SYLLABUS

1. Course title:

Metal removal process I

2. Code:

3. Cycle of study:

1

4. ECTS credits:

6

5. Type of course:

Mandatory

6. Prerequisites:

7. Class restrictions:

8. Duration / semester(s):

1 V

9. Weekly contact hours and student workload:

	Semester (1)	Semester (2)	(for two-semester courses)	Workload: (hours)
	V			
9.1. Lectures	3		Classes:	56,2
9.2. Seminars	1		Individual work:	115,9
9.3. Laboratory / Practice classes	1		In total:	172,1

10. Faculty:

Faculty of Mechanical Engineering Tuzla

11. Department/study program:

Production mechanical engineering

12. Lecturer:

Ph.D Muhamed Mehmedović, associate prof.

13. Course aims:

The basis aims of this course realization are:
to introduce students with purpose of metal removal process as well as principles and definition,
to introduce students with mechanisms of chip formation, mechanics, thermodynamics as well as tribology of metal

removal process,
to introduce students with cutting tool materials, integrity of machined surface as well as machinability,
to introduce students with experimental and analytical methods of metal removal processes modeling as well as possibilities of metal removal processes control and regulation.

14. Learning outcomes:

At the end of this course, the students should be able to: Understand of cutting tool geometry as well as the way for conversion of cutting tool geometry from one to another systems of tool geometry description , Classify chips and identification of conditions for different chip type formation as well as the causes, characteristics and effects of built - up - tool edge formation, Identification of the cutting force components and design Merchant's circle of cutting forces and showing their among relations, To know the possible ways of controlling cutting temperature and the purposes of cutting fluid applications, To know the ways of machinability of materials control as a function of: Chemical and physical properties of work material, processing regimes, cutting tool geometry and environmental factors, To able to recognise and analize of different tool wear types during machining process as well as to create VB-t and T-v curves, To know investigate intensity and nature of influences of inputs variables to the outputs of metal removal process, as well as define mathematical model of output as a function of inputs variables for metal removal process, Determinate the optimal solutions of metal removal process on the basis of different criteria with the goal of optimal control of analyzed process

15. Course content:

1.Introduce, Metal removal process, Classifications and Machine Tools, Kinematics of metal removal processes
2.Geometry of cutting tools, Cutting tools regimes,
3. Mechanisms of chip formation, Forces of metal removal process,
4.Forces of metal removal process, Indicators of plastic deformation during the metal removal process,
5.Types of chips formation, Built up edge - formation and characteristics,
6.Thermodynamics of metal removal process, Cutting fluid characteristics and application,
7.Test 1, Tribology of metal removal process,
8.Tool wear mechanism, Tool life (VB-t) and tool wear (T-v) curves,
9.Mathematical modeling VB-t and T-v curves,
10.Integrity of machined surface,
11.Analytical method for determining processing regime, Optimization of processing regime,
12.Cutting tool materials, Machinability,
13.Cutting speed and cutting tool life optimization,
14.Experimental and analytical methods of metal removal processes modeling.
15.Test 2

16. Learning methods:

The following methods are planned for successful learning:

- Lectures with the use of multimedia equipment and learning technique with active participation and student discussions,
- Auditory exercises,
- Laboratory exercises,
- Graphic paper preparation and working

17. Assessment methods:

• Lectures – theoretical lectures, active two-way communication between student and professor, compulsory attendance of students;
• Theory tests - solving tests;
• Tests with tasks - solving tests;
• Graphic work – independent work of the student to solve the problem;
• Oral final exam - interactive conversation with the student in order to validate the acquired knowledge;
• Consultations – clarification of any ambiguities related to the topic of the studied subject.

The condition for signing is the student's attendance at a minimum of 70% of lectures and exercises.
Grading Scale:

Grade	Descriptive	Letter	Points
5 (five)	Does not meet minimum criteria	F, FX	<54
6 (six)	Meets minimum criteria	E	54÷64
7 (seven)	Generally good, but with significant shortcomings	D	65÷74
8 (eight)	Average, with noticeable errors	C	75÷84
9 (nine)	Above average, with occasional errors	B	85÷94
10 (ten)	Exceptional success with no errors or with minor errors	A	95÷100.

18. Assessment components:

1. Attendance at lectures (45×0.111=5)
2. Theory test (2 tests - 2×10=20)
3. Tests with tasks (2 tests - 2×10=20)
4. Graphic work (1×10=10)
5. Final exam (45)
Through the continuous activities of checking the student's knowledge during the semester (sequential number: 1, 2, 3 i 4), the student can win 55% of the total number of points, and by passing the oral (final) exam another 45% of the total number of points

19. Mandatory reading list:

1. Ekinović S. : „Theory of cutting process“, Faculty of Mechanical Engineering in Zenica, 2003.

20. Additional reading list:

1.R. Childs T.; Maekawa K.; Obikawa T.; Yamane Y.: „Metal Machining, Theory and Applications“, First published in Great Britain, London, 2000 godina

21. Web sources:

22. Applicable from the academic year:

2025/2026

23. Adopted in the Faculty/Academy session:

29.04.2025