

DESCRIPTION OF THE INDIVIDUAL COURSE UNITS: Esd

course unit title

Dynamic Systems

course unit code

Esd

type of course unit (compulsory, optional)

Compulsory

level of course unit (e.g. first, second or third cycle)

First cycle engineering studies, Full-time

year of study

2

semester/trimester when the subject (course unit) is delivered

4

number of ECTS credits allocated

2

name of lecturer(s)

Hubert Wysocki, PhD, DSc

learning outcomes of the course unit

Student knows the notion of dynamic system, can classify dynamic systems.

Student uses different forms of the mathematical description of dynamic systems, is able to transform certain forms of description into other forms, can determine the responses of systems to different characteristic inputs.

Student is able to linearize non-linear dynamic systems by using selected methods.

Student can examine qualitative features of dynamic systems by using selected tests.

Student can apply phase space methods for the analysis of the dynamics of the systems.

mode of delivery (face-to-face, distance learning)

Face-to-Face

prerequisites and co-requisites

Basic knowledge of linear algebra, ordinary differential and difference equations, Laplace and Laurent operational calculus

recommended optional programme components

No recommendations

course contents

LECTURES

Definitions and classification of dynamic systems. Mathematical models of dynamic systems. Linearization of non-linear dynamic systems. Stability, controllability and observability of continuous and discrete dynamic systems.

CLASSES

Linearization of dynamic systems. Operational calculus application in dynamic system problems. Stability, controllability and observability tests. Phase space methods.

recommended or required reading

Basic reading

1. DĘBOWSKI A.: Automatyka – podstawy teorii, WNT, Warszawa 2008.
2. CZEMPLIK A.: Modele dynamiki układów fizycznych dla inżynierów, WNT, Warszawa 2008.
3. GABEL R. A., ROBERTS R.A.: Sygnały i systemy liniowe, WNT, Warszawa 1978.
4. GESSING R.: Podstawy automatyki, Wydawnictwo Politechniki Śląskiej, Gliwice 2001.

Supplementary reading

1. KACZOREK T.: Teoria układów regulacji automatycznej, WNT, Warszawa 1977.
2. KACZOREK T.: Teoria sterowania, tom I, PWN, Warszawa 1977.
3. KACZOREK T., DZIELIŃSKI A., DĄBROWSKI W., ŁOPATKA R.: Podstawy teorii sterowania, WNT, Warszawa 2006.
4. PEŁCZEWSKI W.: Teoria sterowania, WNT, Warszawa 1980.

planned learning activities and teaching methods

| Lectures | Classes | Laboratory | Project | Seminar | Sum |
|----------|---------|------------|---------|---------|-----|
| 12 | 18 | 0 | 0 | 0 | 30 |

assessment methods and criteria

| Course passing criteria | Passing threshold | Percentage of the final grade |
|-------------------------|-------------------|-------------------------------|
| Written test | 60% | 60% |
| Home assignments | 60% | 40% |

language of instruction

Polish, English

work placement(s)

Not applicable