COURSE DESCRIPTION CARD - SYLLABUS

Course name
Producibility of construction

Course

Field of study
Mechanical Engineering
Area of study (specialization)
Machine technology
Level of study
First-cycle studies
Form of study
part-time

Year/Semester
4/8
Profile of study
general academic
Course offered in
Polish
Requirements
elective

Number of hours

Lecture
8
Laboratory classes
Other (e.g. online)
Tutorials
8
Projects/seminars

Number of credit points

4

Lecturers

Responsible for the course/lecturer:
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Responsible for the course/lecturer:

Prerequisites

Prerequisites in terms of knowledge, skills and social competencies:

Knowledge: basic knowledge of materials technology, technical drawing, metrology and manufacturing techniques
Skills: ability to design processes part like housing
Social competencies: understanding the need to broaden their competence, willingness to work in teams

Course objective

Learn the basics of producibility of construction of machine parts.

Course-related learning outcomes

Knowledge

A student who has completed the course can:

1. Student is able to define the concept of construction producibility.
2. Student can describe the inversion method used in machine construction
3. The student is able to rational determine the crosssections and shapes of the supporting elements in terms of strength and stiffness
4. The student is able to depict the means used to increase the emergency and fatigue strength of selected machine parts
5. Student can choose the most appropriate plastic and technological method

Skills

A student who has completed the course can:

1. The student is able to select the appropriate in term of volume of production raw material to produce a stepped shaft.
2. Student can apply principles of concentration or differentiation of operations depending on volume of production.
3. The student is able to analyze and correct the workshop drawing of the stepped shaft in terms of technological progress
4. The student is able to comprehension use of the indicated sources of knowledge (list of basic literature)

Social competences

A student who has completed the course can:

1. Student is able to actively engage in project activities in solving posed problems
2. The student is able to cooperate within the project team and fulfill the duties assigned in the division of team work.
3. Student can show responsibility for his own work and co-responsibility for the effects of the work of the entire team in showing basic orientation in 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%.

Classes:

Elaboration of allotted problems from the range of producibility of construction of machine parts. Allotted problems 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

LECTURE

1. Bacis issues
   - definition of producibility of construction,
   - dividing the construction method into partial tasks,
   - nodal tasks and their interrelation,
2. Construction methodology.
   - method of elaborate construction variants,
   - inversion method
3. Reduction in weight and dimensions of the machine and its parts.
   - Adopting rational crosssections and shapes in terms of strength and stiffness, shrinkage cavity, preventing stress concentration, reducing parts weight.
   - Compact construction,
   - Use of high-strength materials,
   - Increasing fatigue strength
4. Typisation, unification and normalization of assemblies and machine parts
   - Unification, typification and standarization indicators,
   - Methods of construction using unified and standarized assemblies,
   - Using sequences of privileged numbers in construction work,
5. Selecting most suitable plastic and technological method
   - Comparitive characteristics of structural and technological features of cast, welded, forged and pressworked,
   - Applicability range of sintered materials and plastics.

CLASSES

Title: "Analysis of conctruction producibility selected machine parts and profitability evaluation of different types of pigs and blanks materials till manufacturing in a variant system for specific production volume".

Components (program content):

1. Technological producibility evaluation of selected machine part
2. Define production volume (numer of pieces per year) for:

- piece production,
- medium batch production,
- large batch production,
- mass production.

3. Making drawing of pigs with machining allowance designation
4. Elaborating of framework technological processes with taking into account the principles of concentration and differentiation manufacturing operations:

- piece production,
- medium batch production,
- large batch production,
- mass production.

5. Labour consumption calculation for part manufacturing in adopted production volume.
6. Determinig cost of performing parts on the basis of the technical standard of working time, the grade of the works classified and the cost of used material.
7. Determining the cost-effectiveness use of open, die and calibrated forging for combined blank for different production volume.
8. Discussion about the results.

Teaching methods

Lecture: multimedia presentation illustrated with examples given on a board, problem solving.

Classes: solving practical problems, searching for sources, teamwork, discussion

Bibliography

Basic

1. Skarbiński M., Technologiczność konstrukcji maszyn, WNT, Warszawa 1987.
2. Orłow P., Zasady konstruowania w budowie maszyn, WNT, warszawa 1981
3. Feld M., Projektowania procesów technologicznych typowych części maszyn, WNT, Warszawa 2003.
4. Feld M., Projektowanie procesów technologicznych typowych części maszyn, WNT, Warszawa
5. Poradnik Inżyniera, Obróbka skrawaniem. WNT, Warszawa 2001.

Additional

1. Dobrzański T., Rysunek techniczny maszynowy, WNT, Warszawa 2005.
2. Katalogi przemysłowe.
3. Normatywy

Breakdown of average student's workload

	Hours	ECTS
Total workload	16	4,0
Classes requiring direct contact with the teacher	8	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	8	2,0

[1] delete or add other activities as appropriate