

**Tárgy neve:** CNC programming

**Tárgyfelelős neve:** Andó Mátyás

**Tárgyfelelős tudományos fokozata:** PhD, Habil., egyetemi docens

**Tárgyfelelős MAB szerinti akkreditációs státusza:** AT

**Az oktatás célja angolul:**

**a) knowledge**

- They are aware of the vital basics of organization and management, quality assurance and controlling, which enable them to carry out leadership and management duties related to their specialization.
- They have extensive knowledge on business, enabling them to perform business analysis, and to establish and run an IT enterprise.
- They have a high level of fluency in the language of IT – including its professional vocabulary and its characteristic features of expression and composition – both in their mother tongue and in English, at least.
- They are aware of methods and tools for competent and effective networking both in writing and speaking.
- They know the principles and problems of corporate social responsibility related to IT systems.

**b) skills and abilities**

- They are able to perform design, development, operation, and management tasks when operating complex software systems, database management systems, corporate information systems, decision support systems, and expert systems.
- They are able to comprehensively understand, plan, organize, manage and control processes related to their IT specialization at management level.
- They are able to initiate collaboration and work in a team as well as on projects with IT or other professionals.
- They are able to analyze and apply new problem-solving methods and procedures related to their IT specialization.
- They are able to apply their IT skills in a diverse, multidisciplinary professional environment.
- They are familiar with IT professional vocabulary, which enables them to express themselves at a high level, both orally and in writing, in their mother tongue and (at least) in English; i.e. they are able to participate in discussions and debates, to write reports, to work with, understand and utilize scientific and technical literature (e.g. professional books, chapters, articles etc.).
- They are able to plan and execute quality-management subtasks related to their IT specialization.
- They are able to professionally use scientific and technical information sources to obtain knowledge necessary for solving a problem, and to critically interpret and evaluate it.

**c) attitude**

- They are committed to critical feedback and evaluation based on self-examination.
- They are committed to lifelong learning, and they are open to acquiring new IT competencies.
- They accept and make their co-workers apply the ethical principles of work and organizational culture as well as those of IT scientific research.
- They share their knowledge and consider it important to disseminate professional IT results.
- They consider it important to propagate and realize environmentally conscious behavior and social responsibility, and they promote them with the help of information technology.
- They are committed to having quality requirements met and to analyzing them with IT tools.

- They are open to proactive collaboration with IT and other professionals.

**d) autonomy and responsibility**

- They undertake to meet deadlines and to have deadlines met.
- They bear responsibility for their own work as well as for the work of their colleagues they work together with in a project.
- Regarding mission critical IT systems, they can be entrusted with developing and operational responsibilities that are in accordance with their professional competencies.

**Az oktatás tartalma angolul:**

Basic principles of CNC programming, absolute and incremental dimensioning. CNC programming with Sinumerik 808D on PC software. Theory of tool nose radius compensation and effect of the workpiece. Use of cycles, G and M codes. How to use CNC lathe, tool offset and workpiece coordinate system (work offset). Development of CAD and CAM software, typical mistakes. Basic of CAM, overview tool settings, raw materials and cycles.

1. Simulation environment of CNC lathe: Sinumerik 808D on PC software. Contour description, absolute and incremental dimensioning; G00, G01, G02 and G03 interpolations.
2. Tolerances in case of CNC lathe programming. Turn on the CNC lathe, roughing and finishing.
3. Turning cycles and tool setting. Moving the axis on CNC lathe and use of Sinumerik cycles (straight turning and facing, contour turning).
4. Drilling cycles, use of G and M code, determine the workpiece position. Tool setting in CNC lathe, and contour turning, threading.
5. Tool selection (insert, drill, reamer). Determine the workpiece on CNC lathe, drilling, threading, boring.
6. Theory of tool nose compensation. Complex practice.
7. Test. Evaluation the test. Tolerances of the raw materials. Start to use CAM software, EdgeCAM – help, use Workflow.
8. Define tool, raw material and clamping. Threading and grooving. Contour and face turning in EdgeCAM.
9. How to develop the CAD systems. Theory of CAM systems. Threading and grooving in EdgeCAM.
10. Measuring techniques – tolerances – machine accuracy. Drilling and boring in EdgeCAM.
11. CNC programming methods. Complex parts programming.
12. Test. Use of CNC lathe. Parts making in CNC lathe.
13. CNC machine's networks. Parts making in CNC lathe.

**A számonkérés és értékelés rendszere angolul:**

practical course mark

**Idegen nyelven történő indítás esetén az adott idegen nyelvű irodalom:**

Text book, compulsory:

- Siemens, Sinumerik 808D Turning: Programming and Operating Manual – V4.6 (2013)
- Vero: EdgeCAM tutorials, 2019

Proposed further reading:

- Kalpakjian, S. – Schmid, S.: Manufacturing Engineering and Technology, 2014 Pearson, Singapore