Course description

Department/Unit /	KTO / MTC		**Academic Year**	2023/2024
Title	Advanced Technologies		**Type of completion**	Exam
Accredited/Credits	Yes, 4 Cred.		**Type of completion**	Combined
Number of hours	Lecture 2 [Hours/Week] Tutorial 2 [Hours/Week]			

Occ/max	Status A	Status B	Status C		
Summer semester	0 / -	0 / -	0 / -	**Course credit prior to**	YES
Winter semester	15 / -	1 / -	1 / -	**Counted into average**	YES
				Min. (B+C) students	10
Timetable	Yes			**Repeated registration**	NO
Language of instruction	Czech, English			**Semester taught**	Winter semester
Optional course	Yes			**Internship duration**	0
Evaluation scale	1|2|3|4			**Ev. sc. – cred.**	S|N
No. of hours of on-premise					
Auto acc. of credit	Yes in the case of a previous evaluation 4 nebo nic.				
Periodicity	K				
Substituted course	None				
Preclusive courses	N/A				
Prerequisite courses	N/A				
Informally recommended courses	N/A				
Courses depending on this Course	N/A				

Course objectives:

The main goal of this course is to acquaint the students with modern cutting methods, cutting tools and with modern methods of the technology design including CAD/CAM systems.

Requirements on student

Credit conditions: participation in seminars and final test encompassment

Examination:
List of examinational questions will be supply by guarantee of subject. Examination is consists of written part (four questions or task calculation) and oral part (discussion of details of written part).

Content

1. Introduction; Complex machining; Milling
2. Rotary milling
3. Planetary milling, rotary broaching, drilling
4. HSC - principle, advantage and disadvantage, application by different ways of machining, Dry and Hard Cutting
5. HSM - application by sculptured surfaces and parts machining
6. New cutting materials and tools, powerful tools fixing systems, workpiece fixing
7. NC technology
8. System layout in small and medium sized enterprises
9. Mathematic modeling of real parts. CAD/CAM systems
10. Modern CAD/CAM systems
11. Simulation
12. CL data, Postprocessing, G code, Programming of postprocessors
13. Theory of surfaces, Reverse engineering (digitalization)

Fields of study

Guarantors and lecturers

- **Guarantors:** Doc. Ing. Jan Řehoř, Ph.D. (100%)
- **Lecturer:** Ing. Jan Hnátík, Ph.D. (40%), Doc. Ing. Jan Řehoř, Ph.D. (60%)
- **Tutorial lecturer:** Ing. Jiří Vyšata, Ph.D. (100%)

Literature

- **Basic:** *Příručka obrábění : kniha pro praktiky ; přel. Miroslav Kudela*. Praha : Sadvik, 1997. ISBN 91-972299-4-6.
- **Recommended:** LICOM SYSTEMS Ltd. *AlphaCAM Reference Manual*. Coventry, England, 1999. ISBN nemá.
- **Recommended:** Lynch, M. *Computer Numerical Control, Advanced Techniques*. McGraw-Hill, Inc.New York St. Luis, 1992. ISBN 0-07-039224-2.
- **Recommended:** Morávek, Rudolf. *Nekonvenční metody obrábění*. 2. vyd. Plzeň : ZČU, 1999. ISBN 80-7082-518-9.
- **Recommended:** Hnátík J. *Reverzní inženýrství a DP*. [Plzeň] : SmartMotion, 2012. ISBN 978-80-87539-16-3.
- **Recommended:** Sova, František. *Technologie obrábění a montáže*. 2. vyd. Plzeň : ZČU, 1998. ISBN 80-7082-449-2.

Time requirements

All forms of study

Activities	Time requirements for activity [h]
Practical training (number of hours)	52
Presentation preparation (report) (1-10)	10
Preparation for an examination (30-60)	30
E-learning [dáno e-learningovým kurzem]	20
Total:	**112**

assessment methods

Knowledge - knowledge achieved by taking this course are verified by the following means:

Oral exam

prerequisite

Knowledge - students are expected to possess the following knowledge before the course commences to finish it successfully:

To describe basic machining methods.

To describe the ISO code for NC programming.

To describe the geometry of the cutting tool.

To describe the organization of industrial production.

Skills - students are expected to possess the following skills before the course commences to finish it successfully:

To create a simple NC program in ISO code.

To design basic machining technology on different types of surfaces with regard to their quality and accuracy.

To sketch the basic types of cutting tools.

Competences - students are expected to possess the following competences before the course commences to finish it successfully:

N/A

teaching methods

Knowledge - the following training methods are used to achieve the required knowledge:

Lecture

Seminar

E-learning

learning outcomes

Knowledge - knowledge resulting from the course:

To describe areas of application of CAD / CAM systems to create modern NC technologies.

To describe developmental trends in the organization of small and medium-sized enterprises.

To describe modern technological methods in machining.

To describe new methods used in technological preparation of production.

To describe the latest trends in conventional machining.

Skills - skills resulting from the course:

To apply new technological methods in machining.

To design new progressive methods in prototype production.

To use new knowledge when designing the organizational structure of industrial enterprises.

Competences - competences resulting from the course:

N/A

N/A

Course is included in study programmes:

Study Programme	Type of	Form of	Branch	Stage	St. plan v.	Year	Block	Status	R.year	R.
Design Engineering of Machines and Technical Devices	Postgraduate Master	Full-time	Design Engineering of Manufacturing Machines and Equipment	1	2020	2023	Compulsory courses	A	2	ZS
Design Engineering of Machines and Technical Devices	Postgraduate Master	Combined	Design Engineering of Manufacturing Machines and Equipment	1	2020	2023	Compulsory courses	A	2	ZS
Machining, Additive Technology and Quality Assurance	Postgraduate Master	Full-time	Machining, Additive Technology and Quality Assurance	1	2020	2023	Compulsory courses	A	1	ZS
Design Engineering of Machines and Technical Devices	Postgraduate Master	Combined	Design Engineering of Health and Cooperative Technology	1	2020	2023	Core elective courses	B	2	ZS
Design Engineering of Machines and Technical Devices	Postgraduate Master	Full-time	Design Engineering of Health and Cooperative Technology	1	2020	2023	Core elective courses	B	2	ZS