



## Subject card

|   |  |  |          |                                     |  |            |     |
|---|--|--|----------|-------------------------------------|--|------------|-----|
| Subject name and code                       | Numerically controlled machining tools (CNC, PG_00055244)  |  |          |                                     |  |            |     |
| Field of study                              | Management and Production Engineering  |  |          |                                     |  |            |     |
| Date of commencement of studies             | October 2025   | Academic year of realisation of subject                  |          |                                     | 2027/2028  |            |     |
| Education level                             | first-cycle studies  | Subject group  |          |                                     | Optional subject group<br>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                           | 5  | ECTS credits   |          |                                     | 5.0  |            |     |
| Learning profile                            | general academic profile   | Assessment form  |          |                                     | exam   |            |     |
| Conducting unit                             | Institute Of Manufacturing And Materials Technology -> Faculty Of Mechanical Engineering And Ship Technology -> Wydział Politechniki Gdańskiej   |  |          |                                     |  |            |     |
| Name and surname of lecturer (lecturers)    | Subject supervisor   | dr inż. szt. Piotr Sender                                |          |                                     |  |            |     |
|   | Teachers   |  |          |                                     |  |            |     |
| Lesson types and methods of instruction     | Lesson type  | Lecture  | Tutorial | Laboratory                          | Project  | Seminar    | SUM |
|   | Number of study hours  | 30.0   | 0.0      | 30.0                                | 0.0  | 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                                 |  | 61.0       | 125 |
| Subject objectives                          | Introduction to the construction and principles of operation of numerically controlled machine tools. Acquainting with the techniques of programming, selection of the proper machining process, cutting parameters, tools for a given production task.<br><br>Acquainting with the principles of using technological equipment. |  |          |                                     |  |            |     |

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| Learning outcomes   | Course outcome   | Subject outcome   | Method of verification   |
|   | [K6_K01] feels the need for self-realization by learning throughout life, is looking for modern and innovative solutions in their actions, is able to think creatively and act in an entrepreneurial way   | Understanding the principles of programming in the CAD / CAM / CNC environment, enabling work in various systems for programming of CNC machine tools. Acquainting with the construction of numerically controlled machine tools. | [SK5] Assessment of ability to solve problems that arise in practice<br>[SK2] Assessment of progress of work |
|   | [K6_U09] can use analytical techniques as well as computer simulation and numerical analysis methods in solving specific problems in the field of production engineering, is able to carry out simple engineering tasks related to the production of typical machine parts using widely understood techniques and computer tools, is able to select and apply appropriate methods of project planning and control courses with the use of computer aided means | Ability to simulate the machining of a part performed on a CNC machine tool. Ability to organize and optimize the production cell.  | [SU1] Assessment of task fulfilment  |
|   | [K6_U10] " using appropriate techniques and methods, measuring tools, is able to plan, prepare and carry out the measurement of geometrical specifications of products and conduct a critical analysis of the results  | Ability to select the appropriate technological allowances, machining parameters and appropriate operations in systems for programming CNC machine tools.   | [SU1] Assessment of task fulfilment  |
|   | [K6_U03] is able to communicate using various techniques in the professional environment and other environments, has language skills enabling free communication in the field of technical sciences related thematically to management and production engineering  | The ability to correctly name the operation, technological equipment and verify the correctness of the machining program.   | [SU2] Assessment of ability to analyse information   |
|   | [K6_W09] knows the general principles of creating and developing forms of individual entrepreneurship and stimulating employee creativity, using knowledge in the field of design, production and operation of machinery and technical devices   | Independent execution of the machining program of the indicated part.   | [SW3] Assessment of knowledge contained in written work and projects   |
| [K6_W13] has detailed knowledge of the production and operation of machines and devices, diagnosing their technical conditions and selection of regeneration techniques | The ability to describe the principles of diagnostics of CNC machine tools and the course of the machining process of the workpiece. Umiejętność szkicowania kinematyki pracy obrabiarki.  | [SW2] Assessment of knowledge contained in presentation   |  |
| Subject contents  | Construction of numerically controlled machine tools. Basing, instrumentation, diagnosis. Types of CNC machine tools. Programming of numerically controlled machine tools.   |   |  |
| Prerequisites and co-requisites   | Basic knowledge of trigonometry.   |   |  |
| Assessment methods and criteria   | Subject passing criteria   | Passing threshold   | Percentage of the final grade  |
|   | Written test   | 60.0%   | 50.0%  |
|   | Preparation of the machining program   | 60.0%   | 50.0%  |
| Recommended reading   | Basic literature   | Honczarenko "Numerically Controlled Machine Tools", WNT Warsaw; ISBN 978-83-204-3467-5  |  |
|   | Supplementary literature   | Programming instructions of numerically controlled machine tool manufacturers.  |  |

|  | eResources addresses   | Adresy na platformie eNauczenie: |
|--|--|----------------------------------|
| Example issues/<br>example questions/<br>tasks being completed | Describe the construction of a CNC machine tool, characterize possible rail connections, the structure of headstocks and a hydrostatic rolling example. Name the difference between a conventional lathe and a "hard turning" lathe, name the advantages of a "hard turning" lathe. Draw examples of turning and milling machining systems. Describe what an interpolator and a circular interpolation are. List the standardized address characters used in CNC machine tool control codes. Write the CNC's machining code for the indicated workpiece. |                                  |
| Work placement   | Not applicable   |                                  |

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