**SCIENTIFIC RESEARCH AREAS OF**

**LVIV POLYTECHNIC NATIONAL UNIVERSITY**

1. **Institute of Architecture (ІАРХ)**

**Сontact person: Gnes Igor (+38) 032-258-30-35**

**E-mail: AP.dept@lpnu.ua**

**Scientific field: “ Architecture and design”**

* Architecture and design in sustainable development of society
* Studies of building structures, architectural and building physics and climatology, aerodynamics and energy saving in buildings
* Theoretical and practical principles of forming residential and civil buildings and structures
* Genesis and development of architectural environment design
* Design in nature, society and architecture system. Environment conservation and sustainable development
* Planning and reconstruction of cities and territories
* Development of the theory and practice of regeneration and reconstruction of historical city-planning complexes and restoration of architectural objects and works of art

# Institute of Building and Environmental Engineering (ІБІД)

**Сontact person: Khrystyna Sobol (+38) 032-258-26-50**

**E-mail:**  **sobol@ukr.net**

**Scientific field: Civil and environmental engineering (ІБІД)**

* Development and theoretical and experimental studies of conventional and prestressed reinforced concrete structures, buildings, facilities and bridges with different types of reinforcement, concreting and ways of loading taking into account the exposure to a corrosive environment, elevated temperatures and atmospheric factors
* Creation of microclimate support systems in the buildings of various applications
* Hydraulics of pressure pipelines, open channels and facilities
* Development of scientific principles of structure formation and studies of properties of composite materials for road construction; conducting works on the examination of transport and operational parameters of motorways, streets and facilities
* Construction technology, studies of progressive constructions and methods for the construction of buildings and facilities
* Development and improvement of calculation methods of bridge, building and facility structures
* Theoretical and experimental studies of existing and reconstructed superstructures of reinforced concrete bridges under static and repeated loads
* Development and studies of precast and cast-in-situ bridge, building and facility structures
* Development and studies of conventional and prestressed reinforced concrete structures with different types of reinforcement, concreting and ways of loading, studies of their fire resistance; development and studies of bridge, tunnel and foundation structures; development and studies of wooden structures, reinforced foamed concrete structures and complex ones

# Institute of Power Engineering and Control Systems (ІЕСК)

# Сontact person: Fedir Matiko (+38) 032-258-24-68

**E-mail:**  **mfd@polynet.lviv.ua**

**Scientific field: Power engineering and control systems**

* Creation of automation means and development of electromechanical control systems
* Mathematical modeling of processes in electrical circuits, systems and environments
* Increase of reliability and efficiency of power stations, electric power systems and power supply networks
* Methods and techniques of energy accounting and process automation
* Mathematical modelling, automated planning and development of electromechanical converters and their control systems. Theoretical and experimental studies of electric machinery taking into account the nonlinearity of electrical circuits and inductive coupling
* Development of measures of technogenic and ecological safety of technological processes
* Intelligent control systems applied in energy supply of industrial facilities

1. **Institute of Geodesy (ІГДГ)**

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# Сontact person: Ihor Trevoho (+38) 032-258-26-98

**E-mail:**  [trevoho@polynet.lviv.ua](mailto:trevoho@polynet.lviv.ua), **KH.dept@lpnu.ua**

**Scientific field: Geodesy**

* Study of the shape and external gravitational field of the Earth and planets, development of geoinformation systems, software and geospatial data bases
* Development of theoretical principles for the construction of cadastre systems in Ukraine
* Studies of the environmental impact on the accuracy of geodetic measurements
* Studies of the accuracy of technical equipment installation
* Development and studies of stereogrammetric methods for solving specific tasks that are raised by various fields of science and economy
* Development of new technologies for conducting engineering and geodetic works and their mathematical processing
* Geodetic support of natural resources use
* Geodetic monitoring of engineering buildings and geodynamic phenomena
* Studies of the shape and external gravitational field of the Earth and their change with time according to terrestrial and spatial measurements

# Institute of the Humanities and Social Sciences (ІГСН)

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# Сontact person: Zoryana Kunch (+38) 032-258-23-20

**E-mail:**  **UM.dept@lpnu.ua**

**Scientific field: Humanities and social sciences**

* Current problems of humanities and social sciences
* Improvement of foreign language teaching in the context of Bologna process
* Problems of interconnected teaching of main types of speech activity
* Studies of structural, semantic and linguistic peculiarities of scientific and technical literature and belles-lettres
* The problem of method and craftsmanship of foreign writers
* Social and pedagogic aspects of professional training of social workers: theory, history, practice
* Humanitarian dimension of social reforms
* Improvement of the teaching process of students’ physical education
* Scientific and methodological principles of training athletes in higher education institutions
* Students’ training according to the ideas of Olympic movement

1. **Institute of Jurisprudence and Psychology (ІНПП)**

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# Сontact person: Taras Harasymiv (+38) 032-258-30-29

**E-mail:**  **INPP@lp.edu.ua**

* + **Scientific field: Law and psychology**
* System research of impacts on ‘human factor’ from the standpoint of psychology, pedagogics, law and cybernetics
* Problems of the development of a constitutional state and a civil society in Ukraine
* World view and methodological principles of state building process in Ukraine

# Institute of Engineering Mechanics and Transport(ІІМТ)

# Сontact person: Volodymyr Maistruk (+38 )032-258-24-10

**E-mail:**

* **Scientific field: Mechanical engineering and transport (ІІМТ)**
* Development of new technologies, automated production equipment and studies of dynamics and strength of machines and engineering constructions
* Development of highly efficient technological processes of mechanical processing, assembling of and their automation
* Technological process modelling and automation
* Dry [mechanical separation](http://www.multitran.ru/c/m.exe?t=1337746_1_2&s1=%EC%E5%F5%E0%ED%E8%F7%E5%F1%EA%EE%E5%20%F0%E0%E7%E4%E5%EB%E5%ED%E8%E5) of heterogeneous gas systems
* Contact processes in sealing surface joints
* Development of automated design program of technological equipment
* Vibration engineering, packaging engineering
* Environment conservation and sustainable development
* Transport systems
* Structural and parametric synthesis and analysis of machine building constructions
* Statics. Dynamics, strength and reliability of elastic-plastic systems and industrial equipment
* Studies of work processes and optimization of vehicle constructions
* Scientific principles of metalwork reliability growth with consideration of the stressed state of welded joints
* Diagnostics of stressed state; strength and life evaluation of shell construction elements with defects in weld seam areas
* Up-to-date and resource-saving technologies in transport, industry, reliability and diagnostics of machinery, constructions and buildings

# Institute of Computer Science and Information Technologies (ІКНІ)

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# Сontact person: Nataliia Shakhovska (+38) 032-258-26-63

**E-mail:** **natalya233@gmail.com**

**Scientific field: Computer sciences and information technologies**

* Analysis, modelling, design and building of intelligent information computer systems using advanced technologies and software
* Development of mathematical methods and models, technical, software and information means of automated data processing and management systems
* Studies, development and implementation of distributed intelligent information technologies and systems on the basis of databases, data banks, data spaces and knowledge resources with the aim of accelerating the processes of forming a modern information society
* Program and mathematical software of automated systems
* Computer-aided design and modeling of embedded systems
* Advanced computer systems and information technologies

1. **Institute of Computer Technologies, Automation and Metrology (ІКТА)**

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# Сontact person: Roman Stakhiv (+38) 032-258-25-59

**E-mail:** **ikta.dept@lpnu.ua**

**Scientific field: Computer technologies, automation and metrology**

* Development of theoretical principles for computer, measurement and control systems, metrological support, certification testing, information security
* Theoretical, technological and metrological principles of methods and means of physical quantities measurement
* Development of theoretical and methodological principles of normalization of product and service quality characteristics and development of metrological support for their measurement and control for certification and conformity assessment
* Development of theoretical principles of synthesis and analysis of impulse-number functional converters
* Development and studies of technical information security
* Issues of theory, design and implementation of computer systems and networks as well as mathematical tools, components, equipment and instruments of measuring, information and control systems
* Design concepts, modelling, analysis and synthesis techniques of computer-aided automated systems and their components
* Design and studies of smart precision microsystem tools of instrument making application (environmental, medical, automotive and aerospace, navigation instrumentation, non-destructive control)
* Machine building and measuring equipment

1. **Institute of Applied Mathematics and Fundamental Sciences (ІМФН)**

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# Сontact person: Grygoriy Ponedilok (+38) 032-258-21-29

**E-mail**: **ponedilok@polynet.lviv.ua**

**Scientific field: Applied mathematics and fundamental sciences**

* Development of mathematical methods, physical and mechanical models and their application
* Development of mathematical models and methods for their numerical implementation for the description of natural and social phenomena
* Geometric modelling and computer simulation in applied and engineering tasks
* Studies of physical and chemical processes in the surface layers of alloys
* Studies of physical processes in heterogeneous systems with nanosized geometry
* Synthesis, structure and physical properties of semiconductor materials
* Analytical and numerical methods of studies of physical and mechanical fields, processes, cooperative and structural effects in solids and liquids
* Studies of boundary value problems of mathematical physics, function theory and functional analysis. Current issues and theoretical models of linear and differenttial algebra.
* Development of mathematical models of natural and social phenomena, analytical and approximate methods for solving physical, environmental and economic issues

1. **Institute of Economics and Management (ІНЕМ)**

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# Сontact person: Mykhaylo Gonchar (+38) 032-258-24-10

**E-mail**:

* **Scientific field: Economics and management**
* Economic evaluation of innovation and investment activities of enterprises
* Justification of innovative investment strategies, programs and projects of industrial and economic structures, regional development
* Economic evaluation of social infrastructure and enterprise activities as natural monopolies
* Economic issues of resource and energy conservation
* Marketing and logistics in the system of innovation management concepts
* Corporate management issues in engineering and instrumentation
* Development of communication management in engineering
* Issues of competitiveness improvement of domestic producers
* Formation and use of innovation development mechanism of industrial and economic structures
* Financial and credit management issues of innovation development of industrial and economic structures
* Taxation issues and insurance coverage of activity of industrial and economic structures in engineering and instrumentation
* Problems of economics and innovative development management of production units.

1. **Institute of Telecommunications, Radioelectronics and Electronic Engineering (ІТРЕ)**

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# Сontact person: Serhiy Ubizskyi (+38) 032-258-26-05

**E-mail**: [**crystal@polynet.lviv.ua**](mailto:crystal@polynet.lviv.ua)

* **Scientific field: Telecommunications, radio and electronic engineering**
* Theory, development and creation of means, systems and complexes of radio electronic, information and communication technologies
* Physical and chemical processes of synthesis and controlled modification of material properties of functional electronics and micro-and nanoelectronics
* Sensors and converting devices based on semiconductor and dielectric materials and heterostructures
* Theory and design techniques for radio technical circuits, systems and complexes and assurance of their quality
* Theory, research methods and technologies for radiophysics, radioelectronics, communications and medical engineering
* Information and communication systems and networks
* Techniques and tools for signal shaping and processing in radio electronic systems
* Video optical microscopy
* Interaction of laser emission with heterogenous structures, development of laser technologies and photonic systems
* Sensors and converter installations on the base of semiconductor and dielectric materials and heterostructures
* Materials, elements, means and systems of telecommunications, radio-electronics, electronic and medical equipment.

1. **Institute of Chemistry and Chemical Technologies (ІХХТ)**

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# Сontact person: . Zenovii Znak (+38) 032-258-23-10

**E-mail**:[zznak@polynet.lviv.ua](mailto:zznak@polynet.lviv.ua)

**Scientific field: Chemistry and chemical technologies. Nanotechnologies, advanced materials and production technologies**

* Biotechnologies
* Development of theoretical principles and process technology of obtaining organic and inorganic substances and materials of various purposes, analytical and environmental control of existing and new industries
* Synthesis and studies, technology and biotechnology of organic substances and functional materials with bioactivity and a complex of other valuable properties
* Theoretical and applied aspects of synthesis, modification, combination and processing of functionalized copolymers, polymer compositions and ware (membranes, optical, moulding, construction, film, glue-like, insulating, adhesive and process liquids) with special properties
* Modelling and prognostication of the sustainable functioning of objects and technology processes
* Tools of measuring and controlling parameters of production processes and environment
* Development of onboard systems for collecting and processing of aerospace information on the occurance of natural phenomena and environmentally hazardous facilities
* Theoretical principles of the development of highly efficient initiating and  catalyst systems and processes of selective transformations of organic compounds to produce monomers and polymers
* Creation of theoretical principles, improvement and development of fermentation products technology and methods of rational use of secondary products and by-products
* Synthesis of new materials and development of techniques for determination of various products in technical and natural objects and environment
* Studies of oxidation and copolymerization reactions of organic compounds, creation of new chemical and environmental technologies and their intensification
* Investigation of complex processing of sulfur, potassium and phosphate raw materials, waste of non-ferrous and rare metals with the development of environmentally friendly, resource-saving technologies of fertilizers, salts, special types of sulfur, metals and their compounds, metal powders and other products
* Development of physical and chemical principles of energy efficient advanced technologies to produce new refractory nonmetallic and silicate materials and improve operational characteristics of existing materials
* Development of reactive and initiator systems for functionalization (peroxidation) of interphase surfaces and formation of special polymer nanolayers on them, design of filled composites and biocompatible and biodegradable polymeric materials, modification of natural substances
* Development of scientific principles of obtaining motor fuels, oils, monomers, surfactants and resins from oil and gas raw materials
* Usage of hydrodynamic, hydro-mechanical and heat exchange processes with solid, liquid and gaseous phases for developing industrial resource-saving technologies
* Environmental engineering and conservation of sustainable development
* Development of physical and chemical principles for obtaining and clearing vinyl monomers and organic radical initiators and using them in chemical technology.

1. **Diaspora and migration processes in Ukrainian and global dimensions: political, economic, educational, and cultural aspects.**

**Contact person: Iryna Kliuchkovska (+38) 032-258-01-51**

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