

# Manufacturing Processes - opis przedmiotu

| Informacje ogólne   |                                       |
|---------------------|---------------------------------------|
| Nazwa przedmiotu    | Manufacturing Processes               |
| Kod przedmiotu      | 06.9-WM-MaPE-P-ManProc-23             |
| Wydział             | <a href="#">Wydział Mechaniczny</a>   |
| Kierunek            | Management and Production Engineering |
| Profil              | ogólnoakademicki                      |
| Rodzaj studiów      | pierwszego stopnia z tyt. inżyniera   |
| Semestr rozpoczęcia | semestr zimowy 2023/2024              |

| Informacje o przedmiocie        |                                                                                                                           |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| Semestr                         | 2                                                                                                                         |
| Liczba punktów ECTS do zdobycia | 6                                                                                                                         |
| Typ przedmiotu                  | obowiązkowy                                                                                                               |
| Język nauczania                 | angielski                                                                                                                 |
| Sylabus opracował               | <ul style="list-style-type: none"><li>dr hab. inż. Radosław Maruda, prof. UZ</li><li>dr inż. Natalia Szczotkarz</li></ul> |

| Formy zajęć  |                                         |                                        |                                            |                                           |                     |
|--------------|-----------------------------------------|----------------------------------------|--------------------------------------------|-------------------------------------------|---------------------|
| Forma zajęć  | Liczba godzin w semestrze (stacjonarne) | Liczba godzin w tygodniu (stacjonarne) | Liczba godzin w semestrze (niestacjonarne) | Liczba godzin w tygodniu (niestacjonarne) | Forma zaliczenia    |
| Wykład       | 30                                      | 2                                      | -                                          | -                                         | Zaliczenie na ocenę |
| Laboratorium | 45                                      | 3                                      | -                                          | -                                         | Zaliczenie na ocenę |

## Cel przedmiotu

The aim of the course is to familiarise participants with the most important methods of producing semi-finished products in various forms, creating machine parts by means of subtractive manufacturing and chipless forming, familiarisation with different ways of cutting materials, joining and bonding of parts, plastics processing, selected measuring techniques and providing information on the machines and production equipment used in industry.

## Wymagania wstępne

Basics of chemistry and physics at high school level.

## Zakres tematyczny

### Lectures:

- W1. Introduction. A selected issue of metallurgical processes.
- W2. Techniques for obtaining castings. Materials used for casting molds. Mold-making techniques.
- W3. Permanent mold casting and special casting technologies, special molding materials.
- W4. Techniques of avoiding casting defects, technologicity of casting, technological documentation. Environmental hazards of metallurgical processes.
- W5. General classification of bonding processes, characteristics and application of welding processes. Weldability of construction materials. Bonding methods.
- W6. Bonding methods. Material cutting processes. Robotisation of welding processes. Welding defects.
- W7. Physical fundamentals of metal forming. Methods of metal sheet and solid forming, mechanics of processes. Machines and equipment used in plastic forming.
- W8. Physical fundamentals of metal forming. Methods of metal sheet and solid forming, mechanics of processes. Machines and equipment used in plastic forming.
- W9. Methods of testing machine parts and components.
- W10. Classification of polymeric materials with characteristics of individual groups of plastics. Additional materials and agents modifying the properties of plastics. Classification of major processing methods.
- W11. Physical fundamentals of processing. Technology of injection moulding, extrusion, pressing. Types of coatings. Coating application techniques. Elements of surface engineering.
- W12. Machining - basic terms and physical fundamentals.
- W13. Cutting tool materials.

W14. Characteristics of machining processes: turning, milling, drilling.

W15. Characteristics of abrasive machining processes: grinding, honing, lapping.

Scope of the laboratory course:

L1. Introduction. Occupational health and safety. Preparation of casting technology.

L2. Preparation of casting technology.

L3-4. Manual preparation of sand molds.

L5. Casting into sand and metal moulds.

L6. Casting into special moulds.

L7. Quality assessment of castings.

L8. Welding by MIG/MAG method.

L12. Determination of pressability of metal sheets.

L13. Determination of springback angle in the bending process.

L14. Injection molding of thermoplastics.

L15. Identification of plastics used in mechanical engineering.

L16. Identification of defects in materials and products.

L17. Turning of external and internal surfaces.

L18. Turning of contoured surfaces.

L19. Contour milling.

L20. Hole machining.

L21. Grinding of flat and rotary surfaces.

L22. Gear machining.

L23. Chiselling. Credit.

Metody kształcenia

Lecture - conventional.

Laboratory - teamwork during exercises, production-oriented exercises (in some topics).

Efekty uczenia się i metody weryfikacji osiągnięcia efektów uczenia się

| Opis efektu                                                                                                                                                                                                                                 | Symbole efektów                                                       | Metody weryfikacji                                                                                                                                                  | Forma zajęć                                                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| The student has the ability to interact or work in a group, taking various roles.                                                                                                                                                           | <ul style="list-style-type: none"><li><a href="#">K_K03</a></li></ul> | <ul style="list-style-type: none"><li>bieżąca kontrola na zajęciach</li><li>dyskusja</li><li>wykonanie sprawozdań laboratoryjnych</li></ul>                         | <ul style="list-style-type: none"><li>Laboratorium</li></ul>                |
| The student has the ability to use the appropriate technique for manufacturing machine parts in regard to the type of material, semi-finished product, shape, structure and functional properties of the product and the production volume. | <ul style="list-style-type: none"><li><a href="#">K_U31</a></li></ul> | <ul style="list-style-type: none"><li>bieżąca kontrola na zajęciach</li><li>kolokwium</li><li>odповідь ustna</li><li>wykonanie sprawozdań laboratoryjnych</li></ul> | <ul style="list-style-type: none"><li>Wykład</li><li>Laboratorium</li></ul> |
| The student has theoretically-based, detailed knowledge related to selected issues of shaping the properties of finished products.                                                                                                          | <ul style="list-style-type: none"><li><a href="#">K_W26</a></li></ul> | <ul style="list-style-type: none"><li>bieżąca kontrola na zajęciach</li><li>kolokwium</li><li>wykonanie sprawozdań laboratoryjnych</li></ul>                        | <ul style="list-style-type: none"><li>Wykład</li><li>Laboratorium</li></ul> |

| Opis efektu                                                                                                                                                                                                                                                                                                                                                                  | Symbole efektów                                         | Metody weryfikacji                                                                                                                                             | Forma zajęć                                                                    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| The student has basic knowledge of the techniques of manufacturing and operating machines, mechanical systems and manufacturing systems necessary to formulate and solve simple tasks in the field of Production Engineering using Mechanical Engineering methods; knowledge of the basic methods, techniques, tools and materials used in solving simple engineering tasks. | <ul style="list-style-type: none"> <li>K_W10</li> </ul> | <ul style="list-style-type: none"> <li>aktywność w trakcie zajęć</li> <li>dyskusja</li> <li>kolokwium</li> <li>wykonanie sprawozdań laboratoryjnych</li> </ul> | <ul style="list-style-type: none"> <li>Wykład</li> <li>Laboratorium</li> </ul> |
| The student has structured, built-up knowledge in the field of basic manufacturing techniques related to Management and Production Engineering.                                                                                                                                                                                                                              | <ul style="list-style-type: none"> <li>K_W12</li> </ul> | <ul style="list-style-type: none"> <li>bieżąca kontrola na zajęciach</li> <li>kolokwium</li> <li>wykonanie sprawozdań laboratoryjnych</li> </ul>               | <ul style="list-style-type: none"> <li>Wykład</li> <li>Laboratorium</li> </ul> |

## Warunki zaliczenia

**Lecture** - a condition for passing the lecture is obtaining positive grades from 3 colloquia held during the semester, covering verification of knowledge of basic issues. Each partial colloquium contains 3 questions. A positive mark for each of the 3 questions is required to pass the test. The grade from the test is an average.

**Laboratory** - grade calculated on the basis of the component assessing the skills related to the realisation of laboratory exercises and preparation of reports from the laboratory classes carried out as part of the programme, including the student's attendance and activity in classes.

**Final course credit:** The final course grade is the arithmetic mean of the grades for the different forms of the course.

## Literatura podstawowa

1. Weman K.: Welding Processes Handbook, Elsevier Science & Technology, 2011.
2. Kalpakijan S., Schmid S.: Manufacturing Processes for Engineering Materials in SI Units, Pearson Education, 2022.
3. Sodhi H. S., Singhi V.: Basics of Casting, Welding and Forming, KS OmniScriptum Publishing, 2018.
4. Campbell J.: Complete Casting Handbook, Elsevier Science & Technology, 2015.
5. Pandey A., Goyal A.: Metal Cutting Processes, De Gruyter, 2022.
6. Smith G. T.: Cutting Tool Technology, Springer London, 2008.
7. Rowe W. B.: Principles of Modern Grinding Technology, Elsevier, 2014.
8. Osswald T. A., Menges G.: Materials Science of Polymers for Engineers, Hanser Publications, 2012.
9. Kalpakijan S., Schmid S.: Manufacturing Engineering and Technology in SI Units, Pearson Education, 2022.

## Literatura uzupełniająca

1. Instructions for laboratory exercises.
2. Brooks N.: Advanced Mouldmaking and Casting, The Crowood Press Ltd, 2011.
3. Rees H.: Mold Engineering, Hanser Publications, 2009.
4. Goel A.: Metal Cutting and Forming: Machining Techniques and Applications, Unicorn Publishing Group, 2020.
5. Woodworth J. V.: Grinding and Lapping Tools: Processes and Fixtures, Creative Media Partners, LLC, 2022.
6. Saldivar-Guerra E., Vivaldo-Lima E.: Handbook of Polymer Synthesis, Characterization, and Processing, John Wiley & Sons, 2013.

## Uwagi

Brak

Zmodyfikowane przez dr inż. Tomasz Belica (ostatnia modyfikacja: 15-05-2023 14:14)

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