

COURSE GUIDE

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| <u>Subject name</u> | Lean Manufacturing |
| <u>Course of study</u> | Quality and Production Management |
| <u>The form of study</u> | Full-time |
| <u>Level of qualification</u> | First |
| <u>Year</u> | III |
| <u>Semester</u> | V |
| <u>The implementing entity</u> | Department of Production Engineering and Safety |
| <u>The person responsible for preparing</u> | Dr inż. Magdalena Mazur |
| <u>Profile</u> | general academic |
| <u>Course type</u> | principal |
| <u>ECTS points</u> | 3 |

TYPE OF TEACHING – NUMBER OF HOURS PER SEMESTER

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

COURSE AIMS

- C1. Knowledge of the principles and methods of Lean Manufacturing and the algorithm of their application
- C2. Knowledge of Lean Manufacturing tools and their application areas
- C3. Acquiring the ability to use Lean Manufacturing principles and tools in the production process

ENTRY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES

- 1. Student knows the basics of management.
- 2. Student knows the basic production processes.
- 3. The student knows the basic mathematical calculations.

LEARNING OUTCOMES

- EU 1- The student uses the terms in the field of Lean Manufacturing, and also knows how to explain selected principles for the use of selected methods and techniques
- EU 2- The student knows how to use Lean Manufacturing tools in the production process and quality
- EU 3- The student is able to describe and identify areas of MUDA and take actions to limit it.
- EU 4- The student has the ability to create a value stream in terms of reducing inventories, costs and production cycles.

COURSE CONTENT

| Type of teaching – Lecture | Number of hours |
|---|------------------------|
| W 1- Principles of modern production and quality management | 1h |
| W 2- Lean Manufacturing Process | 1h |
| W 3- Lean Manufacturing Instruments | 1h |
| W 4- Toyota production system - TPS system | 2h |
| W 5- Improving the efficiency of people and machines | 3h |
| W 6- Lean Manufacturing implementation rules | 2h |
| W 7- Culture of continuous improvement | 2h |
| W 8 - Future of Lean Manufacturing - WCM, CRS | 1h |
| Type of teaching - class | Number of hours |
| C1- The use of individual Lean principles in the practice of the enterprise | 2h |
| C2- Identification of the Muda, actions limiting waste | 2h |
| C3 - practical application of Lean tools - Glendey sieve, etc. | 6h |
| C4 - VSM, Process mapping, improvement activities. | 5h |

TEACHING TOOLS

- 1. Visual media (computer, overhead projector, projector).
- 2. Chalk + blackboard + pen marker.
- 3. Manuals, scripts.

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

- F1. Observation of the student's work on the grade.
- F2. Evaluation of the implementation of partial exercises.
- P1. Final test.
- P2. Written exam.

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 | 1.08 |
| Preparation for exam | | 10 | 0.4 | |
| Presence on the exam | | 2 | 0.08 | |
| Contact hours with the teacher | Exercises | 15 | 0.6 | 1.4 |
| Contact hours with the teacher | | 10 | 0.4 | |
| Preparation for the colloquium | | 10 | 0.4 | |
| Getting Acquainted with the indicated literature | | 8 | 0.32 | 0.32 |
| Presence on consultations | | 5 | 0.2 | 0.2 |
| TOTAL NUMBER OF HOURS / ECTS POINTS FOR SUBJECT | | 75 | 3 | |

BASIC AND SUPPLEMENTARY RESOURCE MATERIALS

Basic resources:

1. Borkowski S., Ulewicz R.: Instruments of production processes improvement. PTM, Warszawa 2009
2. Borkowski S., Ulewicz R.: Manufacturing systems, Orgmasz, Warszawa 2009\
3. M. Rother, Shook J. Learning to See: Value Stream Mapping to Create Value and Eliminate Muda, Lean Enterprise Institute 1999.
4. Lonnie Wilson, How To Implement Lean Manufacturing, McGraw Hill Professional, 6 lip 2009
5. Womack J.P, Jones D.T., Roos D., Lean thinking, Prodress.com, 2011
5. Łazicki, Lean Manufacturing - praktyczne zastosowanie metodologii, e-book, 2015

Supplementary resources:

1. King Peter L. Value Stream Mapping for the Process Industries, Taylor & Francis, 2015
2. Upadhye Nitin Kumar Value Stream Mapping - a Lean Manufacturing Tool to reduce Lead Time, OmniScriptum GmbH & Co. KG, 2017
3. John Shook, Mike Rother, Nauczyć się widzieć, Lean Enterprise Institute 2009
4. Byrne A, Jak zrewolucjonizować firmę dzięki lean management, 2013
5. Joanna Czerska, Doskonalenie strumienia wartości, Difin, 2010

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 |
|------------------|--|-------------|----------------|----------------|--------------------|
| EU 1 | K_W01, K_W02, K_W03, K_W05, K_W07, K_W08, K_W09, K_U01, | C1 | W1-W8 C 1 | 1,2,3,4 | F1,F2 P1,P2 |

| | | | | | |
|------|---|-------|----------------|------------|------------------|
| | K_U02, K_U03, K_K01 | | | | |
| EU 2 | K_W01, K_W02, K_W03, K_W04, K_W05, K_W06, K_W07, K_W08, K_W09, K_W10, K_U01, K_U02, K_U03, K_U04, K_U05, K_U06, K_U07, K_U08, K_U09, K_U10, K_K04 | C1-C3 | W1-W8 C1-C4 | 1,2,3,4 | F1,F2 P1,P2 |
| EU 3 | K_W01, K_W02, K_W03, K_W04, K_W05, K_W06, K_W07, K_W08, K_W09, K_W10, K_U01, K_U02, K_U03, K_U04, K_U05, K_U06, K_U07, K_U08, K_U09, K_U10, K_K04 | C1-C3 | W1-W8 C1-C4 | 1,2,3,4 | F1,F2 P1,P2 |
| EU 4 | K_W01, K_W02, K_W03, K_W04, K_W05, K_W06, K_W07, K_W08, K_W09, K_W10, K_U01, K_U02, K_U03, K_U04, K_U05, K_U06, K_U07, K_U08, K_U09, K_U10, K_K04 | C1-C3 | W1-W8 C1-C4 | 1, 2, 3, 4 | F1, F2 P1, P2 |

FORM OF ASSESSMENT - DETAILS

| | grade 2 | grade 3 | grade 4 | grade 5 |
|------|---|---|---|---|
| EU 1 | The student does not use the terms of Lean Manufacturing, | The student uses selected terms in the field of Lean Manufacturing, | The student uses the terms of Lean Manufacturing, | The student uses the terms in the field of Lean Manufacturing, and also knows how to explain selected principles for the use of selected methods and techniques |
| EU 2 | The student can not use the Lean Manufacturing tool in the production process and quality | The student knows how to use the chosen Lean Manufacturing tool in the production process | The student knows how to use selected Lean Manufacturing tools in the production process and quality | The student knows how to use Lean Manufacturing tools in the production process and quality |
| EU 3 | The student can not describe to identify areas of MUDA. | The student can describe and identify areas of MUDA | The student can describe and identify areas of MUDA and propose improvement activities. | The student can describe and identify areas of MUDA and propose improvement actions and justify their usefulness. |
| EU 4 | The student can not create a value stream | The student knows how to create a stream of values | The student knows how to create a stream of values in terms of reducing inventory and production costs. | The student knows how to create a stream of values in the aspect of reducing inventories, costs and production cycles. |

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

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Coordinator