



Subject card

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| Subject name and code | Computer aided manufacturing, PG_00055767 | | | | | | |
| Field of study | Mechanical and Medical Engineering | | | | | | |
| Date of commencement of studies | October 2021 | Academic year of realisation of subject | | | 2023/2024 | | |
| Education level | first-cycle studies | Subject group | | | Obligatory subject group in the field of study Subject group related to scientific research in the field of study | | |
| Mode of study | Full-time studies | Mode of delivery | | | at the university | | |
| Year of study | 3 | Language of instruction | | | Polish | | |
| Semester of study | 6 | ECTS credits | | | 4.0 | | |
| Learning profile | general academic profile | Assessment form | | | assessment | | |
| Conducting unit | Zakład Technologii Maszyn i Automatykacji Produkcji -> Institute of Manufacturing and Materials Technology -> Faculty of Mechanical Engineering and Ship Technology | | | | | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | dr hab. inż. Mariusz Deja | | | | | |
| | Teachers | dr inż. Dawid Zieliński mgr inż. Ewa Kozłowska dr hab. inż. Mariusz Deja | | | | | |
| Lesson types and methods of instruction | Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
| | Number of study hours | 30.0 | 0.0 | 15.0 | 15.0 | 0.0 | 60 |
| | E-learning hours included: 0.0 | | | | | | |
| Learning activity and number of study hours | Learning activity | Participation in didactic classes included in study plan | Participation in consultation hours | | Self-study | SUM | |
| | Number of study hours | 60 | 4.0 | | 36.0 | 100 | |
| Subject objectives | Learning the basic techniques of computer-aided manufacturing, especially programming CNC machines with the use of CAM software | | | | | | |
| Learning outcomes | Course outcome | | Subject outcome | | Method of verification | | |
| | [K6_W10] he/she has knowledge in the field of machine part manufacturing and metrology | | The manufacturing process selection depending on the class, type of parts, material, dimensional and shape requirements as well as time and cost of production. | | [SW3] Assessment of knowledge contained in written work and projects | | |
| | [K6_U08] he/she is able to assess whether proposed methods and tools can be used in practice to solve simple engineering task related to machine design, manufacturing and utilization | | The student applies the practical use of CAD/CAM systems to present the designed technology for the production of mechanical components for medical applications. | | [SU1] Assessment of task fulfilment | | |
| Subject contents | Systems for computer-aided manufacturing. Integration of CAD and CAM systems. The exchange of data between systems. Declaration of the workpiece, semi-finished product, tools and fixtures. Definition of machining cycle. Types of turning and milling machining cycles. Selection of machining strategy for specific areas treated. Declaration of cutting parameters. Treatment of free surfaces. High speed machining HSM. Databases in CAM systems. Files containing data access tools. Postprocessors machine tool. Simulation with an analysis of collision. Modification of machining programs. Trends in the development of computer aided manufacturing. Additive technologies and reverse engineering. | | | | | | |
| Prerequisites and co-requisites | Technical drawing, basics of manufacturing techniques, Computer Aided Design CAD | | | | | | |

| Assessment methods and criteria | Subject passing criteria | Passing threshold | Percentage of the final grade |
|---------------------------------|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| | Practical exercises during laboratories | 60.0% | 20.0% |
| | Activity during lectures/classes | 60.0% | 20.0% |
| | Projekt | 60.0% | 20.0% |
| | Exam | 60.0% | 40.0% |
| Recommended reading | Basic literature | <p>1. Przemysław Kochan. EdgeCAM. Wieloosiowe frezowanie CNC. Wydawnictwo Helion. Gliwice 2014.</p> <p>2. Grzesik W., Niesłony P., Bartoszek M.: Programowanie obrabiarek NC/CNC. WNT, Warszawa 2020, Wyd. IV.</p> <p>3. Przybylski W., Deja M.: Komputerowo wspomaganie wytwarzanie maszyn. Podstawy i zastosowanie. WNT, Warszawa 2007.</p> <p>4. Augustyn K.: EdgeCAM. Komputerowe wspomaganie wytwarzania. Wydanie II. Helion, Gliwice 2006.</p> | |
| | Supplementary literature | <p>1. Grzesik, W. Advanced machining processes of metallic materials: theory, modelling and applications. Elsevier, 2016.</p> <p>2. Kosmol J.: Automatyzacja obrabiarek i obróbki skrawaniem. WNT, Warszawa 2000.</p> <p>3. Chlebus E.: Techniki komputerowe CAx w inżynierii produkcji. WNT, Warszawa 2000.</p> | |
| | eResources addresses | <p>Adresy na platformie eNauzanie: Komputerowo wspomaganie wytwarzanie (PG_00055767) IMM, s. 6, lato 2023/2024 - Moodle ID: 37839 https://enauzanie.pg.edu.pl/moodle/course/view.php?id=37839</p> | |

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| <p>Example issues/ example questions/ tasks being completed</p> | <p>The range of applications of CAD/CAM manufacturing support systems.</p> <p>Use and integration of CAx techniques.</p> <p>Generating NC programs using the CAD/CAM system.</p> <p>Data exchange - between different systems.</p> <p>Design and technological compliance in computer-aided manufacturing.</p> <p>Object modeling - Feature Modeling.</p> <p>Generating variants of technological solutions.</p> <p>Trends in the development of CAx techniques in the field of computer-aided manufacturing.</p> <p>Integration of CAD / CAM systems with CAE systems.</p> <p>The structure of the standard of working time in terms of computer-aided production.</p> <p>Process planning for turning technology with the use of the CAD/CAM system.</p> <p>Process planning for milling technology with the use of the CAD/CAM system.</p> <p>List the steps to be followed when designing technology using the CAM system (EdgeCam) with the use of 2D models.</p> <p>List the steps to be followed when designing technology using the CAM system (EdgeCam) with the use of 3D models.</p> <p>Designations of the axes of the coordinate system for: turning, milling and designation of additional axes.</p> <p>List the types of models used in CAM systems.</p> <p>List the designs of CNC lathes (positioning of the tool head) and the consequences of tools, spindle revolutions, etc.</p> <p>Characterize the solid models.</p> <p>Characterize the surface models.</p> <p>Present the essential differences between the solid model and the surface model.</p> <p>Characteristics of parametric CAD design.</p> <p>Ways of determining the center of the coordinate system on the workpiece.</p> <p>Ways of determining the blank in CAM systems.</p> <p>Tasks of the technical preparation of production (TPP) department.</p> |
| <p>Work placement</p> | <p>Not applicable</p> |