COURSE DESCRIPTION CARD - SYLLABUS

Course name
Efficiency of production processes [N2ZiIP2>SPP]

Course

Field of study
Management and Production Engineering

Year/Semester
1/1

Area of study (specialization)
–

Profile of study
general academic

Level of study
second-cycle

Course offered in
Polish

Form of study
part-time

Requirements
compulsory

Number of hours

Lecture
8

Laboratory classes
0

Other
0

Tutorials
0

Projects/seminars
8

Number of credit points

2,00

Coordinators

Lecturers

Prerequisites

Has knowledge of: basics of management, production management and organization, manufacturing techniques, quality management, mathematical statistics, cost accounting Is aware of the responsibility of the company and its employees for meeting the requirements of its stakeholdes

Course objective

Learning, understanding and acquiring the ability to use indicators, strategies, principles, methodologies, methods and tools for efficient operation in a production company

Course-related learning outcomes

Knowledge:
The student has structured, theoretically based knowledge related to the organization of production processes
The student has structured and theoretically based knowledge of trends in the improvement of organization, control and supervision of production processes as well as Industry 4.0 technologies.
The student has knowledge of production process efficiency indicators and production process improvement methodologies (PDCA, DMAIC

Skills:

Is able to define measures of effectiveness and efficiency of production processes, collect data needed to determine them, and analyze the results obtained
Is able to develop forecasts regarding the effectiveness and efficiency of production processes
Is able to prepare and carry out a project to improve the efficiency of the production process (according to the DMAIC methodology)

Social competences:
Is aware of the need to critically analyze and evaluate their proposals and actions
Understands the need to make changes in production processes and in the company. Understands the need for continuous learning; can inspire and organize the learning process of team members
Is able to independently develop knowledge and skills related to continuous improvement of the efficiency of production processes

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture:
Final colloquium based on a multiple-choice test. The test contains 30 questions. At least 60% of correct answers.
Passing the lecture if obtaining at least 50% correct answers. Assignment of grades to percentage ranges of results: <90–100> very good; <80–90) good plus; <70–80) good; <60–70) satisfactory plus; <50–60) satisfactory; <0–50) unsatisfactory.
Project:
Based on developed projects. Verification will take place while reviewing the project and talking to the student (discussion of the results obtained). The student's activity during classes - performed on the date of subsequent assigned tasks - will also be taken into account for the final assessment.

Programme content

Definition and aspects of the efficiency of production processes.
Efficiency measures at individual stages of production regarding: efficiency, productivity and effectiveness, quality, resources, inventory turnover. Compound measures.
Strategies for improving the efficiency of production processes and resources.
Industry 4.0 technologies as a factor in increasing the efficiency of production processes

Course topics

Lecture:
Definition and aspects of the efficiency of production processes.
Efficiency metrics at individual production stages:
- performance, productivity and efficiency measures, including lead time, cycle time, takt time, effective process time),
- quality metrics (p, DPU, DPO, DPMO, ppm, Cp, Cpk),
- resource efficiency metrics (MTBF, MTTF, MTTR, reliability index,
- inventory turnover metrics (inventory turnover ratios),
- composite metrics (OEE, Sigma Level).
Strategies for improving the efficiency of production processes and resources (TQM, Kaizen, Lean Manufacturing; Six Sigma, theory of constraints).
Improving the efficiency of production processes according to the DMAIC methodology
Industry 4.0 technologies as a factor in increasing the efficiency of production processes

Design
Development of a comprehensive set of efficiency metrics for the process selected by the student

Teaching methods

Lecture: multimedia presentation illustrated with examples, solving tasks. Lecture conducted remotely using the synchronous access method.
Project: team work, consultations, presentation

Bibliography

Basic:
Hamrol A.:Strategie i praktyki sprawnego działania. Lean, Six Sigma i inne. Wydawnictwo Naukowe PWN, Warszawa 2017
Alcacer V., Cruz-Machado V. [2019], Scanning the Industry 4.0, A literature Review on Technologies for Manufacturing Systems, Vol. 22. Engineering Science and Technology, and International Journal.

Additional:
Goldratt E.: Cel I: Doskonałość w produkcji, Mint Books, 2006
Kotarbinski T. Traktat o dobrej robocie. Wydawnistwo Uniwersytetu Lubelskiego, Łódz 202

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,00
Classes requiring direct contact with the teacher	18	0,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	32	1,50