

# SYLLABUS FOR 2023/2024 ENROLMENT

## FORM OF STUDY: FULL-TIME PROGRAMME

### GENERAL INFORMATION

**1. Course** Electronic measurement

**2. Field of study** Computer Science

**3. Level of acquired education** first-cycle programme

**4. Number of ECTScredits** 3

**5. Number of hours persemester**

semester	lecture	classes	laboratory/foreign language course	project/practical classes	self-study	internship
II	15		30			

**6. Language of instruction:** English

**7. Lecturer** dr inż. Jerzy Adamczyk, dr inż. Tomasz Grudniewski

### DETAILED INFORMATION

**8. Preliminary requirements**

1. Knowledge of selected topics within Basics of Electrical and Electronic Engineering

2. Knowledge of selected topics in Physics

**9. Course objectives**

C1 To familiarise students with modern measuring instruments and methods of measurement of electrical and non-electrical quantities.

C2 To introduce the use of computer programmes in the process of measurement.

C3 To introduce methods of analysing and calculating uncertainty in measurements and the principles of developing and documenting measurement results.

**10. Field-specific learning outcomes in terms of knowledge, skills and social competences**

A student who completed the course:	reference to field-specific learning outcomes
-------------------------------------	---

#### KNOWLEDGE

EU01 Knows and understands the concepts necessary to understand the operation of basic analogue and digital electronic measuring instruments	K_W03
--	-------

EU02 Knows and understands concepts in the construction of electronic measuring instruments	K_W03
---	-------

#### SKILLS

EU03 Is able to perform measurements of basic electrical quantities using meters and an oscilloscope.	K_U04
---	-------

EU04 Is able to carry out measurements of parameters of analog and digital electronic circuits	K_U04
--	-------

EU05 Is able to use computer programmes in the process of measuring parameters of analog and digital electronic circuits	K_U04 K_U07
--	----------------

EU06 Is able to responsibly perform tasks at a test bench while working in a team and present the results of his/her work	K_U02
---	-------

#### SOCIAL COMPETENCES

EU07 Is ready to continuously learn and improve own professional, personal and social competences	K_K01
---	-------

**11. Course content**

**Course delivery method** – lectures/laboratories

Lectures:

1. Measurement object, its model, physical quantity, units of measurement, measurement and

measurement methods, measurement tools

2. Construction and principle of operation of analogue and digital electronic meters
3. Methods of measurement of electrical and non-electrical quantities: voltage and current, resistance and conductance, and selected non-electrical quantities by electrical methods
4. Measurement uncertainty analysis. Computer programmes in the process of measurement
5. Analogue to digital A/C converters - principle of operation, characteristics and static and dynamic parameters
6. D/A converters - principle of operation, characteristics and static and dynamic parameters of converters
7. Instruments for observing, recording and analysing waveforms. Principle of operation of digital and analogue oscilloscope, basic parameters

#### Laboratory classes:

1. Familiarise with the methods of uncertainty evaluation of direct and indirect measurements
2. Voltage and current intensity measurements of direct and alternating current
3. Resistance measurement in direct and indirect measurement
4. Measurement of capacitance and electrical inductance
5. A/C and D/A converter measurement
6. Digital circuit measurement
7. Oscilloscope measurement of electrical and non-electrical quantities

#### 12. Teaching tools and methods

1. Lectures in the form of a multimedia presentation along with a standard blackboard lecture
2. Instructions for laboratory exercises
3. The electronic circuit simulation program LTspiceXVII
4. Practical method based on observation and analysis
5. Taking measurements using various instruments
6. Work in the laboratory
7. Office hours

#### 13. Assessment method (component, final)

1. Attendance/ class participation
2. Tests
3. Review questions in laboratory or test
4. Report
5. Credit of the lecture in a written form (mark from the test)

#### 14. Student workload

Form of activity	Number of hours
1. Classes with direct participation of the teacher and office hours	55
2. Student workload	20
sum	75
number of ECTS credits	3

#### 15. Reference books

Primary:

- 1) Chwaleba A., Poniński M., Siedlecki A.: Metrologia elektryczna, WNT Warszawa 1998
- 2) Dusza J., Gortat G., Leśniewski A.: Podstawy miernictwa, Oficyna Wydawnicza, PW 1998
- 3) Parchański J.: Miernictwo elektryczne i elektroniczne, WSiP Warszawa 1996

Secondary:

- 1) Stanisław Bolkowski :Teoria obwodów elektrycznych. WNT, Warszawa 1995
- 2) Farley D.: Modern Software Engineering: Doing What Works to Build Better Software Faster, Addison-Wesley Professional, 2021

#### 16. Assessment form - details

**Conditions for obtaining course credit ( lecture):** the lecture ends with a credit.

The final mark is determined on the basis of:

- (a) a credit test in written form, open and closed tasks
- b) participation in lectures

Whereby:

Attendance at lectures in accordance with the Academic Regulations of the Pope John Paul II University of Applied Sciences in Biala Podlaska. Attendance at lectures will be checked, absences will not have a negative impact on the final grade, however, attendance at a minimum of 7 2-hour lectures increases the final grade by 0.5 (except for 2.0 and 5.0 grades).

*The lecturer reserves the right to give additional oral credit before the final mark is awarded.*

A written test to check the student's knowledge and skills, duration 45 minutes. The prerequisite for obtaining a positive mark from the test is to obtain at least 50% of the points.

The percentage scale of marks:

- < 50% insufficient (2.0)
- 50-60 % sufficient (3.0)
- 61-70 % satisfactory (3.5)
- 71-80 % good (4.0)
- 81-90% very good (4.5)
- 91-100% excellent (5.0)

Absence during the assessment is equivalent to a failing grade (2.0). In case of absence or a negative mark, the student is obliged to retake the course on a resit date set by the teacher.

**Conditions for obtaining course credit ( laboratory):**

The class ends with a graded credit. Components of the semester grade: 90% are the student's knowledge and skills, 10% are the student's social competence/attitude.

Methods of verifying learning outcomes in terms of knowledge and skills:

Passing the laboratory: the average of marks from individual exercises from the theoretical part and the practical part (assessment of the correctness of the execution of the task in the laboratory, report on the completed task, control questions during laboratory classes).

The percentage scale of marks:

- < 50 % insufficient (2.0)
- 50-60 % sufficient (3.0)
- 61-70 % satisfactory plus (3.5)
- 71-80 % good (4.0)
- 81-90% very good (4.5)
- 91-100% excellent (5.0)

Absence during laboratory classes is equivalent to a failing grade (2.0). In the case of absence or a negative mark from the laboratory classes the student is obliged to retake the laboratory classes on the date set by the lecturer.

Methods of verifying learning outcomes in the field of social competence:

Observation of the student's involvement and work during classes.

#### **17. Other details concerning the course**

1. Direct information about the issues of classes and a program content is provided by the teacher during classes and during office hours.

2. Classes will be held at AB in Biała Podlaska
3. Classes will be held in accordance with the current schedule
4. Office hours will be held in accordance with the applicable schedule