# COURSE SPECIFICATION

| | | |
|---|---|---|
| Course code | full-time programme: | **M#2-S1-ME-KWW-612** |
| | part-time programme: | |
| Course title in Polish | **Maszyny technologiczne do obróbki plastycznej** | |
| Course title in English | **Metal Forming Machinery** | |
| Valid from (academic year) | **2024/2025** | |

## GENERAL INFORMATION

| | |
|---|---|
| Programme of study | **MECHANICAL ENGINEERING** |
| Level of qualification | **first-cycle** |
| Type of education | **academic** |
| Mode of study | **full-time programme** |
| Specialism | **Computer-Aided Manufacturing** |
| Department responsible | **Department of Metal Science and Manufacturing Processes** |
| Course leader | **dr hab. inż. Marek Konieczny, prof. PŚk** |
| Approved by | **dr hab. Jakub Takosoglu, prof. PŚk, Dean of the Faculty of Mechatronics and Mechanical Engineering** |

## COURSE OVERVIEW

| | | |
|---|---|---|
| Course type | | **specialism-related** |
| Course status | | **compulsory** |
| Language of instruction | | **English** |
| Semester of delivery | full-time programme | **Semester VI** |
| | part-time programme | |
| Pre-requisites | | **Fundamental of Metal Forming, Metal Forming** |
| Examination required (YES/NO) | | **NO** |
| ECTS value | | **1** |

| **Mode of instruction** | | **lecture** | **class** | **laboratory** | **project** | **seminar** |
|---|---|---|---|---|---|---|
| **No. of hours per semester** | full-time programme | **15** | | | | |
| | part-time programme | | | | | |

## LEARNING OUTCOMES

| **Category of outcome** | **Outcome code** | **Course learning outcomes** | **Corresponding programme outcome code** |
|---|---|---|---|
| Knowledge | W01 | On completion of the course, the student will have knowledge about the construction and principles of operation of various technological machinery used in the processes of cold and hot metal forming. | MiBM1_W06<br>MiBM1_W07<br>MiBM1_W11 |

| | | | |
|---|---|---|---|
| | W02 | On completion of the course, the student will have knowledge of the classification and applicability of machinery for the production of various metal products, made with metal forming methods. | MiBM1_W06<br>MiBM1_W07<br>MiBM1_W11 |
| | W03 | On completion of the course, the student will have knowledge of the operation and performance parameters of metal forming machinery | MiBM1_W06<br>MiBM1_W07<br>MiBM1_W11<br>MiBM1_W15 |
| Competence | K01 | Students are aware of the need to critically assess and update their expertise from metal forming and by exchanging knowledge and experiences with other metal forming experts | MiBM1_K01 |

## COURSE CONTENT

| Type of instruction lecture | Topics covered |
|---|---|
| lecture | Classification of machines and devices for cutting and heating the material before performing cold or hot plastic working. Technological division of machines for metal forming. Classification, construction and principle of operation of open die forging hammers. Classification, construction and principle of operation of swaging machines and electro-upsetters used for open die forging. Classification, construction and principle of operation of die hammers with anvil block and counterblow die hammers. Classification, construction and principle of operation of forging machines and forging rolling mills. Classification, construction and principle of operation of drawbenches. Classification, construction and principle of operation of drum drawers. Division of rolling mills. Classification, construction and principle of operation of longitudinal rolling mills. Classification, construction and principle of operation of cross and skew rolling mills. Classification, construction and principle of operation of special rolling mills (WPM, WPMR, ROTO-FLO, planetary, pilger mills). Classification, construction and principle of operation of general purpose mechanical presses: crank and eccentric. Classification, construction and principle of operation of general purpose mechanical presses: screw and toggle. Classification, construction and principle of operation of hydraulic presses |

## ASSESSMENT METHODS

| Outcome code | Methods of assessment *(Mark with an X where applicable)* | | | | | |
|---|---|---|---|---|---|---|
| | Oral examination | Written examination | Test | Project | Report | Other |
| W01 | | | X | | | |
| W02 | | | X | | | |
| W03 | | | X | | | |
| K01 | | | | | | X |

## ASSESSMENT TYPE AND CRITERIA

| Mode of instruction | Assessment type | Assessment criteria |
|---|---|---|
| lecture | non-examination assessment | The pass mark is a minimum of 50% for the final in-class test |

## OVERALL STUDENT WORKLOAD

| ECTS weighting | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **No.** | **Activity type** | **Student workload** | | | | | | | | | | **Unit** |
| | | **full-time programme** | | | | | **part-time programme** | | | | | |
| 1. | Scheduled contact hours | L | C | Lb | P | S | L | C | Lb | P | S | h |
| | | 15 | | | | | | | | | | |
| 2. | Other contact hours (office hours, examination) | 2 | | | | | | | | | | h |
| 3. | **Total number of contact hours** | **17** | | | | | | | | | | h |
| 4. | **Number of ECTS credits for contact hours** | **0,7** | | | | | | | | | | ECTS |
| 5. | **Number of independent study hours** | **8** | | | | | | | | | | h |
| 6. | **Number of ECTS credits for independent study hours** | **0,3** | | | | | | | | | | ECTS |
| 7. | **Number of practical hours** | **0** | | | | | | | | | | h |
| 8. | **Number of ECTS credits for practical hours** | **0,0** | | | | | | | | | | ECTS |
| 9. | **Total study time** | **25** | | | | | | | | | | h |
| 10. | **ECTS credits for the course** *1 ECTS credit = 25-30 hours of study time* | **1** | | | | | | | | | | ECTS |

## READING LIST


1. Tomczak J., Bartnicki J.: Metal Forming Machinery, Wyd. Politechniki Lubelskiej, 2012 (in Polish).
2. Erbel J i inni.: Encyclopedia of manufacturing techniques used in the engineering industry. T 1, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2001 (in Polish).
3. Lange K: Handbook of metal forming, MCGraw-Hill Book Company
4. Pacanowski J.: Design of deep drawing process of axisymmetric drawpieces and design press-forming dies T1 Methods and directives for deep drawing of axisymmetric drawpieces, Kielce: Kielce University of Technology, 2018 (in Polish)
5. Pacanowski J., Chałupczak J.: Design of die forging processes of circular-symmetric elements on presses and hammers Politechnika Świętokrzyska. Kielce, 2011(in Polish)
6. Golatowski T.: Design of deep drawing process and press-forming dies Selected problems. Warsaw: Warsaw University of Technology, 1984 (in Polish)
7. Richert J.: Innovative methods of metal forming processes. Wydawnictwa AGH 2010 (in Polish).