COURSE DESCRIPTION CARD - SYLLABUS

Course name
Semiconductor Devices

Course

Field of study
Electronics and telecommunications

Year/Semester
2/3

Area of study (specialization)

Profile of study
general academic

Level of study
First-cycle studies

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
30

Laboratory classes
15

Other (e.g. online)

Tutorials
15

Projects/seminars

Number of credit points

6

Lecturers

Responsible for the course/lecturer:
dr inż. Krzysztof Klimaszewski
krzysztof.klimaszewski@put.poznan.pl

Responsible for the course/lecturer:

Prerequisites

Knowledge of methods used for analysis of AC and DC current circuits, 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 calculations made in the analysis and the design of electronic circuits.

Course-related learning outcomes

Knowledge

Has the basic knowledge about electronic components, their properties and basic characteristics. Knows simple semiconductor electronic components. Has the knowledge about the use of the components in different electronic circuits. Has the knowledge about the basic, typical electronic circuits.

Knows the history and contemporary developments in the manufacture and the use of electronic components.

Skills

Can search and find the necessary information about electronic components, choose the right components for specific, basic applications.

Can find information about new electronic components and their new applications.

Can select the electronic components that have the parameters appropriate for a specific application.

Social competences

Is aware of the fast pace of development in electronic industry, understands the necessity of constant training.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Written exam wit approximately 8 tasks, 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.

The auditory exercises are graded based on the activity during the exercises and the homeworks.

Programme content

Lecture:

Resistors, capacitors, inductors - real component properties

Kinds of diodes and their applications

Bipolar transistor

JFET Field Effect Transistor

MOSFET Field Effect Transistor

Transistor amplifiers

Other semiconductor components: diac, SCR, triac, UJT, IGBT

Operational amplifier (ideal model, real component), basic opamp circuits, comparator

Laboratories:

Simple RC filters, diode circuits

Study of the BJT circuits

Study of the JFET circuits

Operational amplifier in linear circuits

Auditory exercises:

Diode circuits

Polarization circuits of bipolar transistors

Polarization circuits of field effect transistors

Transistor amplifiers

Operational amplifier in linear circuits

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

Auditory exercises: practical presentaton of the methods for calculating the parameters of exemplary circuits, solving circuit problems on board

Bibliography

Basic

„Electronic devices” (conventional current version) T. Floyd

"Semiconductor devices and analog electronics" K. Klimaszewski

Additional

„Sztuka elektroniki” P. Horowitz, W. Hill

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

„Układy połprzewodnikowe” U. Tietze, C. Schenk

„Przyrządy połprzewodnikowe” W. Marciniak

„Wzmacniacze operacyjne teoria i praktyka” B. Carter, R. Mancini

Breakdown of average student's workload

	Hours	ECTS
Total workload	150	6,0
Classes requiring direct contact with the teacher	75	3,0
Student's own work (literature studies, preparation for laboratory classes and auditory exercises, preparation for exam) [1]	75	3,0

[1] delete or add other activities as appropriate