

**Faculty of Mechanical Engineering / MECHANICAL ENGINEERING / TOOLS AND ACCESSORIES**

<b>Course:</b>	TOOLS AND ACCESSORIES			
<b>Course ID</b>	<b>Course status</b>	<b>Semester</b>	<b>ECTS credits</b>	<b>Lessons</b> (Lessons+Exercises+Laboratory)
282	Mandatory	6	4	2+1+1
<b>Programs</b>	MECHANICAL ENGINEERING			
<b>Prerequisites</b>	There are no requirements for registering and listening to the subject.			
<b>Aims</b>	Through this course, students acquire the theoretical and practical basics of current tools and accessories.			
<b>Learning outcomes</b>	After the student passes this exam, he will be able to: 1. Divide tools and accessories and determine the rules for their construction. 2. Explain the process of making tools for metal processing by plastic deformation, metal processing by cutting, metal processing under pressure and plastic mass processing by pressing. 3. Perform the calculation of the dimensions of the working elements of the tool, the calculation of the labor force for a specific tool and the calculation of the geometry of the tool and accessories. 4. Determine the appropriate materials for working and structural elements of tools and accessories. 5. Select accessories for a specific tool and provide instructions for constructing and using accessories.			
<b>Lecturer / Teaching assistant</b>	Asst. Prof. Nikola Šibalić, PhD; Marko Mumović, MSc			
<b>Methodology</b>	Lectures, calculation exercises, laboratory exercises, homework and consultations.			
<b>Plan and program of work</b>				
Preparing week	Preparation and registration of the semester			
I week lectures	Introduction. Generally about tools and accessories.			
I week exercises	Distribution of tools and accessories. Rules for construction.			
II week lectures	Tools for processing metal by plastic deformation. Tools for cutting and punching sheets.			
II week exercises	Calculation of the force and clearance of the working elements of the tool.			
III week lectures	Tools for processing metal by plastic deformation. Dies, cutters, punches, guides and bushings for guiding tools.			
III week exercises	Dimensioning of the matrix, projecting and punching. Tool project.			
IV week lectures	Tools for processing metal by plastic deformation. Materials for tools.			
IV week exercises	Laboratory exercise. Tool project.			
V week lectures	Colloquium 1.			
V week exercises	Colloquium 1.			
VI week lectures	Blacksmiths tools. Slopes and radii of engraving, so-called. cold and hot dimensions.			
VI week exercises	Dimensioning of blacksmith tools. Calculation of cold and hot dimensions.			
VII week lectures	Blacksmith tools - material and service life.			
VII week exercises	Examples of calculation of working elements of forging tools. Tool project.			
VIII week lectures	Metal cutting tools. Lathe cutting tool.			
VIII week exercises	Tool geometry.			
IX week lectures	Metal cutting tools. Threaders, types and cutting scheme.			
IX week exercises	Laboratory exercise.			
X week lectures	Colloquium 2.			
X week exercises	Colloquium 2.			
XI week lectures	Die casting tools. Constructive elements.			
XI week exercises	Calculation of the dimensions of the tool mold.			
XII week lectures	Tools for pressing plastic masses. Types and characteristics of plastics.			
XII week exercises	Laboratory exercise - visit to production plants.			
XIII week lectures	Constructive elements of tools for ordinary and indirect pressing of plastic masses.			

XIII week exercises		Examples of tools for pressing plastic masses.				
XIV week lectures		Constructive elements of injection molding tools.				
XIV week exercises		Laboratory exercise - visit to production facilities.				
XV week lectures		Auxiliary accessories. Advantages of application. Instructions for constructing accessories.				
XV week exercises		Examples of dimensioning of auxiliary accessories. Pneumo-hydraulic clamping.				
<b>Student workload</b>						
<b>Per week</b>			<b>Per semester</b>			
<b>4 credits x 40/30=5 hours and 20 minuts</b> 2 sat(a) theoretical classes 1 sat(a) practical classes 1 excercises <b>1 hour(s) i 20 minuts</b> of independent work, including consultations			Classes and final exam: <b>5 hour(s) i 20 minuts x 16 =85 hour(s) i 20 minuts</b> Necessary preparation before the beginning of the semester (administration, registration, certification): <b>5 hour(s) i 20 minuts x 2 =10 hour(s) i 40 minuts</b> Total workload for the subject: <b>4 x 30=120 hour(s)</b> Additional work for exam preparation in the preparing exam period, including taking the remedial exam from 0 to 30 hours (remaining time from the first two items to the total load for the item) <b>24 hour(s) i 0 minuts</b> Workload structure: <b>85 hour(s) i 20 minuts (cources), 10 hour(s) i 40 minuts (preparation), 24 hour(s) i 0 minuts (additional work)</b>			
<b>Student obligations</b>			Students are required to attend classes, do a project and pass colloquiums.			
<b>Consultations</b>			Consultations are held after lectures and exercises.			
<b>Literature</b>			B. Musafija: Obrada metala plastičim deformisanjem, Sarajevo, 1988.; F. Rajec: Rezni alati, Zagreb, 1995.; V. Šolaja: Alati za obradu lima, Mašinski fakultet, Beograd, 1998.			
<b>Examination methods</b>			Colloquium I 20 points. Colloquium II 20 points. Homework (Project work) 25 points. Final exam 35 points.			
<b>Special remarks</b>						
<b>Comment</b>						
<b>Grade:</b>	F	E	D	C	B	A
<b>Number of points</b>	less than 50 points	greater than or equal to 50 points and less than 60 points	greater than or equal to 60 points and less than 70 points	greater than or equal to 70 points and less than 80 points	greater than or equal to 80 points and less than 90 points	greater than or equal to 90 points