CALENDAR PLAN OF DISCIPLINE

Mechanical Engineering (Technology of Mechanical Engineering), part 1

fall semester 2016/17 academic year

INSTITUTE**: IC**,
discipline: **Mechanical Engineering;**
quantity of parts: **2**;
quantity of sections: within **first** part – **3** sections; within **second** part – **1** section.
Semesters: **first** part - 7 (fall semester); **second** part - 8 (spring semester)
groups: 8L3I
Lecturer: Kozlov V.N.
Forms of checking: tests of knowledge, individual home work, exam

Quantity of points total – 100 (for each section)
Excellent (5): 91 – 100 points;
Good (4): 71 – 90 points;
Satisfactory (3): 55-70 points;
Maximal points at the end of semester: 60 points;
Permitting to exam – 32 points
Exam: 40

Technology of Mechanical Engineering, part 1

Lectures	48 hours (class)
Practice work	24 hours (class)
Laboratory work	26 hours (class)
Check of knowledge	4 hours (class)
Total class hours	**102 hours**
Self-Studying Activity	102 hours

Rating Tables

Discipline: **Technology of Mechanical Engineering**, part 1
Class hours – 102, including: lectures - 48 hours, practice works - 24 hours, laboratory works-26, check of knowledge – 4.

Section 1			
Type of works	Quantity of hours	Maximal point for one hour	Maximal point for each type of work at the end of semester
Lectures	30	2	6
Practice works	10	10 (after defense of work)	10
Laboratory works)	16	10 (after defense of work)	16
Dead line test of knowledge	2 (1 test)	100	10
Individual home work	1	180 (after defense of work)	18
		Total:	60
Section 2			
Type of works	Quantity of hours	Maximal point for one hour	Maximal point for each type of work at the end of semester

Lectures Practice works Laboratory works) Dead line test of knowledge Individual home work	10 12 8 2 (1 test) 1	2 10 (after defense of work) 10 (after defense of work) 200 180 (after defense of work)	2 12 8 20 18
		Total:	60
Section 3			
Lectures Practice works Laboratory works) Dead line test of knowledge Individual home work	8 2 2 --- (1 test) 1	5 40 (after defense of work) 40 (after defense of work) 200 180 (after defense of work)	4 8 8 20 20
		Total:	60

№ week	№ lect.	Them of lecture (lectures - 48 hours)	Quantity of hours	Quant-ity of points	Themes of laboratory works (26 hours)	Quantity of hours	Quantity of points	Themes of laboratory works (24 hours)	Quantity of hours	Quantity of points	Quantity of points at all
		Section 1 "Metrology, standardization and technical measurements"	**30**		**Laboratory works – 16 hours**			**Practice works – 10 hours**			
1	1	**Introduction. Measuring and layout tools.** The International System of Units. The international standard for the meter. Gage blocks. Interchangeability. Measuring and layout tools. vernier calipers. The parts and reading of a vernier caliper and micrometer.	2	4	Measurement with a vernier caliper and micrometer	2	20				
1	2	**Universal dial indicators and dial indicating gages.** The parts of dial indicator, setting discs and setting rings. Measuring with a dial indicator.	2	4							
2	3	**Gages and toolmaker's microscopes.** Gage blocks and its classifications. Building up a specific gage block combination. Angle gage blocks. Toolmaker's microscopes and optical comparators. The sine bar. Limits gages.	2	4	Measurement with a dial indicator gages	2	20				
2	4	**Methods of Measurements.** The methods of absolute measurements and	2	4							

		methods of relative measurements. The advantages and disadvantages of relative measurement method.									
3	4	**Tolerance zones.** Actual size. Notions "shaft" and "hole". The basic size and zero line. Limit deviations and sizes. Fundamental deviation and tolerance. Schemes of fundamental deviations of shafts and holes. Tolerance zones. Marking of working size in accordance with the system ISO.	2	4							
3	5	**Fits.** Notion "fit". Tolerance of the fit. Fits in systems hole and shaft. Types of fits. Tolerance zones of fits.	2	4				Tolerances and fits	4	4	
4	6	**Fits for rolling contact bearing.** Tolerance zones for rolling contact bearing. Fits for rolling contact bearing. **The method of selective assembly.** Tolerance zones of very accurate fits. The method of selective assembly. Calculation of limit sizes for groups.	1 1	2 2				Special forms of fits	4	4	
5	7	**Gages for testing parts.** Limits gages. Schemes of gages tolerances zones for testing a hole and shaft. The advantages and disadvantages of gages. Plain, taper and thread ring gages.	2	4	Measurements of a limit plug gages	2	20				
6	8	**Key and slit junctions. Tolerances of angles and cones.** Key and slit fits. Methods and tools for control of angles and cones.	2	4							
6	9	**Screw threads.** Types of threads. Fundamental terms of thread. Scheme of tolerance zones of an internal and external threads. Basic and complete designations for ISO Metric threads. Square thread. Brown and Sharp Worm Thread. Pipe Threads. Tapping and threading. The taper, plug, and bottoming taps.	2	4				**test №1** "Measuring tools, tolerance zones and fits"		10	

7	10	**Screw thread measurement.** The measurement of the minor and major diameters. The measurement of the pitch diameter. Measurements by thread micrometers, ring and screw thread plug gages, roll thread snap gages, thread comparators, optical comparators, by the three-wire method. Measurements by toolmaker's microscope. Profile of go- and not-go gages.	2	4	Measurement of screw threads	2	20				
7	11	**Control of surface finish.** Waviness and roughness. Lay and flaws. Centerline. Roughness sampling length. Roughness average. Height of the profile roughness on ten points. Roughness spacing. Roughness spacing on the centerline. Relative profile length. Surface Finish Symbols. Roughness and grade of tolerance. Flatness measurement.	2	4	Inspection of surface roughness	2	20				
8	12	**Inspection of surface form and disposition of surfaces.** The tolerance of deviation of the form and disposition of surfaces. Degrees of accuracy. Item deviation. Radial and face palpitation. Dependent tolerance.	2	4	Inspection of the surface form and disposition of surf	2	20				**27\27**
9	13	**Control of gears.** Types of gears. Gear terms and definitions. Fixing of accuracy: accuracy on norms of kinematics accuracy, on norms of smoothness of work, on norms of teeth contact, kind of interface and kind of the tolerance on a lateral clearance. Complexes of the control.	2	4	Inspection of gears	4	40				
10	14	**Drawing requirements.** Requirements for the assembly and design drawings.	2	4				Drawing requirements	2	2	
								Defense of individual home work		18	**32\60**
		Section 2 “Cutting of materials and cutting tools“	**10**		**Laboratory works – 8 hours**			**Practice works – 12 hours**			

10	15	**Cutting tools.** Requirements to cutting tool materials. Cutting speed, cutting feed, and depth of cut. Classification of tools. Cutting tool geometry. Thickness of removing layer. A chip breaker.	2	4	Measurements of cutting tool geometry	2	20				
11		**Cutting tool materials**. Cutting tool materials and its properties. Carbon-tool-steel, high-speed steel, cast-alloy, cemented-carbide, cermet, ceramic and diamond cutting tools. Coated steel and carbides. Comparative cutting speeds and rate feed.	2	4							
11	16	**Cutting action.** Zones of deformations. Types of chips. Shear angle. Zones of cutting tool wear.	2	4	Measurements of cutting force	2	20				
12	17	**Cutting force and power.** Three principal components of the cutting force. Machinability. Influence of a built-up edge on cutting forces.	2	4	Investigation of influence of a built-up edge on cutting forces	2	20	**Test 2** "Cutting tools and cutting action"		20	**27\27**
13	18	**Calculation of cutting speed and force.** Wear and cutting tool life. Calculation of cutting speed and force. Cutting fluids.	2	4	Investigation of wear and cutting tool life	2	15	Calculations of cutting force and power at turning	4	4	
14								Calculations of cutting force and power at drilling, core drilling and reaming	4	4	
14								Calculations of cutting force and power at milling	4	4	
14								Defense of individual home work		18	**32\60**
		Section 3 'Fundamentals of mechanical engineering technology"	**8**		**laboratory works – 2 hours**			**Practice works – 2 hours**			
15	19	**Size circuits.** Terms of size circuits. Definition of the limiting sizes of the closing link. The deviations definition of making links for a known	2	10				Calculations of size circuits	2	8	

		initial link. Method of the equal tolerances. Method of equal accuracy at complete interchangeability. Method of equal accuracy at incomplete interchangeability.									
15	20	**The basing and methods of holding workpiece.** The basing. Schemes of basing. Conditional designations of support, clips and adjusting devices. Methods of holding workpiece.	2	10							
16	21	**Cut layer in machining.** Cut layer. Calculation of technological sizes and initial blank size. Connection of size circuit, cut layer and basing.	2	10				**Test 3** "Size circuits and basing"		20	**31\31**
16	22	**Technological designing.** The production and technological process. The basic principles of designing of technological processes. Technological process of machining of a stepped shaft.	2	10	Investigation of probability of size manufacturing at shaft turning	2	80				
								Defense of individual home work		18	**29\60**
		Exam of section 1								40	**40\100**
		Exam of section 2								40	**40\100**
		Exam of section 3								40	**40\100**

Lecturer: docent of department Mechanical Engineering and Industrial Robotics Kozlov V.N.