



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Analog electronic circuits [S1EiT1>AUE]

### Course

Field of study

Electronics and Telecommunications

Year/Semester

2/4

Area of study (specialization)

–

Profile of study

general academic

Level of study

first-cycle

Course offered in

Polish

Form of study

full-time

Requirements

compulsory

### Number of hours

Lecture

30

Laboratory classes

30

Other

0

Tutorials

0

Projects/seminars

0

### Number of credit points

5,00

### Coordinators

dr inż. Krzysztof Klimaszewski

krzysztof.klimaszewski@put.poznan.pl

### Lecturers

### Prerequisites

Knowledge of methods used for analysis of AC and DC current circuits, knowledge of basic electronic components and the principles of their operation. Practical ability to use electronic circuit diagrams. The ability to gather information from the literature in Polish and in English.

### Course objective

Demonstration of the basic electronic components, their properties and principles of their operation and possible uses in electronic circuits. Provide knowledge on the basic aspects of the design of electronic circuits.

### Course-related learning outcomes

Knowledge:

Understands the principles of operation of typical circuits used in applications presented during the classes. Understands the basic principles of circuit design.

Skills:

Can identify the problem and specify the design requirements of a simple analog electronic circuit. Can

describe the principle of operation of a simple electronic circuit based on its schematic. Can use the documentation of electronic components during the design of simple circuits.  
Can design and build a simple electronic circuit.

Social competences:

Knows the limitations of one's own knowledge and capabilities, understand the necessity of constant training. Can cooperate in the development of the more complex goals, understands the need to assume consequences of one's own decisions and acts.

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Written exam with calculation tasks and test questions, equally graded. The passing threshold: 50% of maximum points. If necessary, the written exam may be accompanied by an oral exam. The final mark is influenced

by the student active participation in the activities, i.e. homeworks.

The laboratory exercises are graded based on the reports prepared by the students and the evaluation of their activity during the laboratories.

### Programme content

The program introduces students to various basic analog electronics systems from a theoretical and practical perspective.

### Course topics

Lecture:

Generator circuits: relaxation, RC, LC, quartz

Feedback in amplifiers

Phase locked loop (PLL)

Differential amplifiers, multistage, selective amplifiers

Power amplifier classes

Passive and active electronic filters, switched capacitors filters

Voltage regulators - linear and switching

Thermal resistance

Analog to digital converters, digital to analog converters - principles of operation

Digital logic circuits

Basics of noise in electronic circuits

Laboratories:

Comparator, twilight switch

Nonlinear circuits and generators using opamps

Function generator

Wein bridge oscillator

Analog thermometer

Phase locked loop

Microphone amplifier

Active filters

Linear voltage regulator

Switching voltage regulator

### Teaching methods

Lectures: multimedia presentation, illustrated by the examples shown on overhead projector, conversatory lecture

Laboratory exercises: executed in 2/3 student groups, following the provided manuals, groups build and measure the circuits themselves using the provided components

### Bibliography

Basic

„Sztuka elektroniki” P. Horowitz, W. Hill

„Układy półprzewodnikowe” U. Tietze, C. Schenk

Additional

"The Art of Electronics: The x-Chapters" P. Horowitz, W. Hill

„Układy Elektroniczne Analogowe i Cyfrowe ” A. Filipkowski

„Układy Elektroniczne cz.I Układy Analogowe Liniowe” Z. Nosal , J. Baranowski

### Breakdown of average student's workload

	Hours	ECTS
Total workload	125	5,00
Classes requiring direct contact with the teacher	70	3,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	55	2,00