Higher Education Institution: National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute".

Faculty: Educational and Research Institute of Mechanical Engineering

Bachelor field: 131 Applied mechanics

Bachelor study programme: Automated and robotic mechanical systems

Study period: 2022/2023 academic year

EDUCATIONAL SPACES FOR THE STUDY PROGRAM IN THE UNIVERSITY YEAR 2022/2023

No.	Educational spaces	Indicator				
		Requirements calculated at the enrolled capacity of the study cycle *(3, 4, 5 or 6 years)*		Owned by the higher education institution		[%] owned from the requirements
		Number	Surface (m^2)	Number	Surface (m^2)	
0	*1*	*2*	*3*	*4*	*5*	*6*
1	Lecture rooms	26	1979,8	26	1979,8	100%
2	Seminar rooms	28	1705,8	28	1705,8	100%
3	Laboratories**	29	1663,9	29	1663,9	100%
4	Library rooms	11+	13869,0	11+	13869,0	100%

* The situation presented is in accordance with the schedule of each study group for the evaluated study program 2022/2023 academic year.

** The list of laboratories with equipment (synthetic) and the list of laboratory works attached: Material and technical support of department of Fluid Mechanics and Mechatronics https://pgm.kpi.ua/downloads/programs/lab-tabl.pdf https://pgm.kpi.ua/downloads/bakalavry/2022/lab.pdf

Subject code	Laboratories, area	Subject	Staff	Equipment	Lab works	Additional information
0	1	2	3	4	5	6
PC 02	Laboratory of general and non-organic Chemistry 219-4 (65 sq.m.)	Chemistry	T. I. Duda	Laboratory chemical equipment: Tables for conducting laboratory experiments (with lighting, water and electricity), Sets of chemical reagents, Burette for titration, A set of redox indicators, Industrial pH meter, Chlorine-silver electrode Glass electrode Potentiometer, A set of metals, a set of oxidizing acids Voltmeters Copper-zinc galvanic elements Steel plates of technical purity Electrolyzer for obtaining gases Electrolyzer for coating	1. Determination of the amount of alkali in the solution 2. Chemical properties of inorganic substances 3. Reactions in aqueous solutions of electrolytes 4. Determination of quantitative characteristics of electrolyte solutions 5. Redox reactions 6. Chemical stability of metals 7. Galvanic elements 8. Corrosion of metals and alloys 9. Application of coatings	
PC 12.1	Laboratory of material streghtness (build.1, lab. 166E) 154,8 sq.m.) Laboratory of rigid body mechanics (buil. 1, lab. 312 85 sq.m.)	Mechanics of Materials and Structures. Part 1. Simple Load	O.P. Zakhovaiko A.M. Babak	The machine is broken 2054; R-5 bursting machine; Universal machine UMM-5 SM-4 stand; Machine KM-50-1; Device DP-6; Installation of SM-18A. CM-12-M installation; CM-24-B installation;	1. Determination of mechanical characteristics during stretching. Stretch diagram. 2. Compression testing of materials. 3. Determination of the modulus of elasticity during stretching. 4. Testing of materials for cutting. 5. Determination of the modulus of elasticity in shear. 6. Determination of spring elasticity characteristics. 7. Study of the stressed state of the beam under conditions of pure bending. Determination of the position of the bending center for thin-walled profiles.	

PC 12.2	*Laboratory of rigid body mechanics (buil. 1, lab. 312 85 sq.m.)*	*Mechanics of Materials and Constructions. Part 2. Complex Load, rigidity and dynamics*	*O.P. Zakhovaiko A.M. Babak*	*Installation for the study of elastic vibrations; Copper pendulum WPM; Installation for stability tests; Stands for testing the theorem on reciprocity of movements; Statically indeterminate beam; Stand for modeling oblique beam bending; Spatial core.*	*1. Theorem on reciprocity of movements. 2. Statically indeterminate beam. 3. Experimental verification of the theory of oblique bending. 4. Deformation of a spatial broken rod. 5. Stability of the compressed rod. 6. Determination of impact viscosity. 7. Free oscillations of a system with one degree of freedom. Study of bending vibrations of a cantilever beam by the resonance method.*	
PC 14	*Educational and scientific laboratory of interchangeability, standardization and metrology 617-22 , build 22, Area: 64 m2 Educational and scientific (experimental) laboratory of measuring equipment of the ESMMI 617-22 , build 22, Area: 139 m2*	*Metrology, standardization and certification*	*N.V. Minits'ka*	*1. Micrometers 2. Inner gauge 3. Plane-parallel finite measures of length 4. Accessories 5. Lever bracket 6. Optimeter 7. Small instrument microscope 8. Stand for measuring radial and end runout 1. Coordinate measuring machine 2. Roughness measurement complex with PC 3. Round gauges Tolirund mod. 2 and Caliber mod. 298.*	*1. Measurement of actual dimensions of external cylindrical surfaces (shafts) using a micrometer and internal cylindrical surfaces (holes) using an indicator feeler gauge. Calculation of landing characteristics. 2. Control of cork gauges using a minimeter. 3. Measurement of shape deviations of cylindrical surfaces on a vertical optimeter. 4. Measurement of radial and end runout with an inductive sensor. 5. Measurement of the elements of the external metric thread on the instrument microscope. 6. Measurement of kinematic accuracy parameters of straight-toothed cylindrical gears. 7. Measurement of surface roughness, determination of roughness parameters by profilogram. 8. Measurement of deviations of the shape of cylindrical surfaces using a dial gauge. 9. Measurement of deviations in the location of holes on the coordinate-measuring table машині.*	
PC 15	*Laboratory of hydraulic (build. 1, 04 64 sq.m.) Laboratory of hydraulic (build. 7, 626 34 sq.m.)*	*Fluid and Gas Mechanics*	*O.M. Yakhno A.M. Muraschenko*	*2 didactic stands on pipeline hydraulics, Device layouts, Pressure measuring stand The stand of relative stillness of the liquid Stand leaking from holes and nozzles*	*1. 1. Hydrostatics 2. 2. Pascal's law 3. 3. Hydraulic resistance is local 4. 4. Hydraulic resistance along the length 5. 5. Fluid movement modes 6. 6. Pressure measuring devices 7. 7. Flow measurement devices 8. 8. Leakage of liquid from holes and nozzles*	

PC 16	*Theory of machines and mechanisms and machine devices and components laboratory 422-19 (45 m2)*	*Sine mechanism bench* *2 benches for rotor balancing* *3 benches for experimental evaluation of reduced moment of inertia* *Bench for sliding friction coefficient evaluation* *Bench for evaluation of rotor moment of inertia of the motor*	*V. Lukavenko* *A. Petryshyn* *P. Protsenko*	*Sine mechanism bench* *2 benches for rotor balancing* *3 benches for experimental evaluation of reduced moment of inertia* *Bench for sliding friction coefficient evaluation* *Bench for evaluation of rotor moment of inertia of the motor*	*1. Kinematic layout plotting scheme of a flat mechanism and its structural analysis* *2. Study of sine mechanism kinematics* *3. Rotor balancing for the case of known unbalance vectors* *4. Rotor balancing for the case of unknown unbalance vectors* *5. Experimental estimation of reduced moment of inertia for rank-and-rocker, crank-slide and slot mechanisms* *6. Lubricated and non-lubricated sliding friction coefficients estimation on horizontal flat surface* *7. Estimation of rotor moment of inertia of the motor by falling weight method*	
PC 18	*Laboratory of machine parts adn theory of mechanisms and machines* *(build. 19, lab. 422* *45 sq.m.)*	*Machine Parts and Design Fundamentals*	*Y.P. Horbatenko* *O.P. Salenko* *N.V. Havrushkevych* *A.I. Petryshyn* *P.Y. Protsenko*	*Single-spindle lathe-turner "Tarex"* *Stand "Gearbox of a lathe and screw-cutting machine"* *Stand "Lathe with CNC"* *A working sample of a cylindrical 3-stage vertical gearbox with a pad electro-hydraulic brake* *Didactic set of typical assemblies of machine parts* *Liquid friction research stand DM28* *Stand for the study of rotation resistance in rolling and sliding bearings DM-29* *Stand for determining the efficiency of worm transmission DM-41* *Stand DM35UA* *The DP19A screw pair efficiency research stand*	*1-2. Determination of design features of typical units and gears of machine parts* *3. Testing of rolling bearings* *4. Testing of sliding bearings* *5. Study of the design and determination of the main parameters of the cylindrical gear reducer and its details* *6. Study of friction losses in rolling bearings* *7. Study of rotation resistance in rolling and sliding bearings* *8. Determination of the efficiency of worm transmission* *9. Study of the traction capacity and efficiency of the belt transmission* *10. Study of the efficiency of the screw pair*	
PC 21	*Laboratory of electric and electronic copmponents of mechatronic systems (build. 1, lab. 299-5, 38,6 sq.m.)* *Laboratory of design and simulating of phisically heterogeneous systems (build. 1, lab 120A,* *70 sq.m.)*	*Fundamentals of mathematical modeling of physically heterogeneous systems*	*O.V. Uzunov* *O.S. Haletskyi* *I.V. Nochnichenko*	*Siemens didactic equipment for the study of elements and systems based on electrical components.* *8 sets.* *Siemens didactic equipment for the study of elements and systems based on electrical and electronic components.* *10 sets.* *Measuring equipment (oscilloscope)* *Hameg HM 203-7 – 1 pc*	*Research of static characteristics of information elements of physically heterogeneous systems.* *Research and modeling of static characteristics of computing elements of systems.* *Research and modeling of transforming elements of systems* *Research and modeling of reinforcing elements of systems.* *Research and modeling of electrical executive elements of systems.* *Research and modeling of a physically heterogeneous system of discrete action.*	

					Research and modeling of a physically heterogeneous system of continuous action.	
PC 22	***laboratory of The Discrete Control Systems*** ***300-1 , build 1, Area: 119 m2***	***Discrete control systems for actuators***	***O.P. Hubarev*** ***K. O. Bielikov*** ***A.M. Muraschenko***	***8 FESTO "Blue line" didactic stands with equipment, power supplies, compressors.*** ***Didactic kits:*** ***Pneumatics P111, P121, P122, Electropneumatics EP211, EP222, EP232 (Germany), Hydraulic visualization station with models, models of Pneumatics, models of Hydraulics***	***1. Bistable and monostable control*** ***2. Pneumatic automation: control and management*** ***3. Pneumatic automation: logic functions, time and pressure relays*** ***4. Pneumatic automation: cyclic systems*** ***5. Pneumatic automation: memory elements*** ***6. Pneumatic automation: modes of operation*** ***7. Electropneumatic automation: control and management*** ***8. Electropneumatic automation: logic functions, time and pressure relays*** ***9. Electropneumatic automation: cyclic systems*** ***10. Electropneumatic automation: memory elements*** ***11. Electropneumatic automation: modes of operation*** ***12. Cyclic systems of the 1st class*** ***13. Cyclic systems of the 2nd class*** ***14. Cyclic systems of the 3rd class*** ***15. Cyclic hydraulic systems*** ***16. Cyclic systems of electro-hydraulic automation***	
PC 23	***Automated electric drives laboratorie 416-19 (45 sq.m.)***	***Fundamentals of industrial electric drive***	***V. Lukavenko*** ***A. Zilinskii*** ***K. Belikov***	***Didactic set: circuit breakers, thermal relays, magnetic contactors and starters, intermediate relays, load rheostat, ammeter, voltmeter, strain gauge*** ***Liquid friction research stand*** ***Stand for determining the efficiency of worm transmission*** ***The stand for determining the moment of inertia of the engine rotor*** ***A stand for researching a serial DC motor***	***1. Means of recording sensor signals during experimental research. Equipment for control and protection of electric drives*** ***2. The structure of an asynchronous motor, the scheme of including the windings in a star and triangle, determining the marking of the phases of the stator winding*** ***3. Reversible contactor start of an asynchronous electric motor (AD) with a short-circuited (short-circuited) rotor and devices for its implementation*** ***4. Study of the principle of operation and assembly of the scheme of the automated electric drive of the compressor*** ***5. Study of the characteristics of a three-phase asynchronous motor with a short-circuited rotor*** ***6. Study of the characteristics of an asynchronous motor using a frequency converter*** ***7. Study of the characteristics of a DC motor of independent excitation*** ***8. Study of a serial direct current motor and construction of its mechanical and electromechanical characteristics***	

PC 6.1	*Laboratory of mechanics and optics 308-4-1 (71 sq.m)*	*General Physics. Part 1. Mechanics. Basics of Electrodynamics*	*Y.O. Taranenko V.O. Kondakov*	*Experimental setup for the study of ball collisions. An experimental setup for studying coupled oscillations of two pendulums. Oberbeck's pendulum. Atwood's car. An experimental setup for studying the oscillations of a physical pendulum and determining the acceleration of free fall using a reversible pendulum. Experimental installation for the study of gravity waves in deep water. Experimental setup for studying the dependence of electrical resistance on temperature.*	*1. Studying the laws of conservation of energy and momentum in the collision of balls. 2. Study of the law of conservation of energy on the example of coupled oscillations. 3. Studying the laws of rotational motion using the Oberbeck pendulum as an example. 4. Studying the rectilinear movement of bodies in a gravitational field using Atwood's machine. 5. Study of the physical pendulum. 6. Study of gravity waves in deep water. 7. Acquaintance with methods of processing experimental results, examples of studying the dependence of electrical resistance on temperature.*	
PC 6.2	*Laboratory of Electricity and magnetics 308-5-1 (95 sq.m.)* *Laboratory of mechanics and optics 308-4-1 (71 sq.m)*	*General Physics. Part 2. Electricity and Magnetism. Optics. Atomic Physics*	*Y.O. Taranenko V.O. Kondakov*	*Experimental setup for studying electric fields of charged bodies. Experimental setup for studying EMF and internal resistance of electrical energy sources. Optical benches, raters, sets of lenses. Experimental setup for the study of light interference phenomena. Experimental setup for studying Fresnel diffraction. Experimental setup for the study of Fraunhofer diffraction. An optical spectrometer based on a goniometer. An experimental setup for studying the behavior of a frame with a current and a magnetic needle in a magnetic field. Experimental setup for studying the laws and properties of alternating current.*	*1. Coulomb's law. 2. Electric fields and potentials of charged bodies. Image method. 3. Internal resistance and coordination of current sources. 4. Magnetic moment in a magnetic field. 5. Determination of the Earth's magnetic field. 6. A capacitor in an alternating current circuit. 7. Inductance in an alternating current circuit 8. RLC is a circle. 9. Coupled oscillations of two circuits.* *1. Measurement of focal lengths of lenses. 2. Optical devices. 3. Interference of light. 4. Newton's rings. 5. Diffraction of light from a point source 6. Diffraction in parallel beams and the uncertainty principle. 7. Study of polarized light. 8. Study of the mercury lamp spectrum using a goniometer. 9. Study of prism dispersion using a goniometer and a mercury lamp.*	
SC 06.2	*laboratory of The Discrete Control Systems* *300-1 , build 1, Area: 119 m2*	*Pneumatics and Pneumatic drives*	*O.S. Haletskyi*	*4 FESTO "Blue line" didactic stands with equipment, power supplies, compressors.* *Layouts of devices of elements of pneumatic systems.*	*Study of the design and principle of operation of compressed gas preparation equipment. Study of the design and principle of operation of the regulatory equipment. Study of the design and principle of operation of the guiding equipment. Study of a pneumatic actuator with a time delay valve. Development and research of pneumatic actuators with one executive device. Testing of a double-action piston pneumodrive with static load. Construction of pneumatic circuits for the*	

					implementation of logic functions with using pneumatic valves "I", "OR".	
SC 06.3	*Computer class 416-19 (46.8 m2) Laboratory of computer laboratory practice 422-19 (40.5 m2)*	*Lifting machines*	*Y.P. Horbatenko A.I. Petryshyn*	*Computer class (6 computers). Installation of a lifting mechanism (electric hoist). Installation of the movement mechanism of the cargo cart. Two-pad brake test stand.*	*1. Determination of dynamic loads on structural elements of lifting crane mechanisms. 2. Experimental determination of the braking time of a pad brake with an electromagnetic drive. 3. Study of the transition periods of movement of the lifting mechanism. 4. Study of screw conveyor parameters.*	
SC 08.3	*Computer class 416-19 (46.8 m2) Laboratory of computer practice 422-19 (40.5 m2)*	*Transport machines*	*Y.P. Horbatenko A.I. Petryshyn*	*Computer class (6 computers). Test installation of a multi-motor chain conveyor. Installation of a vertical belt conveyor.*	*1. Study of the coefficient of resistance to the rotation of the belt conveyor roller. 2. Determination of the modulus of elasticity of the belts on an experimental sample of a vertical two-belt conveyor). 3. Experimental determination of stiffness (stiffness coefficient) of traction chains.*	
SC 1.1	*Educational and scientific laboratory of Mechatronics* *126 , build 1, Area: 80 m2*	*Synthesis of discrete control systems*	*O.P. Hubarev K. O. Bielikov A.M. Muraschenko*	*Computer class (14 computers) 2 FESTO "Blue Line" didactic stands with programmable controllers, control and management equipment, power supplies, compressors. Didactic kits: Programmable controllers E311, E321, Electropneumatics EP211, EP222, EP232 (Germany), Programmable controllers FEC Compact, FEC Standard*	*1. PLC control systems, general information 2. FST controller programming environment, project 3. LD programming language, communication with electric relay control 4. Inputs, outputs, flags, logical functions 5. Structure of the control algorithm, order of information processing 6. Control algorithm with a step structure, cyclic pneumatic control system 7. Control algorithm with a parallel structure, cyclic pneumatic control system, initial state 8. Timer, drive system with time control 9. Counter, drive system with control of the number of activations 10. Single and long cycle, switching on and off the system 11. Multimode system control algorithm, routine 12. Algorithm for controlling a multi-mode system with cyclic and non-cyclic modes*	

SC 10-1	*Laboratory of design and simulating of phisically heterogeneous systems (build. 1, lab 120A, 70 sq.m.)*	*Mathemtical simulation and design of phisically heterogeneous systems*	*O.V. Uzunov O.S. Haletskyi I.V. Nochnichenko*	*Computer class*	*Development of a program for finding a solution to a system of algebraic equations. Development of a program using function subroutines for finding a solution to a system of algebraic equations. Development of a program for modeling and studying the behavior of a given mathematical function. Development of a program for modeling characteristics based on the approximation of an array of experimental data with visualization of results. Modeling of mass movement processes under the influence of an external force. Modeling of processes in an elastic system under external disturbance. Modeling of processes in an electromechanical drive. Designing a schematic diagram of a physically heterogeneous system.*	
SC 11.2	*Laboratory of hydraulic (build. 1, 04 64 sq.m.)* *Laboratory of hydraulic (build. 7, 626 34 sq.m.)*	*Dynamic hydraulic and pneumatic machines and transmissions*	*D.V. Kostiuk*	*Centrifugal pump research stand* *Stand "Research of parallel/serial connection of pumps"* *Stand "Research of the vortex pump"* *Layouts of devices*	*1. Centrifugal pump testing* *2. Testing the vortex pump* *3. Cavitation tests of a centrifugal pump* *4. Determination of the main theoretical characteristics of the centrifugal pump* *5. Parallel operation of centrifugal pumps* *6. Continuous operation of centrifugal pumps* *7. Checking the laws of proportionality of centrifugal pumps* *8. Centrifugal fan testing* *9. Testing the fan working on the network* *10. Familiarization with the construction of hydrodynamic gears*	

SC 12.2	*Laboratory of hydraulic and pneumatic drives 1-07 (80 m2)*	*Design of hydraulic and pneumatic drives*	*S.V. Nosko*	*5 didactic stands equipped with measuring equipment.*	*Study of the design and principle of operation of air preparation equipment.* *Study of the design and principle of operation of the control equipment.* *Study of the design and principle of operation of the steering apparatus.* *Study of cost characteristics of pneumatic equipment elements.* *Experimental construction of pneumatic circuits with fast pneumatic valves exhaust and sequence.* *Study of a pneumatic actuator with a time delay valve.* *Testing of a piston pneumatic actuator of one-way action.* *Dynamic studies of a two-way pneumatic drive.* *1. 11. Research of a pneumohydraulic stand*	
SC 13.2	*Laboratory of volumetric hydraulic machines (build.1, lab. 299-5 33 sq.m.)*	*Computational hydromechanics of hydraulic components*	*D.V. Kostiuk*	*13 computer stations* *Samples of hydraulic equipment*	*1. Study of laminar fluid flow in a round pipe.* *2. Study of pressure distribution on the surface of a circular cylinder.* *3. Study of pressure distribution on a flat regulating body.* *4. Model determination of local resistance coefficients.* *5. Modeling of leaks through ring gaps in hydraulic drive elements.* *6. Flow simulation in a Venturi flow meter.* *7. The influence of the regulatory body on the distribution of pressure along the length of the pipeline.* *8. The influence of the regulatory body on the formation of the speed map.* *9. Analysis of fluid flow in a hydraulic distribution valve*	
SC 16.2	*Laboratory of compressors (build. 1, lab. 05 50 м2)*	*Compressores*	*Kostiantyn Bielikov*	*Compressor ПКС-1,75* *Compressor ВВ3,5/10* *Equipment for measurements* *Samples of compressors' parts*	*Acquaintance with the design and equipment of the piston compressor station PKS-1.75* *Study of the characteristics of the PKS-1.75 compressor station* *Acquaintance with the construction and equipment of the VV-3.5/10 reciprocating compressor station* *Study of the characteristics of the VV-3.5/10 compressor station*	

SC 3.2	*Laboratory of hydraulics (build. 1, lab. 04 64 м2)* *Laboratory of compressors (build. 1, lab. 05 50 м2)* *Laboratory of aerodynamics (build. 1, lab. 08 60 м2)*	*Gas dynamics*	*V. V. Turyk*	*Stand for calibration of flow measuring devices and pneumatic pressure tubes.* *Multifunctional gas dynamic stand "Adiabatic outflow of gas from the tank".* *Wind tunnels and control and measuring equipment*	*Theory of aero- and gas-dynamic experiment: basic thermodynamic parameters; equation of state; estimation of gas compressibility. Principles of laboratory modeling of aerogasodynamic processes and laws of similarity. P-theorem. Full and partial similarity. Consideration of heat exchange. Coordinate systems in experimental aerodynamics. Aerodynamic coefficients. Center of pressure. Polara. Mathematical processing of experiment results. Devices for measuring gas consumption. Calibration of the variable pressure drop flow measuring device. Devices for measuring the average local velocity in a gas flow. Designs of pnemometric pressure tubes. Devices and methods of measuring local instantaneous velocities in a subsonic flow..*	
SC 4.1	*Educational and scientific laboratory of Mechatronics* *126 , build 1, Area: 80 m2*	*Logical synthesis of control algorithms*	*O.P. Hubarev* *K. O. Bielikov* *A.M. Muraschenko*	*Computer class (14 computers)* *2 FESTO "Blue Line" didactic stands with programmable controllers, control and management equipment, power supplies, compressors.* *Didactic kits:* *Programmable controllers E311, E321, Electropneumatics EP211, EP222, EP232 (Germany),* *Programmable controllers FEC Compact, FEC Standard*	*1. PLC control algorithms in mechatronics systems, general information* *2. FST controller programming environment, project, program, subroutine* *3. STL programming language, connection with the algorithm of functioning of the mechatronic system* *4. Inputs, outputs, flags, logical functions* *5. STEP structure, step control algorithm, order of information processing in the STL algorithm* *6. Cyclic pneumatic control system with 4 executive devices* *7. Control algorithm with a parallel structure in 2 steps* *8. Cyclic pneumatic control system, initial state* *9. Timer, drive system with time control* *10. Counter, drive system with control of the number of activations* *11. Single and long cycle, switching on and off the system* *12. Subroutines, multimode system control algorithm*	

SC 6.1	*laboratory of The Discrete Control Systems* *300-1 , build 1, Area: 119 m2*	*Electro-pneumatic drives*	*O.V. Levchenko*	*8 FESTO "Blue line" didactic stands with equipment, power supplies, compressors.* *Didactic kits: Pneumatics P111, P121, P122, Electropneumatics EP211, EP222, EP232 (Germany), Hydraulic visualization station with models, models of Pneumatics, models of Hydraulics*	*1. Directions of application of the electro-pneumatic drive.* *2. General information about the composition and purpose of electropneumatic drive systems.* *3. Principles of implementation of the logical sequence of electro-pneumatic drive operation.* *4. Development of the logic of operation of the electro-pneumatic drive using the system state tables.* *5. Development of the logic of electro-pneumatic drive operation using step diagrams.* *6. Development of the logic of electro-pneumatic drive operation using GRAFCET.* *7. Development of the logic of electro-pneumatic drive operation using functional graphs.* *8. Electro-pneumatic drive with control over the position of the working body of executive devices.* *9. Implementation of an electro-pneumatic drive using force control on the working body executive device.* *10. Implementation of an electro-pneumatic drive using pressure control.* *11. Time control in an electropneumatic drive with executive devices of rotary movement.* *12. Logical complexity classes of electro-pneumatic drive systems.* *13. Logical-indeterminate electro-pneumatic drive systems.* *14. Fundamentals of designing and selecting equipment for electro-pneumatic drive systems.*	
SC 7.1 *SC 7.3*	*Laboratory of electric and electronic copmponents of mechatronic systems (build. 1, lab. 299-5, 38,6 sq.m.)*	*Robots and manipulators in mechanical engineering* *Robotics in logistic systems*	*O.V. Uzunov* *O.S. Haletskyi* *I.V. Nochnichenko*	*Siemens 2GA didactic stand - 7 pcs* *Educational complex "Siemens digital logic modules" electricity advanced level 2GA5430 - 40 pcs* *Universal simulator "Siemens Digital Modules" electricity advanced level 2GA5101-3E - 10 pcs* *Set of magnetic applications - 1 pc* *Universal simulator Siemens "Programming of production machines" electricity advanced level 2GA3545-4L - 3 pcs* *Universal simulator Siemens "Management of production drives" electricity advanced level 2GA3545-4N - 3 pcs* *Universal simulator Siemens "Simatic digital control module" electricity advanced level 2GA4110-4B-Z - 12 pcs* *Layouts of mechatronic modules - 6 pcs* *Measuring equipment (oscilloscope) Hameg HM 203-7 – 1 pc* *Computer for programming of digital*	*Basics and features of electric drives and microcontrollers in robotics tasks.* *Sensors of industrial robots.* *Electric drive of industrial robots.* *Arduino controller software emulator.* *UnoArduSim controller software emulator* *RoboLogx software emulator for simulating a robotic system.*	

				microcontrollers - 1 pc *Multimedia mobile station - 1 pc* *Controller and set of components -3*		
SC 7.2	*Laboratory of aeromechanics (build. 1, lab. 08 35 sq.m.)* *Laboratory of hydraulic (build. 1, 04 64 sq.m.)* *Laboratory of hydraulic (build. 7, 626 34 sq.m.)*	*Applied fluid mechanics*	*O.M. Yakhno* *D.V. Kostiuk*	*Rotary viscometer* *Wind tunnel* *Centrifugal pump research stand* *Stand "Adiabatic gas flow"*	*1. Measurement of the viscosity of liquids* *2. Familiarization with the principle of operation and control of the wind tunnel* *3. Taring of the Pitot-Prandtl tube* *4. Measurement of local velocities using a Pitot-Prandtl tube* *5. Determination of pressure distribution on the surface of the aerodynamic profile* *6. Study of the operation of a wind energy installation* *7. Determination of flow characteristics in the grid of profiles* *8. Study of centrifugal pump operation in cavitation mode* *9. Adiabatic outflow of gas from the nozzle* *10. Jet action*	
SC 8.2	*Educational and scientific laboratory of Mechatronics* *126 , build 1, Area: 80 m2*	*Mobile hydraulics*	*O.V. Levchenko*	*1 two-sided didactic stand "Silver Line" FESTO with equipment, power supply units, pumping station.* *Didactic kits:* *Mobile hydraulics TP801, TP802, TP803, Electrohydraulics TP601, TP602, TP610 (Germany),* *Hydraulic visualization station with models, models*	*1. Directions of application of a mobile hydraulic drive.* *2. Open and closed hydraulic circuits.* *3. Hydrostatic transmissions, feed pumps, washing blocks, bypass valves.* *4. Load sensitive hydraulic systems: open and closed center.* *5. Regulated pumps of mobile machines with manual and automatic regulators.* *6. Two-pump systems with unloading valves.* *7. Flow dividers and adders.* *8. Sectional distributors of mobile machines, 7/3 distributors, pressure difference valves, anti-cavitation valves, impact valves, overturning valves.* *9. 6/3 distributors with open center: parallel, tandem and series connection.* *10. Schemes of load-independent flow regulation, pre-included and are included* *11. Holding and safe lowering of cargo, controlled non-return valves, brake and balancing valves.* *12. Hydraulic and electronic joysticks.* *13. Priority valves, static and dynamic.* *14. Steering, with open and closed center, reactive and non-reactive.*	

					15. Specialized software for modeling the operation of hydraulic systems mobile machines (FluidSim-Hydraulics 5.0). 16. Detection and elimination of malfunctions in hydraulic systems of mobile machines. 17. Safety techniques when working with practical systems of a mobile hydraulic drive.	
SC 10-2	***Laboratory of design and simulating of phisically heterogeneous systems (build. 1, lab 120A, 70 sq.m.)***	***Mathematic simulation and design of hydraulic and pneumatic drive systems***	***O.V. Uzunov O.S. Haletskyi I.V. Nochnichenko***	***Computer class***	***Development of a program using function subroutines for finding a solution to a system of algebraic equations. Development of a program for finding a solution to a system of algebraic equations. Development of a program using function subroutines for finding a solution to a system of algebraic equations. Development of a program for modeling characteristics based on the approximation of an array of experimental data with visualization of results. Modeling of processes in a hydraulic accumulator. Modeling processes and determining the characteristics of a hydromechanical converter. Design of the basic diagram of the hydraulic system according to technical specifications.***	