# COURSE DESCRIPTION CARD - SYLLABUS

Course name
Production instrumentation [S2ZiIP2>OP]

## Course

Field of study
Management and Production Engineering

Year/Semester
1/2

Area of study (specialization)
Quality Engineering and Management

Profile of study
general academic

Level of study
second-cycle

Course offered in
Polish

Form of study
full-time

Requirements
elective

## Number of hours

Lecture
15

Laboratory classes
15

Other
0

Tutorials
0

Projects/seminars
0

## Number of credit points

2,00

## Coordinators

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## Lecturers

## Prerequisites

Basic knowledge of machine construction and machine technology: machining, assembly, metrology, welding, metal forming, foundry. The ability to think logically, operate simple technical equipment, use information obtained from various sources.

## Course objective

Identify the role and scope of production instrumentation. To learn about current production instrumentation solutions used in manufacturing processes.

## Course-related learning outcomes

Knowledge:
The student is able to describe the influence of production instrumentation on the accuracy, efficiency and economy of the manufacturing process.
The student is able to divide production instrumentation and identify its functions
The student is able to identify basic types of instrumentation and describe their properties

Skills:

The student is able to determine the area of application of particular instruments in production technology.
The student is able to select appropriate instrumentation for a given task and justify his choice.
The student is able to describe the characteristics of particular fixtures, indicate their strengths and weaknesses.
The student is able to make a simple economic analysis of the application of particular technological fixture in a given case.

Social competences:
The student understands the need for continuous learning in order to improve his/her professional qualifications
The student acquires the ability to work in a team, to formulate questions and to generate ideas

## Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The knowledge acquired during the lectures is verified at the end of the semester in the form of an exam. The pass threshold is 50%.
Skills acquired in the laboratory classes are verified by evaluating student activity and skills to solution basic problems. The skill to present and analyze research results is checked in the form of experience reports.
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.

## Programme content

1. Division, role, selection and economics of using insrumentation in the production process.
2. Review of technological insrumentation.
3. Technological effects of using technological insrumentation.

## Course topics

Scope of lecture:
- the breakdown of the insrumentation used in the manufacturing process,
- the role of fixtures in different manufacturing processes,
- fixtures used in machining; breakdown of fixtures,
- place and role of workholders in technological processes, specificity for different manufacturing techniques,
- purposefulness and need for using holders - examples,
- basic definitions and classifications of workholders,
- selection of technological fixtures and serial production,
- importance of toolholders in the technological process,
- classification of toolholders according to different criteria; tool holders used in HSM machining,
- influence of toolholder on technological effects of machining (tool life, geometric structure of the surface),
- instrumentation used in measuring technology; gauges,
- instrumentation used in welding technologies,
- welding fixtures, material and tool manipulators,
- instrumentation used in assembly technology,
- instrumentation for flat material handling,
- instrumentation used in foundry operations,
- operating economics of toolholders .

Laboratory classes consist of set of exercises on which students: familiarize themselves with various solutions for toolholders and work holders, and select them according to various criteria, carry out performance tests on toolholders and work holders (run-out, clamping repeatability, rigidity, etc.), prepare the tooling for the machining task, and become acquainted with computerised systems for managing tools and tooling.

## Teaching methods

Lecture: multimedia presentation illustrated with examples, animations and short films, discussion.
Laboratory classes: execution of experimental studies, solving problem, discussion, teamwork.

## Bibliography

Basic:
Chudzikiewicz R., Mechanizacja i automatyzacja odlewni. WNT, Warszawa 1980.
Dobrzański T., Uchwyty obróbkowe, Poradnik konstruktora. Wydawnictwa Naukowo-Techniczne, Warszawa, 1987.
Feld M., Uchwyty obróbkowe. Wydawnictwa Naukowo-Techniczne, Warszawa 2002.
Feld M., Technologia budowy maszyn. Wydawnictwo Naukowe PWN. Warszawa 2000.
Golatowski T., Mechanizacja i automatyzacja w tłocznictwie. Wydawnictwa Naukowo-Techniczne, Warszawa 1978.
Kosmol J., Automatyzacja obrabiarek i obróbki skrawaniem. Wydawnictwa Naukowo-Techniczne, Warszawa 2000.
Meldner B., Darlewski J., Narzędzia skrawające w zautomatyzowanej produkcji. Wydawnictwa Naukowo-Techniczne, Warszawa 1991.
Poradnik inżyniera. Obróbka skrawaniem t. II.

Additional:
Honczarenko J., Elastyczna automatyzacja wytwarzania. Obrabiarki i systemy obróbkowe. Wydawnictwa Naukowo-Techniczne, Warszawa 2000.
Pietrusewicz W., Kwaczyński W., Nazzal A., Projektowanie uchwytów obróbkowych specjalnych, Wydawnictwo Politechniki Szczecińskiej, 2004.

## Breakdown of average student's workload

| | Hours | ECTS |
|---|---|---|
| Total workload | 50 | 2,00 |
| Classes requiring direct contact with the teacher | 30 | 1,00 |
| Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation) | 20 | 1,00 |