COURSE GUIDE

Subject name	**Assembly processes**
Course of study	**Quality and Production Management**
The form of study	**Full-time**
Level of qualification	**First**
Year	**III**
Semester	**VI**
The implementing entity	**Department of Production Engineering and Safety**
The person responsible for preparing	**dr inż. Marek Krynke**
Profile	**General academic**
ECTS points	**4**

TYPE OF TEACHING – NUMBER OF HOURS PER SEMESTER

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

COURSE AIMS

C1. Basic knowledge of assembly processes.
C2. Practical use of various markings appearing in technical drawings.

ENTRY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Basic knowledge of technical drawing.
2. Knowledge of engineering design basics, problems of production management, production systems,

LEARNING OUTCOMES

EU1. Student uses concepts in the design of assembly systems.
EU2. Student is able to mark the types of connections in technical drawings, identifies various markings in technical drawings.
EU3. The student can identify the SMED system to shorten the time of replacement of assembly means.
EU4. Student has the ability to synthesize and use knowledge from various learning areas in order to analyze and solve the problem of designing assembly systems.

COURSE CONTENT

Type of teaching – LECTURE	**Number of hours**
W1. Basic concepts in assembly technology.	2
W2. Mounting types.	1
W3. Coupling methods and means of assembly.	1
W4. Recording elements of the structure.	1
W5. Determining the surface of the object.	1
W6. Auxiliary and technological means of assembly.	1
W7. Use of SMED to shorten the replacement time of mounting means.	1
W8. Tolerance and parts fit in the drawings.	1
W9. Types of connections and their representation in the drawings.	2
W10. Principles of making assembly drawings.	1
W11. Automatic assembly of products.	2
W12. Safety of workers at assembly stations.	1
Type of teaching - CLASS	**Number of hours**
C1. Concept and meaning of process and assembly.	1

C2. Assembly methods.	1
C3. Analysis of technical drawings, types of drawings, dimensioning, tolerance of dimensions and shapes, determination of surface roughness and corrugation, and heat treatment of coatings.	2
C4. Reading drawings of machine parts connections, drawing of disconnection and inseparable connections.	2
C5. Examples of different mounting types.	2
C6. An overview of the use of SMED.	1
C7. Reading assembly drawings, tables on assembly drawings, dimensioning, and additional information in assembly drawings.	1
C8. Inseparable connections.	1
C9. plastically deformable joints.	1
C10. Analysis of the sequence of technological operations during assembly.	1
C11. Product design for assembly.	1
C12. Check the message.	1
Type of teaching - PROJECT	**Number of hours**
P1. Assigning topics to students, discussing the project framework.	1
P2. Compilation of lists of elements occurring in a given device, taking into account quantity, type of material, method of production-processing, manufacturer.	4
P3. Prepare the assembly procedure: specify the order of assembly, specify the number of fasteners, the type of fasteners, the fastening method, the tolerances used, the method of orientation of the object with respect to the second, the method of fixing the connections.	6
P4. Analysis of technological means of assembly used in the developed process.	2
P5. Safety at the post.	1
P6. Presentation and evaluation of the project.	1

TEACHING TOOLS

1. Books and monographs.
2. Audiovisual presentation.

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

F1. Evaluation of the execution of partial projects.
F2. Observation of student work on assessment.
F3. Evaluation of the presentation of performed tasks.
P1. Assessment the project.
P2. Assessment test.
P3. Written exam from lectures.

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**	**1.2**
Preparation for exam		**13**	**0.52**	
Presence on the exam		**2**	**0.08**	
Contact hours with the teacher	Exercises	**15**	**0.6**	**1**
Preparation for the test of exercises		**10**	**0.4**	
Contact hours with the teacher	Project	**15**	**0.6**	**1.88**
Preparation of your own project		**12**	**0.48**	
Getting acquainted with the indicated literature		**12**	**0.48**	**0.48**
Presence on consultations		**6**	**0.24**	**0.24**
TOTAL NUMBER OF HOURS / ECTS POINTS FOR SUBJECT		**100**	**4**	

BASIC AND SUPPLEMENTARY RESOURCE MATERIALS

Basic resources

1. Savarese A.B.. Manufacturing Engineering. Nova Science Publishers, Nowy Jork 2011.
2. Lewandowski J., Walaszczyk A., Jałmużna I. Product and Packaging Tendencies for Development in Manufacturing. Wydaw. Politechniki Łódzkiej, 2012.
3. Jędrzejewski J. Manufacturing Systems Development Industry Expectations. Agenda Wydaw. Wrocławskiej Rady FSNT NOT, 2005.
4. Laughner V.H., Hargan A.D. Fastening and joining of metal parts.

Supplementary resources

1. loan Constantin Dima. Operational Management Systems of the Production Achieved in Flexible Manufacturing Cells. Technical University, Kosice, 2011.
2. Włosiński W. The Joining of a Advanced Materials. Oficyna Wydaw. Politechniki Warszawskiej, 1999.
3. Borkowski S., Ulewicz R. Systemy produkcyjne: Manufacturing Systems. Instytut Organizacji i Zarządzania w Przemyśle ORGMASZ, Warszawa 2009.
4. Krynke M., Knop K. Zastosowanie metody SMED do poprawy wskaźnika OEE. [in:] Ulewicz R., Woźny A. (eds.) Teoria i praktyka w zarządzaniu produkcją i bezpieczeństwem. Oficyna Wydawnicza Stowarzyszenia Menedżerów Jakości i Produkcji, Częstochowa 2017,pp. 95-106
5. Borkowski S., Krynke M. Doskonalenie procesów w różnych branżach. [in:] Borkowski S., Krynke M. (eds.) Oficyna Wydawnicza Stowarzyszenia Menedżerów Jakości i Produkcji. Częstochowa 2015.

TEACHERS (NAME, SURNAME, E-MAIL ADDRESS)

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MATRIX OF LEARNING OUTCOMES REALISATION

Learning outcome	Reference of given outcome to outcomes defined for whole program (PRK)	Course aims	Course content	Teaching tools	Ways of assessment
EU1	K_W01, K_W02, K_W03, K_W04, K_W05, K_W07, K_W10, K_U02, K_U04, K_U05, K_U06, K_U08, K_U09, K_K04	C1	W1-W3, C1, C2, P1	1, 2, 3	F1,F2, P1, P2, P3
EU2	K_W06, K_W09, K_U01, K_U02, K_U03, K_U06, K_U07, K_U09, K_U10, K_K02	C1, C2	W4, W5, W8, W9, W10, C3, C4, C7, P2	1, 2, 3	F1,F2, P1, P2, P3
EU3	K_W01, K_W04, K_W05, K_W07, K_W09, K_U01, K_U04, K_U05, K_U06, K_U07, K_U08, K_U09, K_U10, K_U11, K_K01, K_K04, K_K05	C1, C2	W2, W3, W7, W11, C2, C5, C6, C10, P2-P4	1, 2, 3	F1, F2, F3 P1, P2, P3
EU4	K_W01, K_W05, K_W06, K_W07, K_W08, K_W09, K_U01, K_U02, K_U05, K_U06, K_U07, K_U08, K_U09, K_U10, K_U11	C1, C2	W6, W11, W12, C5, C6, C8-C11, P3- P6	1, 2, 3	F1,F2, F3P1, P2, P3

FORM OF ASSESSMENT - DETAILS

	grade 2	grade 3	grade 4	grade 5
EU1	Student does not use the concepts of designing assembly systems.	Student is using the chosen concepts of assembly systems design.	Student uses the concepts of assembly systems design.	Student is very familiar with concepts of assembly systems design and express their opinion.
EU2	Student can not mark connection types in technical drawings.	Student can only mark certain types of connections in technical drawings.	Student can mark the types of connections in technical drawings, compare them and evaluate them.	Student can compare and mark the marks in technical drawings. Student knows the tolerance markings.
EU3	Student does not know the SMED method.	Student defines the SMED method, but can not apply it in real conditions.	Student knows the SMED method well, can identify assembly systems used in this method, is able to develop simple assembly systems using SMED techniques.	Student knows the features of the SMED method very well, knows its application and use. He can design simple assembly systems using SMED techniques.

EU4	Student has no opportunity to synthesize and use knowledge from various fields of education to analyze and solve assembly design problems.	Student can solve the simplest problems of assembly systems design. The student knows how to use the sources indicated by the instructor.	Student is able to use the acquired knowledge to solve the problem of designing assembly systems. The student is looking for additional sources of literature to broaden his knowledge.	Student is able to use the acquired knowledge to correctly solve the problem of designing assembly systems and is able to propose directions of improvement. The student deepens his knowledge by searching for additional sources of literature, can compare the messages contained there, draw conclusions from them.

ADDITIONAL USEFUL INFORMATION ABOUT THE COURSE

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