COURSE GUIDE

Subject name	**Production scheduling and control**
Course of study	**Quality & Production Management**
The form of study	**Full-time**
Level of qualification	**I**
Year	**II**
Semester	**4**
The implementing entity	**Department of Production Engineering and Safety**
The person responsible for preparing	**dr inż. Magdalena Mazur**
Profile	**general academic**
Course type	**elective**
ECTS points	**4**

TEACHNING METHODS – NUMBER OF HOURS PER SEMESTER

LECTURE	CLASS	LABORATORY	PROJECT	SEMINAR
15	**-**	**30**	**-**	**-**

ITEM DESCRIPTION

1. COURSE AIMS

C1. Knowledge of basic information about production systems and control of production flow depending on the production volume and its purpose (per warehouse, commissioned).

C2. Overview of scheduling and production control.

C3. Practical designation of orders for determining the size of batches and balancing of tasks.

2. ENTRY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. The student knows the basic principles about functioning of production systems.
2. The student is knowledgeable about the implementation stages and logistics flow.
3. Student knows the basics of Microsoft Office programms.
4. Student can do mathematical calculations.

LEARNING OUTCOMES

EK 1- Student knows the basic issues of production flow control on production lines.

EK 2- Student uses the concepts of planning and production control techniques.

EK 3- Student can design a schedule of production works based on designated production batches.

3. COURSE CONTENT

Type of teaching – LECTURES	No. of hours
W 1- Production factors and their role.	1
W 2- Concept of production capacity.	1
W 3- The basic functions of planning and production control.	1
W 4- Types of workpiece flow through production sites.	1
W 5- Output and norms in production planning and control: batch size, production reproducibility intervals (bar, rhythm), production cycle, production stocks in progress	2
W 6-. General assignment of production batches and load index of machines.	1
W 7- Control by order urgency. Classification of priority rules.	1
W 8- Push and pull production systems	1
W 9- Size of the production batch or delivery batch..	1
W 10- Models and algorithms for load balancing.	1
W 11- The concept of "bottlenecks" in production processes.	1
W 12- Schedule at the workplace including the "bottleneck".	1

W 13- Importance of constraint theory in OPT.	1
W 14- Rules for recording production orders.	1
Type of teaching – LABORATORY	**No. of hours**
L 1- Overview of organization rules and final evaluation conditions.	1
L 2- Principles of organization of production systems - repetition.	1
L 3- Overview of modular construction of integrated management systems in companies.	2
L 4- Exercises in creating production schedules using the linear method - based on elements from production systems known by the participants	4
L 5- Exercises in creating production schedules using the CPM network method - based on elements from production systems known by the participants.	4
L 6- Laboratory classes based on the module of production flow simulation in the Push system - ***Factory of Things***.	8
L 7- Laboratory classes based on the module of production flow simulation in the Pull system - ***Factory of Things***.	8
L - 8 - Final test.	2

4. TEACHNING TOOLS

1. lecture with audiovisual - presentation.
2. simulation program "***Factory of Things***".
3. compilation of numerical data for performance analyzes.
4. textbooks and scripts.
5. Microsoft Office (excel, word) software.

5. WAYS OF ASSESSMENT (F – FORMATIVE, P – SUMMATIVE)

F1. Evaluation of sub-reports.
F2. Observation of student work.
P1. partial control studies.

6. STUDENT WORKLOAD

Form of activity		**Average number of hours for realization of the activity**		
		[h]	ECTS	ECTS
Contact hours with the teacher	LECTURE	**15**	**0,6**	**1,12**
Preparation for exam		**13**	**0,52**	
Contact hours with the teacher	Laboratory	**30**	**1,2**	**2,28**
Preparation of the laboratory		**12**	**0,48**	
Preparing for test		**15**	**0,6**	
Getting Acquainted with the indicated literature		**10**	**0,4**	**0,4**
Consultation		**5**	**0,2**	**0,2**
TOTAL NUMBER OF HOURS / ECTS POINTS FOR THE COURSE		**100**	**4**	

7. BASIC AND SUPPLEMENTARY RESOURCE MATERIALS

Basic resources:

1. Dominica Degrandis,Tonianne DeMaria. *Making Work Visible: Exposing Time Theft to Optimize Work & flow*. Natl Book Network 2017.
2. Paul Myerson. *Lean Supply Chain and Logistics Management*. MCGRAW-HILL Professional 2012.
3. Ursula Kuehn. *Integrated Cost and Schedule Control in Project Management*. Berrett-Koehler Publishers; 2 edition - 2010.
4. Douglas Scott Burr. *The Schedule Book: 75 Schedules for Any Work Environment*. Createspace Independent Pub, 2009.

Supplementary resources:

1. Jeffrey H. Schutt. *Directing the Flow of Product*. J.Ross Publishing 2004.
2. Daniel Quadt. *Lot-Sizing and Scheduling for Flexible Flow Lines*. Springer 2004.

8. TEACHERS (NAME,SURNAME, ADRES E-MAIL)

1. dr hab. inż. Robert Ulewicz, prof. PCz. (robert.ulewicz@wz.pcz.pl)
2. dr inż. Magdalena Mazur (magdalena.mazur@wz.pcz.pl)
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6. dr inż. Krzysztof Knop (krzysztof.knop@wz.pcz.pl)

9. MATRIX OF LEARNING OUTCOMES REALISATION

Learning outcome	Reference of given outcome to outcomes defined for whole program	Course aims	Course content	Teaching tools	Ways of assessment
EK1	K_W05, K_W07, K_W08, K_W09, K_U05, K_U07, K_U10	C1, C2	W13, W14, W1 ÷ W 5	1,4, 5	F2
EK2	K_W01, K_W02, K_W05, K_W09, K_U01, K_U02, K_U06, K_U07, K_U09, K_U10, K_K03,	C10, C2	W 4 ÷ W 13 L 2 ÷ L 5	1,4	P1
EK3	K_W02, K_W04, K_W05, K_W08, K_U01, K_U04, K_U05 K_U06, K_U07, K_U08, K_U09 K_U2, K_K03	C2, C3	L 2 ÷ L 7 W 8 ÷ W10,	1,2,3,4,5	F1, F2, P1

10. FORM OF ASSESSMENT - DETAILS

	grade 2	grade 3	grade 4	grade 5
EK 1	Student doesn't know the basic issues of production flow on production lines and control methods	Student knows only selected issues in the scope of production flows on the production lines and their control	Student knows all aspects of production flow control on the production lines that were presented during the classes	Student knows all aspects of the flow of production on the production lines, and can also indicate the differences between them
EK 2	Students don't know the concepts of planning and production control techniques	Student knows how to use the selected concepts in the field of planning and production control techniques	Student knows how to use the techniques of planning and production control	Student knows how to use the concepts of planning and production control techniques and he can express his opinion
EK 3	Student is unable to develop a production schedule based on designated production batches.	Student is able to present the assumptions of scheduling production works based on designated production batches but can not perform their analysis.	Student is able to analyze selected areas of production scheduling based on designated production batches	Student is able to analyze the production schedules based on the designated production batches

11. ADDITIONAL USEFUL INFORMATION ABOUT THE COURSE

1. Information where presentation of classes, instruction, subjects of seminars can be found, etc. - information presented to students in class, if required by the formula classes are sent electronically to the e-mail addresses of individual dean groups - information can be found on the website of the department.
2. Information about the place of classes - - information can be found on the website of the department.
3. Information about the timing of classes (day of the week / time) - information can be found on the website of the department.
4. Information about the consultation (time + place) - are given to students for the first class, can be found on the website of the department.

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Coordinator