11. Lean production

GENERAL INFORMATION ABOUT THE COURSE		
Course coordinator	Živko Kondić, PhD, professor	
Course name	**Lean production**	
Study program	**Mechanical engineering**	
Course status	Compulsory / elective	
Year	1	
Semester	2	
Number of credits and teaching methods	ECTS student load coefficient	4
	Number of hours (lectures + seminars + exercises)	

1. DESCRIPTION OF THE COURSE

1.1. Course objectives

The goal of the course is to familiarise students with the modern organisation concept of management and improving business processes, and relating to theoretical foundations of scientific organisation of work and practice so that student will come to understand modern trends in organising business and to encourage critical thinking towards business excellence and industry 4.0.

1.2. Course enrolment prerequisites *(if applicable)*

No prerequisites

1.3. Expected course learning outcomes

After having listened to the lectures, successfully completing the exercises as well as drafting and presenting the seminar paper, the student will be able to:

1. Identify and analyse production processes in terms of performance by using adequate criteria and measures for the performance of processes, especially in determining value for the customer while recognising the Lean approach.
2. Compare and explore good and excellent production processes using the principle of process mapping, tracking process flow, establishing the pull principle and other standard Lean principles in addition to tracking and eliminating waste.
3. Create projects for establishing excellent working positions, processes and business systems.
4. Devise implementation of the Lean concept in specific business systems.
5. Evaluate the performance of production processes, identify places requiring improvements, present and verify the results of the improvements.
6. Plan and organise reconstruction plans in particular sectors of the machinery production.
7. Devise education programs for the Lean concept, present and implement them at various levels.

1.4. Course content

1. Define the Lean concept. Brief history. Lean gurus
2. Principles of the modern organisational concept
3. Losses in modern production processes
4. Types of activities in processes
5. Green waste
6. Suggestion system in the Lean concept
7. Lean tools and Lean metrics
8. Lean tools
9. Time analysis, buyer tact, time allocation
10. Mapping the value stream
11. Improvement procedures
12. Kaizen system
13. Foundations of the Lean concept
14. Implementation of Lean in production systems
15. Implementation of Lean in services systems

1.5. Types of teaching	☒ Lectures ☒ Seminars and workshops ☒ Exercises ☐ Distance learning ☐ Field work	☒ Autonomous exercises ☒ Multimedia and network ☐ Laboratory ☒ Mentor assistance ☒ Other types
1.6. Comments		

1.7. Student obligations *(attendance at classes, lectures, tutorials, seminars)*

- Attending lectures and exercises
- Solving the interim exam
- Drafting and presenting the seminar paper
- Passing the exam

1.8. Tracking student work (proportion of individual activities in terms of ECTS credits based on the total number of ECTS credits)

Class attendance	1	Class participation	0.1	Seminar paper	1.5	Experimental work	
Written exam		Oral exam		Essay		Research	0.6
Project		Continual assessment of knowledge		Written seminar paper (presenting the seminar paper)	0.4	Practical work	
Online activity				Periodical reports	0.2	Final self-assessment	0.2

1.9. Grading and assessment of student work during the semester and for the final exam *(interim exam, written exam, oral exam)*

1.10. **Mandatory literature** (relevant at the time of submitting the proposed study program)
- Kondić Živko; LEAN PRODUCTION, lectures and exercises in digital format
1.11. Supplementary literature (relevant at the time of submitting the proposed study program)
- James P. Womack, Daniel T. Jones; “The machine that Changed the World: the Story of Lean Production“; Seamon &Schuster UK Ltd, 2007. - James P. Womack, Daniel T. Jones; “Lean Thinking“; free Press, NY, 2003.
1.12. Manner of tracking quality to ensure the acquisition of exit knowledge, skills and competences
- Tracking student attended at lectures and exercises - Tracking student activity and preparations for lectures and exercises - Interim exam results - Drafting and presenting the seminar paper - Quality of comments on other seminar papers - Exam (based on requirements for students who do not pass the exam via the interim exam)

2. COMBINING THE LEARNING OUTCOMES, TEACHING METHODS AND ASSESSMENT OF THE LEARNING OUTCOMES

2.1. Class participation	*2.2. Student participation*	*2.3. Learning outcome*	*2.4. Assessment method*
Lectures	Listening to lectures and participating in discussions	1-7	Recording attendance and active participating (20% of total assessment)
Seminar paper	Writing up the seminar paper in accordance with instructions and presenting it to students and the teacher	1-7	Submission of seminar paper and presentation (40% of total assessment)
Online activities	Analysis and reviews of seminar papers and presenting them based exactly on defined criteria	1-7	Evaluating all analyses and reviews as well as comparing them along with teaching analyses and reviews (40% of total assessment)