



## Subject card

|   |   |   |          |                                     |  |            |     |
|---|---|---|----------|-------------------------------------|--|------------|-----|
| Subject name and code                       | Simulation Modelling of Processes, PG_00044322  |   |          |                                     |  |            |     |
| Field of study                              | Engineering Management  |   |          |                                     |  |            |     |
| Date of commencement of studies             | October 2022  | Academic year of realisation of subject   |          |                                     | 2024/2025  |            |     |
| Education level                             | first-cycle studies   | Subject group   |          |                                     | Obligatory subject group in the field of study<br>Subject group related to scientific research in the field of study |            |     |
| Mode of study                               | Full-time studies   | Mode of delivery  |          |                                     | blended-learning   |            |     |
| Year of study                               | 3   | Language of instruction   |          |                                     | Polish   |            |     |
| Semester of study                           | 5   | ECTS credits  |          |                                     | 4.0  |            |     |
| Learning profile                            | general academic profile  | Assessment form   |          |                                     | assessment   |            |     |
| Conducting unit                             | Department of Management -> Faculty of Management and Economics   |   |          |                                     |  |            |     |
| Name and surname of lecturer (lecturers)    | Subject supervisor  | dr inż. Marzena Grzesiak  |          |                                     |  |            |     |
|   | Teachers  | dr inż. Marzena Grzesiak  |          |                                     |  |            |     |
| Lesson types and methods of instruction     | Lesson type   | Lecture   | Tutorial | Laboratory                          | Project  | Seminar    | SUM |
|   | Number of study hours   | 30.0  | 0.0      | 30.0                                | 0.0  | 0.0        | 60  |
|   | E-learning hours included: 10.0   |   |          |                                     |  |            |     |
| Learning activity and number of study hours | Learning activity   | Participation in didactic classes included in study plan  |          | Participation in consultation hours |  | Self-study | SUM |
|   | Number of study hours   | 60  |          | 8.0                                 |  | 32.0       | 100 |
| Subject objectives                          | The aim is to acquire the practical skills to construct models of the processes using iGrafx Process software, simulation experiments, inference based on simulation results.   |   |          |                                     |  |            |     |
| Learning outcomes                           | Course outcome  | Subject outcome   |          |                                     | Method of verification   |            |     |
|   | [K6_U04] forecasts phenomena and processes in the organisation, including technical and innovative processes  | Models real processes. Analyses the process on the bases of simulation results. Interprets simulation results. Combines knowledge from management and simulation modelling. |          |                                     | [SU4] Assessment of ability to use methods and tools   |            |     |
|   | [K6_U08] analyses engineering and managerial solutions in decision-making processes, taking into account pro-quality and pro-environmental aspects, as well as safety of work processes   | Interprets simulation results. Combines knowledge from management and simulation modelling  |          |                                     | [SU4] Assessment of ability to use methods and tools   |            |     |
|   | [K6_W13] has a basic knowledge of the design, modelling and optimisation of technical processes and systems   | Describes processes with the use of iGrafx software. Identifies process stages.   |          |                                     | [SW1] Assessment of factual knowledge  |            |     |
| Subject contents                            | Introduction to the course. Defining of basic terms, queuing systems, models. General characteristics of process approach in the organization. Structure of simulation model (static and dynamic). Rules of process map building. Introduction to the iGrafx software. Structure: department, activity, resources, costs, generator, schedules. Rules of setting properties for the activity: inputs, outputs, resources, attributes. Defining task (type, duration, schedule, capacity). Defining activity inputs (starting point, collecting transactions at input). Generators, types and ways of defining. Resources, defining (types, costs, schedule, overtime, costs, availability, attributes), allocating for tasks (type, origin, way of allocation, limitations, waiting options, relation). Tasks, types (work, delay, subprocess), costs (class of values), overtime. Attributes, defining (location, type, value, name), setting the value. Defining decisions. Defining simulation environment. Rules of scenario creation. Carrying out simulation experiment. Results analysis. Preparation of a simple queuing system on the basis of a description. Preparation of individual project of complex queuing system. |   |          |                                     |  |            |     |
| Prerequisites and co-requisites             |   |   |          |                                     |  |            |     |

| Assessment methods and criteria                                | Subject passing criteria   | Passing threshold   | Percentage of the final grade |
|--|--|---|-------------------------------|
|  | Practical exercise   | 50.0%   | 50.0%                         |
|  | Written exam   | 50.0%   | 50.0%                         |
| Recommended reading  | Basic literature   | <p>Filipowicz B.: Modele stochastyczne w badaniach operacyjnych. WNT, Warszawa 1996</p> <p>Grajewski P.: Organizacja procesowa, PWE, Warszawa 2007</p> <p>Mielczarek B.: Modelowanie symulacyjne w zarządzaniu. Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2009</p> <p>Dokumentacja programu iGrafx Process, dostępna w Internecie</p> <p>Materiały do zajęć dostępne na moodle.zie.pg.gda.pl/</p> |                               |
|  | Supplementary literature   | <p>Adair C.B., Murray B.A.: Radykalna reorganizacja firmy. Wydawnictwo Naukowe PWN, Warszawa 2002</p> <p>Champy J.: X-engineering przedsiębiorstwa. Wydawnictwo Placet, Warszawa 2003</p> <p>Hammer M.: Reinżynieria i jej następstwa. Wydawnictwo Naukowe PWN, Warszawa 1999</p> <p>Tyszer J., Symulacja cyfrowa, WNT, Warszawa 1978</p>   |                               |
|  | eResources addresses   | <p>Adresy na platformie eNauczanie:<br/> Modelowanie symulacyjne procesów 2024 - Moodle ID: 39524<br/> <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=39524">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=39524</a></p>  |                               |
| Example issues/<br>example questions/<br>tasks being completed | <p>Build a simulation model of the selected process</p> <p>Carry out a simulation experiment</p> <p>Interpret the results and make improvements to the process</p> |   |                               |
| Work placement   | Not applicable   |   |                               |

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