COURSE DESCRIPTION CARD - SYLLABUS

Course name
Simulation of production systems [N2ZiIP2>SyPP]

Course

Field of study
Management and Production Engineering

Year/Semester
1/2

Area of study (specialization)
–

Profile of study
general academic

Level of study
second-cycle

Course offered in
Polish

Form of study
part-time

Requirements
compulsory

Number of hours

Lecture
8

Laboratory classes
8

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

2,00

Coordinators

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Lecturers

Prerequisites

The student should have knowledge of the basics of organizing production systems, management of production processes and skills in the basics of programming in a high-level language and the basics of statistics.

Course objective

Familiarizing students with the basics of simulation of production processes.

Course-related learning outcomes

Knowledge:
1. The student has knowledge about the specificity of the simulation method as a research method
2. The student has knowledge of the stages of simulation research and their sequence
3. The student knows the basic methods of statistical analysis of input data for the purposes of process simulation
4. The student knows the basic methods of statistical analysis of output data for the purposes of process simulation
5. The student has knowledge about the types of simulation experiments and the methods of

conducting and developing the results of such experiments
6. The student has structured, theoretically based knowledge of trends in improving the organization of control and supervision of production processes

Skills:
1. The student is able to develop a model of activities carried out in production processes and develop their simulation model
2. The student is able to validate the simulation model
3. The student is able to perform statistical analysis of input and output data related to the simulation study of the production process
5. The student is able to plan, conduct and develop the results of a simulation experiment
6. The student is able to use experimental, data analysis and simulation methods to support decisions in various areas of enterprise operation

Social competences:
1. The student is able to work in a team carrying out a simulation study of the production process
2. The student is able to communicate with process owners during the implementation of a simulation study
3. The student is able to indicate and obtain data necessary to carry out a simulation study
4. The student presents and discusses the results of the process simulation study to the company's management staff

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The knowledge acquired during the lecture will be verified on the basis of a final test. Passing the lecture if obtaining at least 50.1% correct answers. Assignment of grades to percentage ranges of results: <90–100> very good; <80–90) good plus; <70–80) good; <60–70) satisfactory plus; <50–60) satisfactory; <0–50) unsatisfactory.
The knowledge and skills acquired during laboratory classes will be verified on the basis of independently performed final tasks reflecting the individual stages of the simulation study. To pass the course, it is required to obtain a positive grade for each of the assignments.

Programme content

The program includes the application of simulation method for the purpose of analysis of production processes.

Course topics

Lecture:
1. Simulation as research method. Taxonomy of simulation. Algorithms of simulation. General steps of simulation study.
2. Types of simulation models. Verification and validation of models.
3. Statistical input data analysis for simulation purposes.
4. Statistical output data analysis from simulation model.
5. Types of simulation experiments. Planning, conducting and analysis of result of simulation experiment.
Laboratory:
1. Event-driven dynamic simulation algorithms.
2. Simulation model building and verification.
3. Statistical input data analysis for simulation purposes.
4. Obtaining and analysis of simulation output data.
5. Planning, conducting and analysis of result of simulation experiment.

Teaching methods

Lecture: multimedia presentation, discussion on the discussed issues.
Laboratories: multi-media presentation illustrated with examples given on the boards, tasks in the utility environment in terms of the use of software (simulator), analysis of the results obtained.

Bibliography

Basic:
BANKS J., CARSON J.S., NELSON B.L., NICOL D.M., Discrete-Event System Simulation, Pearson Prentice
Hall, 2001
ROBINSON S., Simulation: The Practice of Model Development and Use, John Wiley&Sons, 2009
JURCZYK K., FlexSim. Podręcznik użytkownika, InterMarium Sp. z o.o., 2022

Additional:
BEAVERSTOCK M., GREENWOOD A., NORDGREN W., Symulacja stosowana (wyd. 2), InterMarium Sp. z
o.o., 2019
KACZMAR I., Komputerowe modelowanie i symulacje procesów logistycznych w środowisku FlexSim, PWN 2019

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,00
Classes requiring direct contact with the teacher	16	0,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	34	1,50