

## SYLLABUS

**1. Course title:**

Metal removal process I

**2. Code:****3. Cycle of study:****4. ECTS credits:****5. Type of course:** Mandatory  Elective**6. Prerequisites:**

Materials I, Materials II

**7. Class restrictions:****8. Duration / semester:****9. Weekly contact hours:**

9.1. Lectures:

3

9.2. Seminars:

1

9.3. Laboratory/Practice classes:

1

**10. Faculty:**

Faculty of mechanical engineering

**11. Department/study program:**

Production engineering

**12. Lecturer:**

Prof.Ph.D Muhamed Mehmedović

**13. Lecturer's e-mail:**

muhamed.mehmedovic@untz.ba

**14. Web site:**

<http://mf.untz.ba/>

**15. 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.

**16. Learning outcomes:**

At the end of this course, the students should be able to:

Understand of cutting tool geometry as well as conversion of cutting tool geometry from one system to another systems of description of tool geometry,  
 Classify chips and identify the condition for different chip forms as well as the causes, characteristics and effects of built - up - edge formation,  
 Identify the cutting force components and develop Merchant's diagram and show the forces and their relations,  
 State the possible ways of controlling cutting temperature and identify the purposes of cutting fluid application,  
 Illustrate the ways of machinability control as a function of: Chemical and physical properties of work material, processing regimes, cutting tool parameters and environmental factors,  
 Investigate intensity and nature of influences of inputs variables to the output, as well as define mathematical model of output as a function of inputs variables for metal removal process,  
 Determine of the optimum of solutions of metal removal process on the basis of different criteria and make optimal control of metal removal process.

**17. Course content:**

Introduce, Metal removal process - purpose, principles and definition,  
 Classifications of metal removal processes and Machine Tools,  
 Kinematics of metal removal processes, Geometry of cutting tools, Cutting tools regimes,  
 Mechanisms of chip formation,  
 Orthogonal and oblique cutting, Forces of metal removal process - Merchant's circle diagram,  
 Indicators of plastic deformation during the metal removal process,  
 Types of chips and conditions for formation of those chips, Built up edge - formation and characteristics,  
 Thermodynamics of metal removal process,  
 Cutting fluid characteristics and application,  
 Tribology of metal removal process,  
 Integrity of machined surface,  
 Cutting tool materials, Machinability,  
 Experimental methods of investigation of metal removal processes ,  
 Experimental and analytical methods of metal removal processes modeling,  
 Possibilities of machining processes regulation and control.

**18. 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,
- Laboratory exercises,
- Graphic papers preparation and working

**19. Assessment methods:**

Activities during lectures realization and exercises realization,  
Semester's paper/homework,  
Partially exams during lectures realization,  
Final exam at the end of course,  
Remedial exams.

Above mentioned assessments are taken into account as a cumulative exam only if the result is positive after each partial exam, and if its portion is more than 50% of the total of required knowledge and skills of this activities. The exam is successful finished if student has minimum 54% of cumulative points.

**20. Assessment components:**

	Points
Obligations of the student	
Presence and activities during course	5
Graphic papers	10
Tests from the theory	20
Tests from the exercises	20
Final examination	45

**21. Required reading list:**

Ekinović S. : „Theory of cutting process“, Faculty of Mechanical Engineering in Zenica, 2003.  
Cukor G.: „Calculations in to metal removal processes“, Technical faculty Rijeka, Croation, 2006.  
R. Childs T.; Maekawa K.; Obikawa T.; Yamane Y.: „Metal Machining, Theory and Applications“, First published in Great Britain, London, 2000 godina.

**22. Web sources:****23. Applicable starting from the academic year:**

2014/15

**24. Adopted in the Faculty/Academy session:**