



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Subtractive manufacturing [S1ZiIP2>TeU1]

### Course

Field of study

Management and Production Engineering

Year/Semester

1/1

Area of study (specialization)

–

Profile of study

general academic

Level of study

first-cycle

Course offered in

Polish

Form of study

full-time

Requirements

compulsory

### Number of hours

Lecture

0

Laboratory classes

15

Other

0

Tutorials

15

Projects/seminars

0

### Number of credit points

2,00

### Coordinators

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### Lecturers

### Prerequisites

Basic knowledge of physics and mechanics.

### Course objective

Familiarization students with practical aspects of subtractive forming techniques.

### Course-related learning outcomes

Knowledge:

The student knows how to recognize basic kinds and types machining operations.

The student knows how to describe design features and application of cutting tools.

The student knows how to characterize technological capabilities of hand powered metalworking, lathe, milling and drilling machines or grinders.

Skills:

The student is able to choose the appropriate subtractive technology to give a specific surface shape.

The student is capable of setting cutting parameters.

The student is capable of operating basic measuring devices.

The student is capable of mounting and using cutting tools for different types of machining.

Social competences:

The student acquires skills of teamwork.

The student is aware of importance of machining for contemporary economics and society.

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The knowledge acquired during the tutorials is verified at the end of the semester, in the form of a mixed test, consisting of theoretical questions and calculation tasks. The pass threshold is 50%.

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.

The skills acquired during the laboratory classes are verified by evaluating the student's activity and individually made reports from particular experiences.

### Programme content

1. Kinematics and cutting parameters.
2. Overview of cutting methods.
3. Construction and application of various cutting tools.
4. Practical application of the subtractive manufacturing for shaping various products.

### Course topics

During the tutorials, students:

- familiarize with tools and measurement techniques, marking, filling, threading and cutting,
- learn about kinematics of turning process, design and types of turning tools, different types of mounting tools and workpiece, scope of this machining operation,
- learn about kinematics of milling process, design and types of milling tools, different types of mounting tools and workpiece, scope of this machining operation,
- learn about kinematics of drilling, boring, reaming and centering processes, design and types of drilling tools, different types of mounting tools and workpiece, scope of this machining operation,
- learn about kinematics of shaft, planar and hole grinding process, design and types of abrasive tools, exploitation of abrasive tools, different types of mounting workpiece in machine tools, scope of this machining operation.

In addition, they select tools and calculate the cutting parameters for selected machining operations.

During the laboratory classes, students make machine elements on machine tools in the field of technologies learned during the exercises: hand powered metalworking, workshop measurements, turning, milling, centre drilling, drilling, re boring, counterboring, reaming and grinding.

### Teaching methods

Tutorials: multimedia presentation illustrated with examples, practical exercises, discussion, solving tasks.

Laboratory classes: selection of tools, machining of machine parts, discussion, teamwork.

### Bibliography

Basic:

Brodowicz W., Skrawanie i narzędzia. WSiP, Warszawa 1998.

Praca zbiorowa pod red. Erbla J., Encyklopedia technik wytwarzania w przemyśle maszynowym. Tom II - obróbka skrawaniem, montaż. Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2001.

Filipowski R., Marciniak M., Techniki obróbki mechanicznej i erozyjnej. Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2000.

Praca zbiorowa pod red. Laber A., Wybrane zagadnienia z inżynierii wytwarzania. Obróbka użytkowa. Oficyna Wydawnicza Uniwersytetu Zielonogórskiego, Zielona Góra 2008.

Paczyński P., Metrologia techniczna: przewodnik do wykładów, ćwiczeń i laboratoriów. Wydawnictwo Politechniki Poznańskiej, Poznań 2003.

Additional:

Praca zbiorowa pod red. Cichosza P., Techniki wytwarzania - obróbka ubytkowa. Laboratorium. Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2002.

Tomaszewski R., Wstęp do technologii mechanicznej. Wydawnictwo Politechniki Poznańskiej, Poznań 2003.

### 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