COURSE DESCRIPTION CARD - SYLLABUS

Course name
Semiconductor Devices [S1MiKC2>PP]

Course

Field of study
Microelectronics and Digital Communication

Year/Semester
2/3

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
24

Laboratory classes
30

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

4,00

Coordinators

dr inż. Krzysztof Klimaszewski
krzysztof.klimaszewski@put.poznan.pl

Lecturers

Prerequisites

Knowledge of methods for analyzing DC and AC circuits. Ability to obtain information from literature in Polish and English.

Course objective

Familiarizing students with basic electronic components, principles of their operation and possibilities of their use in electronic systems. Transferring knowledge about basic calculations performed during the designing of the electronic systems.

Course-related learning outcomes

Knowledge:
Knows the properties and characteristics of electronic components and simple systems built using them.
Knows the principles of performing measurements and interpreting measurement results in electronics.

Skills:
Is able to obtain and analyze information from literature, databases and other sources in Polish and English. Is able to integrate and interpret the obtained information, draw conclusions and justify

opinions.
Is able to select and use electronic components in accordance with information from catalogues and application notes and is able to design and implement electronic systems.

Social competences:
Knows the limitations of his/her own knowledge and skills, understands the need for further education.
Is aware of the need for a professional approach to solving technical problems and taking responsibility for the technical solutions he/she proposes.
Has a sense of responsibility for the electronic systems he/she designs.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Written exam consisting of questions and tasks related to issues presented in class. Passing threshold: 50% of points. If necessary, the written exam may be supplemented by an oral exam. The final grade may include activity during classes - including solving additional tasks.
Passing laboratory exercises based on evaluation of reports prepared during each class and evaluation of involvement in the course of classes.

Programme content

During the classes, knowledge about basic electronic components, their actual properties and how they work is provided.

Course topics

Lecture:
Resistors, capacitors, coils - parameters of real electronic components
Types of diodes and their applications
Bipolar transistor
JFET field effect transistor
MOSFET field effect transistor
Transistor amplifiers
Other semiconductor components: diac, thyristor, triac, single-junction transistor, IGBT transistor
Operational amplifier (ideal model and real amplifier), basic circuits using operational amplifier, comparator
Laboratory exercises:
Circuits with diodes
Examination of circuits with bipolar transistor
Examination of circuits with field effect transistor
Examination of linear circuits with operational amplifier
Analog thermometer
Comparator, twilight switch

Teaching methods

Lecture: multimedia presentation, illustrated with examples provided on a projector, conversational lecture
Laboratory exercises: multimedia presentation, performing tasks described in the exercise instructions in two/three-person groups, independent construction of systems, independent performance of measurements

Bibliography

Basic:
„Electronic devices” (conventional current version) T. Floyd, Pearson 2014
„Semiconductor devices and analog electronics” K. Klimaszewski (for download from Ekursy)

Additional:
„Sztuka elektroniki” P. Horowitz, W. Hill, WKiŁ 2015
„The Art of Electronics: The x-Chapters” P. Horowitz, W. Hill, Cambridge University Press 2020

„Układy połprzewodnikowe” U. Tietze, C. Schenk, WNT 1996
„Przyrządy połprzewodnikowe i układy scalone” W. Marciniak, WNT 1984
„Wzmacniacze operacyjne teoria i praktyka” B. Carter, R. Mancini, BTC 2011

Breakdown of average student's workload

	Hours	ECTS
Total workload	104	4,00
Classes requiring direct contact with the teacher	54	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	50	2,00