Material Cutting and Cutting Tools

Course Overview for gr. 158L3A, 7-th semester

Level of study	**Bachelor Degree**
Workload	**ECTS: 4** **Total Hours: 72** **Contact Hours: 32** • **Lectures: 16** • **Labs: 16** • **Seminars: ---**
Course Code	B3.B.1.1
Semester	**Winter**
Prerequisites	*"Structural Materials Engineering", "Metrology, Standardisation and Certification", "Materials Science", "Material Cutting and Cutting Tool, part 1"*
Course Objectives	*The objective of the course is to develop knowledge, skills and experience in the field of metal cutting tools application, design and calculation*
Learning Outcomes	*Will know:* • *physics of cutting;* • *types and application of cutters, broaches, drills, core-drills, reamers; milling, thread and gear cutting tools* • *cuttinf tools for automated production* • *geometrical parameters, design and calculation of form cutters, broaches, drills, core-drills, reamers; milling, thread and gear cutting tools* • *cutting mode parameters and optimal tool life in cutting with form cutters, broaches, drills, core-drills, reamers; milling, thread and gear cutting tools* *Will be able to:* • *design and calculation of form cutters, broaches and milling cutting tools;* • *calculate cutting mode parameters, forces and required machine tool power in cutting with form cutters, broaches, drills, core-drills, reamers; milling, thread and gear cutting tools;*
Syllabus	*1. Costructions of Turning and Shaping (Planing) Cutters, Design and Calculation of Cutters* *2. Costructions of Broaches, Design and Calculation of Broaches* *3. Costructions of Sizing Tools, Design and Calculation of Drills, Core-Drills, Reamers* *4. Costructions of Milling Cutters, Design and Calculation of Milling Cutters* *5. Costructions of Thread Cutting Tools, Design and Calculation* *6. Costructions of Gear Cutting Tools, Design and Calculation* *7. Costructions of Cutting Tools for Automated Production*
Labs	*1. Measurement of Cutter's Geometrical Parameters* *2. Sharpening of Cutters* *3. Measurement of Twist Drill's Geometrical Parameters* *4. Sharpening of of Twist Drills* *5. Measurement of Core-Drill's and Reamer's Geometrical Parameters* *6. Sharpening of Core-Drills and Reamers* *7. Measurement of Milling Cutter's Geometrical Parameters* *8. Sharpening of of Milling Cutters*
Practical works	*1. Calculation of cutting mode, force and power in turning* *2. Calculation of cutting mode, force and power in cutiing with sizing tools* *3. Calculation of cutting mode, force and power in milling* *4. Calculation of cutting mode and power in grinding*

Projects	
Assessment	*Exam*
Resources	• *Material cutting and cutting tools : учебное пособие / С. В. Кирсанов (http://www.lib.tpu.ru/fulltext2/m/2014/m261.pdf)* • *Technology of Mechanical Engineering, part 2: study aid / V. N. Kozlov; Tomsk Polytechnic University (TPU). — Tomsk: Tomsk Polytechnic University Publishing House, 2002.* • *Cutting Tool Applications. George Schneider, 2005* • *Manufacturing Engineering and Technology. Fifth edition. Serope Kalpakjian, Steven R. Schmid, 2006*
Instructors	*Kim Alexey Bogowhich* *http://portal.tpu.ru/SHARED/b/BOGOWHICH* *Kozlov Viktor Nikolaevich*