GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

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|---|---|---|---|
| Subject name and code | CNC programming, PG_00053659 | | |
| Field of study | Mechanical Engineering | | |
| Date of commencement of studies | October 2024 | Academic year of realisation of subject | 2026/2027 |
| Education level | first-cycle studies | Subject group | |
| Mode of study | Full-time studies | Mode of delivery | at the university |
| Year of study | 3 | Language of instruction | English |
| Semester of study | 6 | ECTS credits | 2.0 |
| Learning profile | general academic profile | Assessment form | assessment |
| Conducting unit | Institute of Manufacturing and Materials Technology -> Faculty of Mechanical Engineering and Ship Technology -> Faculties of Gdańsk University of Technology | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | dr hab. inż. Daniel Chuchała | |
| | Teachers | | |

**Lesson types**

| Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
|---|---|---|---|---|---|---|
| Number of study hours | 15.0 | 0.0 | 15.0 | 15.0 | 0.0 | 45 |

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 | 45 | 0.0 | 0.0 | 45 |

**Subject objectives**

Introduction to the basics of programming CNC machine tools

**Learning outcomes**

| Course outcome | Subject outcome | Method of verification |
|---|---|---|
| K6_U08 | The student is able to design a CNC machining programme including the selection of tools and cutting parameters. | [SU1] Assessment of task fulfilment |
| K6_U09 | The student is able to estimate costs of manufacturing with the use of CNC machine tools. | [SU2] Assessment of ability to analyse information |
| K6_W11 | The student has knowledge of the basic programming languages for CNC machine tools. He/she has knowledge about the basics of creating machining programmes. | [SW1] Assessment of factual knowledge |
| [K6_W12] possesses basic knowledge necessary to understand the ex-technical conditions of engineering activity, possesses basic knowledge on management, including quality management and running commercial enterprise, within the range of protection of intellectual property and patent law; knows general principles of creating and developing forms of individual entrepreneurship and basic HSE rules applicable to machine industry | The student has knowledge of how to prepare a semi-finished product for the machining process on CNC machine tools. He/she has knowledge about the types of subcontracting services available to prepare a semi-finished product of sufficient quality. | [SW1] Assessment of factual knowledge |

<table>
<tr><td>Subject contents</td><td>Course content – lecture<br><br>Lecture: Fundamentals of CNC machine tools. Basic CNC controllers and their programming languages. Design of a CNC machining programme. Basic programming in ISO code (G code). Basic programming in Heidenhain. Parametric programming. Use of logical functions in CNC programming.<br><br>Laboratory: CNC programming on Heidenhain and ISO-God control for turning and milling processes.<br><br>Project: Execution of a machining programme for a mechanical component.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Basic engineering knowledge of machining, machine tool construction and cutting tools</td></tr>
<tr><td>Assessment methods and criteria</td><td>
<table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Project</td><td>60.0%</td><td>40.0%</td></tr>
<tr><td>Laboratory</td><td>60.0%</td><td>30.0%</td></tr>
<tr><td>Lecture</td><td>60.0%</td><td>30.0%</td></tr>
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</td></tr>
<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>1. Kaushik Kumar, Chikesh Ranjan, J. Paulo Davim. CNC Programming for Machining. Springer International Publishing, 1st Edition, 2020, p.136. DOI: 10.1007/978-3-030-41279-1<br><br>2. Fundamentals of CNC Machining. A Practical Guide for Beginners. Compliments of Autodesk, Inc. USA, 2014<br><br>3. Users Manual HEIDENHAIN Conversational TNC 640, 4, 2012<br><br>4. Lathe Operators Manual. December 2018, English, Original Instructions, Haas Automation Inc., U.S.A. HaasCNC.com</td></tr>
<tr><td>Supplementary literature</td><td>1. Graham T. Smith. CNC Machining Technology. Volume 3: Part Programming Techniques. Springer-Verlag London, 1993, p. 137. DOI: 10.1007/978-1-4471-1748-3</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
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<tr><td>Example issues/ example questions/ tasks being completed</td><td>1. Linear interpolation in G-Code.<br><br>2. Linear interpolation in Heidenhain.</td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
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