University: University of Žilina in Žilina	
Faculty: Faculty of Mechanical Engineering	
Subject code: 2Y027	**Subject name:** Theory of Cutting
Profile subject: no	
Type, scope and method of educational activities:	

Weekly number of teaching hours in the form of lectures, exercises, seminars, clinical practice.	2 - 2 - 0 (lectures-exercises-laboratory exercises) hours
The method by which the educational activity is carried out	The teaching takes place in person.
Methods of achieving educational results	**Lectures:** systematic theoretical problem interpretation of the issue, problem-oriented teaching, interactive lecture with multimedia support, semester written work, consultations in connection with feedback
	Exercises: model examples, motivational demonstration, explanation, problem-based teaching, continuous written examination

Number of credits: 6.0
Student workload: *4h * 13 (full-time teaching) + 52h (self-study) = 104 hours*
Recommended semester / trimester study: winter semester
Degree of study: 1. degree
Prerequisites:

Conditions for passing the subject:
The subject Theory of Cutting is evaluated by points. The resulting points are the sum of the points that the student gets during the semester in the exercises and the points that he gets in the exam. It is possible to get max. 100 points, of which 30 points in the exercises and 70 points in the exam.
During the semester, there will be one written test of 10 points, and then the student will prepare a paper on a selected topic in the field of cutting theory related to the specific aspects. Students should work out five home works (each of 4 points) in which specific aspects of cutting process will be analyzed.

Final rating:
The exam consists of a written part, which includes the elaboration of a theoretical question with a maximum number of points 30. The oral part of the exam is evaluated for a maximum of 40 points. The sum of the points obtained during the exam and during the semester determines the final evaluation of the completed course.

The resulting classification of the subject:
Rating A: 93 - 100 points
Rating B: 85 - 92 points
Rating C: 77 - 84 points
Rating D: 69 - 76 points

Rating E: 61 - 68 points
FX rating: less than 61 points.

The specific method of evaluating the student's work during the semester and the exam will be specified at the beginning of the semester by the subject teacher. The final evaluation of the student's study results for completing the course - expressed by a grade - is governed by Art. 9 Directive no. 209 Study Regulations for the first Degree of University Studies at the University of Žilina in Žilina.

Learning Outcome Scoreboard:

Forms and methods of evaluation	Scale	Area of knowledge, skills, competences
1 test	10%	Professional knowledge, independent work with professional literature
Written semester work	20%	Professional knowledge, independent work with professional literature
Written part of the exam	30%	Professional knowledge
Oral examination	40%	Professional knowledge

Learning outcomes:
 By completing the course Theory of Cutting, the student will be able to:
- analyses the specific aspect of plastic deformation in the cutting zone,
- to carry out decomposition of cutting forces in the cutting zone,
- to calculate heat produced in the different regions in the cutting zone,
- interpret knowledge about the tool wear, cutting fluids machinability of materials and tool materials,
- assess the optimal cutting conditions for the different cutting operations.

Course contents:
Lectures
- Tool geometry.
- Cutting zone and the different cutting methods.
- Plastic deformation in the cutting region – models. Chip classification.
- Components of cutting force and their decompositions with respect of tool geometry.
- Temperature and heat in the cutting region.
- Tool wear – T-vc relationship. Tool wear in grinding.
- Machinability of materials and cutting ability of tool materials.
- Stability of cutting process.
- Cutting fluids.
- Quality of machined surface.
- Machinability of specific materials.
- Tool materials and their applications.
- Optimization of cutting process.

Exercises

- Cutting edge geometry.
- Plastic deformation in the cutting region – analysis.
- Decomposition of cutting forces during turning.
- Decomposition of cutting forces during drilling.
- Tool wear. T – vc relationship.
- Residual stresses – calculations.
- Surface roughness – calculations.

Recommended reading:

NESLUŠAN, M. – ČILLIKOVÁ, M. (2015): Teoretické základy trieskového obrábania. Žilina: Edis – vydavateľské centrum ŽU v Žiline, str.248 , ISBN 978-80-554-1032-6

ČILLIKOVÁ, M. – MIČIETOVÁ, A. – NESLUŠAN, M.(2014): Trieskové obrábanie. Žilina: Edis – vydavateľstvo ŽU v Žiline, str. , ISBN 978-80-554-0497-4

NESLUŠAN, M. – ČILLIKOVÁ, M. (2007): Teória obrábania, EDIS - ŽU v Žiline, ISBN 978-80- 8070-790-3

SHAW, M.C. (1985): The Theory of Metal Cutting, https://doi.org/10.1007/978-1-349-07529-4_3, ISBN 978-1-349-07529-4

STEPHENSON, D. – AGAPIOU, S. (2019): Metal Cutting Theory and Practice, Taylor & Francis Ltd, ISBN: 0367868199

A language whose knowledge is required to complete the course: english

Notes:

Course evaluation

Total number of evaluated students: 0

A	B	C	D	E	FX
0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Person securing the subject (subject guarantor):

prof. Dr. Ing. Miroslav Neslušan

Teaching:

Name and surname of the teacher, titles	Organizational form provided by the university teacher (Lectures, exercises, laboratory work, field exercises)
prof. Dr. Ing. Miroslav Neslušan	Lectures
prof. Dr. Ing. Miroslav Neslušan	exercises

Date of last change: 2.12. 2022

Approved: prof. Dr. Ing. Miroslav Neslušan.