrument. Extending the voltmeter and ampere meter measuring range. Electronic measuring instruments. Digital measuring instruments: Counting, Measuring frequency, Measuring time, Measuring the phase shift. Counter Timer. DA converters. Function generators. AD converters. The method of voltage compensation, the method of converting voltage to frequency, the method of double slope, Sigma-Delta method. Digital multimeters. Oscilloscopes: Time base, Trigger time base, XY mode. Multi-channel oscilloscopes. Digital oscilloscopes. Measuring bridges: DC measuring bridges. Wheatstone bridge, Kelvin bridge. AC measuring bridge. Unbalanced measuring bridges. Measuring bridges with multiple sources. Measuring compensators: DC measuring compensators. Alternating measuring compensators. Measurement of electrical quantities. Measuring the resistance/impedance, Inductance measurement/mutual inductance, Measuring capacitance, Measuring electric power. Measurement uncertainty. Measurement error: a rough mistake, systematic error, random errors. Measurement uncertainty: The standard measurement uncertainty, Type ‘’A’’, Type ‘’B’’. Combined measurement uncertainty, Expanded measurement uncertainty.

Required Reading: Relevant literature in English TBD

Weekly Contact Hours:4	**Lectures:2**	**Practical work:2**

Teaching Methods:

Lectures. Laboratory Practice. Consultations.

Knowledge Assessment (maximum of 100 points):100

Pre-exam obligations	points	**Final exam**	points
Laboratory exercise attendance	30	Written part of the exam	40

		Oral part of the exam	30
The methods of knowledge assessment may differ; the table presents only some of the options: written exam, oral exam, project presentation, seminars, etc.			