COURSE DESCRIPTION CARD - SYLLABUS

Course name
Planning of manufacturing processes [S1MiTPM1>PPT]

Course

Field of study
Materials and technologies for automotive industry

Year/Semester
3/6

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
15

Laboratory classes
0

Other
0

Tutorials
0

Projects/seminars
30

Number of credit points

2,00

Coordinators

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Lecturers

Prerequisites

Prerequisites in terms of knowledge, skills and social competencies: -- Knowledge: basic knowledge of manufacturing techniques, materials technology, technical drawing and metrology Skills: ability to use literature (acquiring knowledge from specified sources) and the Internet Social competencies: understanding the need to broaden their competence, willingness to work in teams.

Course objective

Learn the basics of designing technological processes of machine parts and computer simulation of processes in materials technologies.

Course-related learning outcomes

Knowledge:
A student who has completed the course can:
-- define the concept of technology and technology of machines and define areas of concern to the machine technology,
-- mefine the basic units of mechanical engineering factory with a full production cycle,
-- define the concept and to divide the technological process at the primary and secondary components

and determine the characteristics of operation and treatment technology,
-- define structure of technical time standards and provide ways to determine the value of its components and determine the components of the time spent at the workplace.

Skills:
A student who has completed the course can:
-- use technology regulations to determine machining parameters,
-- define the framework technological process for selected part like stepped shaft based on detailed drawing,
-- prepare and control the course of numerical calculations carried out by computer using a commercial simulation system and analyze the obtained results,
-- analyze and correct detailed drawing for part like stepped shaft in terms of dimensioning, accuracy and surface roughness, machining bases and compliance determinations with PN,
-- calculate the value of technical time standards based on the calculated value of cycle time and setup time,
-- benefit from an understanding of the identified sources of knowledge (basic bibliography).

Social competences:
A student who has completed the course can:
-- actively involved in the problem solving on design classes,
-- cooperate with the project team and carry out their assigned duties within the division of labor in a team,
-- have responsibility for own work and for the results of the entire team in the reporting of basic orientation in terms of the whole project.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lectures:
Lecture assessment based on colloquium or written exam (student's activity will be take into account for final mark). Mark criteria:
3,0 40,0%-55,0%,
3,5 55,1%-70,0%,
4,0 70,1%- 80,0%,
4,5 80,1%-90,0%,
5,0 90,1%-100%.
Project:
Elaborate a technological project for selected part rotationally symmetric (stepped shaft) and a project containing the course and results of the technological process simulation for the selected product.
The project should be largely carried out on the design class. To obtain a positive assessment of the student should demonstrate the orientation of the content and substantive of the project. This will be verified during the design review and discussions with the student. The final mark will also be taken of student activity during classes - carried out within a further entrusted tasks.

Programme content

-- General information and concepts in the field of machine technology
-- Components of the technological process
-- Production process in a machine building plant with a full production cycle
-- Principles of standardizing the technological process
-- Construction of a technical standard for working time
-- Framework technological processes
-- Basics of technological process simulation in materials technologies

Course topics

LECTURE
1. Definition of basic concepts
• technology,
• machine technology,

• production process,
• technological proces etc.
2. Cognitive areas of machine technology
3. Organizational division of mechanical engineering institute with a full production cycle
• Types of departments, branches and organizational units of engineering institute.
• Discussion of the tasks of organizational units included in the production department with special emphasis on processes of straightening, cutting and centering.
• Discussion of the tasks of organizational units included in the branch machining parts with particular emphasis on machining, heat treatment, surface treatment.
• The role of organizational units of the auxiliary department
• Division of service and the role of branches warehouse management, transportation, energy, communications, sanitary-technical and administrative-economic.
4. Production process in mechanical engineering institute with a full production cycle
5. The basic components of the technological process
• Technological operation and its characteristics.
• The treatment technology and its variations.
6. Auxiliary components of technological process
• The division of the treatment technology for cut pass, working movements and elementary shanks
• Areas of interest and depth analyzes technologist and ergonomist in relation to auxiliary components of the process
7. Examples of divisions the technological process part of the part rotationally symmetric in hierarchical configuration
8. The principles of standardization of the technological process
• Defining the concept of technical time standards
• The basic tasks of technical time standardizations.
• The factors necessary for the proper determination of the technical time standards.
• Distribution of time spent at the workplace with a particular focus on the components of working time and breaks.
• Time standardized and nonstandard
• Scheme of technical standards and working time rules for determining the value of its components
• Definitions of setup time, cycle time, primary time (machine, machine-manual and manual), complementary and auxiliary.

PROJECT

Title: "Elaborate technological process for part like stepped shaft, bush or plate"

Components of the project (program content):

1. Front page (according to supplied pattern)
2. Output drawing of indicated workpiece part like shaft, bush or plate.
3. Analysis of the correctness of the output drawing in terms of norms and principles of technical drawing.
4. Improved detailed drawing.
5. Production program divided into batches.
6. Selection of the forging stock material (blank or pig) with pig technical drawing (forging, casting, moulding etc.)
7. Process operation sheet (variant for the production of medium series)
8. Instruction sheet for each technological and treatment operations (including heat treatment and technical control) with selection of machining parameters, cutting tools and control-measurement instruments.
9. Calculations of machining parameters.
10. Effort calculation of part manufacturing (determine value of technical time standards)
11. Selection of machine tools and their characterization technology
12. List of tool and equipment
13. Control system - receipt batch products.
14. Discussion of the obtained results

Title: "Simulation of material manufacturing processes"

Project components (program content):

CAE modules for materials manufacturing process technologies. Development of a technology concept for manufacturing a product with a specific structure using a CAD system and simulation code. Independent preparation of a CAD model of the tool + product system (e.g. injection mold + molding,

forging die-forging, mold-casting) and transfer of the solid model to the simulation program. Import of the solid model in the simulation code and definition of uniqueness conditions. Independent preparation and implementation of simulation. Analysis of simulation results.

Teaching methods

Lecture: multimedia presentation illustrated with examples given on a board, problem solving.
Project: solving practical problems, searching for sources, teamwork, discussion

Bibliography

Basic:
1. Poradnik Inżyniera, Obróbka skrawaniem. WNT, Warszawa 2001. Warszawa 2003.
2. Feld M., Projektowanie procesów technologicznych typowych części maszyn, WNT, Warszawa.
3. Feld M., Podstawy projektowania procesów technologicznych typowych części maszyn, WNT.
4. Wołk R., Normowanie czasu pracy na obrabiarkach do obróbki skrawaniem. WNT, Warszawa.
5. Magmasoft academy, Kom-Odlew, Kraków 2022.
6. Ignaszak Z., Podstawy modelowania CAD/CAE. Wybrane zagadnienia, e-skrypt, Poznań, 2008.

Additional:
1. Technology regulations.
2. Industrial catalogues.
3. Dobrzański T., Rysunek techniczny maszynowy, WNT, Warszawa 2005.

Breakdown of average student's workload

	Hours	ECTS
Total workload	58	2,00
Classes requiring direct contact with the teacher	45	1,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	13	0,50