Modelling and Simulation of Processes - opis przedmiotu

Informacje ogólne

Nazwa przedmiotu	Modelling and Simulation of Processes
Kod przedmiotu	06.1-WM-ER-MiBM-01_18
Wydział	Wydział Mechaniczny
Kierunek	WM - oferta ERASMUS
Profil	-
Rodzaj studiów	Program Erasmus
Semestr rozpoczęcia	semestr zimowy 2023/2024

Informacje o przedmiocie

Semestr	1
Liczba punktów ECTS do zdobycia	3
Typ przedmiotu	obowiązkowy
Język nauczania	angielski
Sylabus opracował	• dr inż. Joanna Cyganiuk

Formy zajęć

Forma zajęć	Liczba godzin w semestrze (stacjonarne)	Liczba godzin w tygodniu (stacjonarne)	Liczba godzin w semestrze (niestacjonarne)	Liczba godzin w tygodniu (niestacjonarne)	Forma zaliczenia
Wykład	15	1	-	-	Egzamin
Laboratorium	30	2	-	-	Zaliczenie na ocenę

Cel przedmiotu

The aim of the course is to familiarize students with the methods of mathematical and physical modeling as well as with methods and techniques of processes simulation. To familiarize students with the options of the use of the methods in modeling and simulation of processes like: production, transport, manipulation and machines automation occurring in these processes.

Wymagania wstępne

Mathematics, Physics, Mechanics and Strength of Materials, Fundamentals of Machine Design, Automated Transport and Storage , The ability to use basic computer tools,

Zakres tematyczny

The content of the lecture:

Basic concepts connected with modelling and simulation of processes: model, system, simulation, process. Model construction. Types of models and algorithms of modelling processes. Issues connected with mathematical and physical modelling and simulation of processes: data types and their collection, define parameters and variables, define a problem. Methods of formalization of description of process and object. Apparatus of dimensional analysis - theorem π. Modelling with the use of dimensional functions. Network models. Scheduling. Computer tools in modelling and simulation of processes. The use of practical examples of modeling and simulation methods.

The content of the laboratory:

Create virtual models, dimensional analysis and simulation of appliances used in automation of production and transport processes. The use of network models in analysis of automated production systems. The use of operation planning schedules including automation and manufacturing processes.

Metody kształcenia

Lecturers are given with the use of multimedia technics. Work with specialist literature – textbooks, professional journals.

Laboratories are given with the use of computer software – methods: problem tasks, solution analysis. Individual and group job during the realization of laboratory exercises.

Efekty uczenia się i metody weryfikacji osiągania efektów uczenia się

Opis efektu	Symbole efektów	Metody weryfikacji	Forma zajęć
The student knows computational methods, basic tools and techniques of informatics needed in solving engineering tasks which are essential in modeling and processes simulation.		• egzamin - ustny, opisowy, testowy i inne	• Wykład
The student has knowledge of the simulation and analysis of mechanical systems, automation, transport and manipulation appliances and production processes.		• egzamin - ustny, opisowy, testowy i inne	• Wykład
The student can plan and carry out computer simulations, to interpret the results and to draw conclusions.		• wykonanie sprawozdań laboratoryjnych	• Laboratorium

Opis efektu	Symbole efektów	Metody weryfikacji	Forma zajęć
The student uses modern simulation and analytical computational methods for modeling and simulation of processes like engineering problems.		• wykonanie sprawozdań laboratoryjnych	• Laboratorium
The student can identify aims and priorities used for tasks set by him and others.		• wykonanie sprawozdań laboratoryjnych	• Laboratorium
The student can make a critical analysis of the way of functioning of processes of modeling and simulation including used in processes appliances, operations, and planning methods.		• wykonanie sprawozdań laboratoryjnych	• Laboratorium
The student can demonstrate the ingenuity and skill in selection of appropriate modeling and simulation methods, depending on considered problem.		• wykonanie sprawozdań laboratoryjnych	• Laboratorium

Warunki zaliczenia

To get a credit the student has to pass all course forms.

The final grade received by the student is the arithmetic mean of the above grades.

Literatura podstawowa

1. Severance F. W., System modeling and simulation - an introduce, Wiley, West Sussex 2001,

2. Totten G. E. , Xie L., Funatani K.,Modeling and simulation for material selection and mechanical design, Marcel Dekker INC, New York Basel 2004,

3. Miranda F., Abreu C., Handbook of research on computational simulation and modeling in engineering, IGI Global, USA 2015,

4. Banerjee S., Mathematical modeling: models, analysis and applications, CRC Press, USA 2014,

5. Zeigler B. P., Muzy A., Kofman E., Theory of Modeling and Simulation, Academic Press, Cambridge, Massachusetts 2018,

Literatura uzupełniająca

1. Bungartz H. J.(Author), Zimmer S., Buchholz M., Pfluger D., Le Borne S., Modeling and simulation: an application-oriented introduction, Springer, Cookeville 2010,

Uwagi

Lecture and Laboratory in English

Zmodyfikowane przez dr Katarzyna Skrzypek (ostatnia modyfikacja: 31-05-2023 14:15)