Course description

Department/Unit /	KTO / TO			**Academic Year**	2023/2024	
Title	Machining of Metals - Cutting			**Type of completion**	Exam	
Accredited/Credits	Yes, 6 Cred.			**Type of completion**	Combined	
Number of hours	Lecture 3 [Hours/Week] Tutorial 2 [Hours/Week]					
Occ/max	Status A	Status B	Status C	**Course credit prior to**	YES	
Summer semester	14 / -	0 / -	1 / -	**Counted into average**	YES	
Winter semester	0 / -	0 / -	0 / -	**Min. (B+C) students**	10	
Timetable	Yes			**Repeated registration**	NO	
Language of instruction	Czech			**Semester taught**	Summer 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	KTO/ZSZT3, KTO/ZSZT4, KTO/ZSZT5					

Course objectives:

To acquire important theoretical knowledge of the cutting process and accompanying phenomena, stability and optimization in machining.

Requirements on student

Taking part in laboratory hours, handing in corresponding reports and fulfilment of the test requirements.

Content

1. Physical principles of metal cutting
2. Mechanics of chip formation
3. Mechanics of chip formation, methods of experimental process study
4. Dynamic phenomena in metal cutting
5. Cutting forces and methods of their estimation
6. Chatter in machining
7. Heat phenomena in machining
8. Tool wear
9. Tool life
10. Machinability of metals, coolants
11. Process optimalization
12. Process optimalization, metal removal rate
13. Process optimalization, development directions in metal cutting (HSC)

Fields of study

Guarantors and lecturers

- **Guarantors:** Doc. Ing. Jan Řehoř, Ph.D. (100%)
- **Lecturer:** Doc. Ing. Miroslav Gombár, PhD. (100%), Doc. Ing. Jan Řehoř, Ph.D. (100%), docent PaedDr. Alena Vagaská, PhD. (100%)
- **Tutorial lecturer:** Ing. Jaroslava Fulemová, Ph.D. (100%), Ing. Michal Povolný, Ph.D. (100%), Doc. Ing. Jan Řehoř, Ph.D. (100%)

Literature

- **Basic:** Přikryl, Zdeněk; Musílková, Rosa. *Teorie obrábění*. Vyd. 1. Praha : SNTL, 1971.
- **Recommended:** Liemert, Gaston. *Obrábění*. Vyd. 1. Praha : SNTL, 1974.
- **Recommended:** AB Sandvik Coromant. *Technical Guide*. Sweden, 2010.
- **Recommended:** Kráľ, Ján. *Technologické a informačné činitele obrábania*. Vyd. 1. Košice : Technická univerzita, Strojnícka fakulta, Centrum informatiky, 2009. ISBN 978-80-553-0381-9.
- **Recommended:** Mádl, Jan; Schubert, Vilém. *Základy experimentálních metod a optimalizace v teorii obrábění : Určeno pro posl. fak. strojní*. [2.], přeprac. vyd. Praha : ČVUT, 1974.

Time requirements

All forms of study

Activities	Time requirements for activity [h]
Preparation for formative assessments (2-20)	20
Preparation for comprehensive test (10-40)	30
Preparation for an examination (30-60)	60
Contact hours	60
Practical training (number of hours)	5
Total:	**175**

assessment methods

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

Combined exam

Test

Skills demonstration during practicum

Individual presentation at a seminar

Skills - skills achieved by taking this course are verified by the following means:

Combined exam

Test

Skills demonstration during practicum

Individual presentation at a seminar

Competences - competence achieved by taking this course are verified by the following means:

Combined exam

Skills demonstration during practicum

prerequisite

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

To describe the basic conventional and unconventional machining methods.

To describe the fundamentals of machining of metallic materials and the cutting tools.

To describe the tool geometry and cutting process parameters.

To describe the basics of the cutting process of machining.

To describe the basics of cutting machining optimization.

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

To apply conventional and unconventional machining methods to a defined area of required precision and quality of machined surface.

To carry out the optimization of cutting conditions (cutting speed) when turning according to the basic criteria.

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

Lecture with a video analysis

Lecture supplemented with a discussion

Practicum

Laboratory work

Multimedia supported teaching

Task-based study method

Skills demonstration

Skills - the following training methods are used to achieve the required skills:

Lecture

Lecture with a video analysis

Lecture supplemented with a discussion

Practicum

Laboratory work

Task-based study method

Skills demonstration

Multimedia supported teaching

Competences - the following training methods are used to achieve the required competences:

Practicum

Task-based study method

learning outcomes

Knowledge - knowledge resulting from the course:

To describe the physical base of the cutting process.

To describe the mechanics of the chip formation.

To describe dynamic phenomena and stability in the cutting process.

To describe the thermal effects of the cutting process.

To describe the cutting edge of the cutting tool and its measurements according to the ISO standard.

To describe cutting edge durability, cutting fluid environment, cutting materials and their influence on the cutting process.

To describe the machinability of metallic materials and the ways of its specification.

To describe optimization of the cutting process, optimization criteria and ways of optimizing cutting conditions.

Skills - skills resulting from the course:

To apply knowledge in the field of cutting process, accompanying phenomena and stability and machining optimization.

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.
Machining, Additive Technology and Quality Assurance	Postgraduate Master	Full-time	Machining, Additive Technology and Quality Assurance	1	2020	2023	Compulsory courses	A	1	LS