Lviv Polytechnic National University is the oldest technical educational institution in Ukraine and Eastern Europe. The history of Lviv Polytechnic University dates back to the foundation of the Technical Academy in Lviv in 1844.

In 1877 the Technical Academy was renamed into the Polytechnic School with the rights of a higher technical educational institution of the Austro-Hungarian Empire.

In June 1920 the new statute of the Polytechnic School was adopted and it was renamed into Politechnika Lwowska. In the 1930s the Polytechnic consisted of seven institutes: architectural, chemical, mechanical, land and water engineering, agriculture and forestry, general. In October 1939 Politechnika Lwowska was renamed into Lvov Polytechnic Institute.

Projekt współfinansowany przez Unię Europejską w ramach Europejskiego Funduszu Społecznego
Lviv Polytechnic National University

Today about 30,000 students study here in 41 directions.

Over 185 doctors of science, professors and about 1000 candidates of science, associate professors work at the University.

It consists of 16 institutes, 82 departments.
Structure of the University

Institute of Applied Mathematics and Fundamental Sciences
Institute of Architecture
Institute of Humanities and Social Sciences
Institute of Geodesy
Institute of Building and Environmental Engineering
Institute of Power Engineering and Control Systems
Institute of Engineering Mechanics and Transport
Institute of Chemistry and Chemical Technologies
Institute of Telecommunications, Radioelectronics and Electronic Engineering
Institute of Computer Technologies, Automation and Metrology
Institute of Computer Sciences and Information Technologies
Institute of Economics and Management
Institute of Distance Education
Institute of Postgraduate Education
Lviv Institute of Land Forces
International Institute of Education, Culture and Relations with Diaspora
Institute of Computer Science and Information Technologies

Departments:

1. automatic control systems;
2. computer-aided systems;
3. software department;
4. information systems and networks;
5. applied linguistics

Institute of Computer Science and Information Technologies trains qualified professionals in:

1. computer science
2. information management systems and information technologies
3. design technologies
4. software for automation systems
5. intelligent decision making
6. applied linguistics
7. computer-aided science and publishing
8. software engineering
Computer Aided Systems Dept was created in 1989 on the base of Department of Radio Devices’ Design and Manufacturing (Radio-engineering faculty).

Head of the Dept
prof Łobur Mychajło, DSC
Staff

30 persons are employed at the Dept. Among them:

• 2 professors;
• 15 associate professors;
• 6 senior assistants;
• 7 assistants.
• 10 PhD students
Conferences

• **THE EXPERIENCE OF DESIGNING AND APPLICATION OF CAD SYSTEMS IN MICROELECTRONICS (CADSM) (since 1996)**

• **PERSPECTIVE TECHNOLOGIES AND METHODS IN MEMS DESIGN (MEMSTECH) (since 2005)**

• **CAD IN MACHINERY DESIGN. IMPLEMENTATION AND EDUCATIONAL PROBLEMS (CADMD) (since 1992)**
CADSM Topics

MODELLING AND OPTIMIZATION FOR TECHNOLOGICAL PROCESSES

MODELS AND METHODS FOR RADIOELECTRONICS DEVICE AND SYSTEM DESIGN
Signal processing in radioelectronic system and telecommunications. Telecommunications and radioelectronic design tools. Electronic and computer tools in biomedical engineering. Methods and tools of digital signal processing.

DESIGN OF SPECIALIZED SYSTEMS AND DEVICES

OPTIMAL DESIGN PROBLEMS

CAD MODERN INFORMATION TECHNOLOGY

MODELS AND METHODS FOR MICROELECTROMECHANICAL SYSTEMS
Mathematical model of sensors and actuators. Microsystems modeling and design. New microelectronic technologies.
MEMSTECH Topics

• Analysis, modeling, research and design methods of microsensors and microactuators;
• Software systems, models, algorithms, methods and strategies of embedded systems design;
• Field issues in embedded systems modeling and design;
• Issues of testing, verification, reliability and optimization in embedded systems modeling and design;
• Sensors and actuators systems, nanotechnology;
• Applications for electron device design;
• Information Technology. Engineering Application of Informatics. Engineering Education.
Scientific Activity

1. Automation of design of microelectronic devices;
2. Design, modeling, simulation and optimization of MEMS and other microsystems;
3. Automation of design of complicated organizational systems;
4. Development of complicated information systems for simulation of ecological and economic processes;
5. Design and simulation of technological processes.
1. Automation of design of microelectronic devices

- Algorithms and applications for topological synthesis of hybrid integral micro-assemblies and electronic circuits.
- Modern methods for defects analysis in microelectronic circuits
- Optimization tasks solution on graphs
- Research of graphs’ isomorphism

Prof. Lobur M.

Dr Tkatchenko S.
Publications

• Білаль Раді А’Гель аль Забі, Ткаченко В., Ткаченко С.П. Алгоритми встановлення ізоморфізму графів. // Proceeding of the IVth International Conference of Computer Science and Information Technologies CSIT’2008. - Lviv, 2008 - P.112-113


2. Design, modeling, simulation and optimization of MEMS and other microsystems;

- Design and simulation of micro electro-mechanical systems (MEMS).
- Development of automated subsystems for MEMS’ design
- Mathematical simulation of MEMS’ technological processes - diagnosing deviations in technological processes based on functional control and system testing results; expert systems design.
Publications


Non-linear dynamic systems analysis
Publications

Effective algorithms synthesis
Publications

Dr Protsko I.

- Патент 19531А Україна, G06F7/04. Пристрій канонічного розкладу числа на множники. /Процько І.О., Рашкевич Ю.М., (Україна) /Заявл. 13.02.96; Опубл. 02.12.97, Бюл. №6.
- Патент 25782А Україна, G06F15/332, G01R23/16. Пристрій формування значень тригонометричних функцій для цифрового аналізатора спектра. /Процько І.О., Рашкевич Ю.М., (Україна) /Заявл. 25.12.96; Опубл. 30.10.98, Бюл. №5.
- Патент 25783А Україна, G06F7/04. Пристрій для формування і відбору переставлень. /Процько І.О., Рашкевич Ю.М., (Україна) /Заявл. 24.12.96; Опубл. 30.10.98, Бюл. №5.
- Деклараційний патент 34614А Україна, G06F7/00, G06F15/00. Пристрій для обчислень швидкого трансформування Фур'є. /Процько І.О., Радомський В.А., (Україна) /Заявл. 28.07.98; Опубл. 15.03.2001, Бюл. №2.
MEMS investigations

- Current Situation in MEMS:
  - Decreasing feature sizes
  - Complicated process techniques
  - Technological constraints (max. accuracy of etching, etc.,)

- Main Goal: Achieve a methodology that considers process variations in the design phase and makes its performances more robust to these process variations

A robust design methodology for MEMS / NEMS is needed
AUTOMATED PROCESS ENGINEERING OF PIEZORESISTIVE MICROSENSOR’S PARAMETERS CALCULATION

The technology and subsystem for execution of automated calculation and creation of the technical documentation of the piezoresistive microsensors with the help CAD/CAM/CAE is presented. The associations between physical values and voltage out from a bridge circuit of piezoresistive microtransmitters are obtained.

Fig. 1. Constructions of microsensors of a piezoresistive type, where a, b, c - microsensors for measuring pressure, magnetic field and thermoelectric couple

Fig. 2. Finite-element models of a microsensor, where a, b, c - for measuring pressure, magnetic field and thermoelectric couple

Fig. 3. Stress state of piezoresistive microsensors for measuring: a, b - pressure, c, d – magnetic field and e, f – thermoelectric couple
AUTOMATION DESIGN OF TYPICAL MEMS ACCELEROMETER

The method of rapid analysis of the typical MEMS-accelerometers in the ANSYS environment is presented in the work.

/PREP7
BLC5, ,300e-6,300e-6
BLC5, ,220e-6,220e-6
BLC5, ,260e-6,260e-6
RECTNG,-20e-6,20e-6,-110e-6,-130e-6,
ASBA, 1, 3
FLST,2,3,5,ORDE,3
FITEM,2,2
FITEM,2,4
FITEM,2,-5
VEXT,P51X, ,0,0,2e-6,...
FLST,3,1,6,ORDE,1
FITEM,3,1
VGEN,2,P51X, ,10e-6,0
BLOCK,-300e-6,300e-6,-300e-6,300e-6,-7e-6,21e-6,
FLST,2,5,6,ORDE,2
FITEM,2,1
FITEM,2,-5
VOVLAP,P51X

Fig. 1. ANSYS code to create the geometry
3. Automation of design of complicated organizational systems

- Software and hardware design for organizational and technical systems.
- Development of algorithms and applications in the field of transportation.
- Development of systems for city transport modeling and investigation of its influence upon city noise maps.
Publications


4. Development of complicated information systems for simulation of ecological and economic processes

- Development of complicated information systems for simulation of ecological and economic processes.
- Systems for collaborative design
- Groupware systems
- Commercial database design and programming;
- Design of complicated information systems MRP/ERP;
- Simulation and design of complicated processes моделировання та аналіз складних процесів методами нечіткої логіки;
- математичні обчислення МСЕ;
- автоматизоване проектування складних об'єктів і систем в CAD/CAM/CAE

Dr Matviykiv O.

Dr inż. Kernitsky A.
Publications


OmegaLP system
StyleX
PowerPlans
5. Design and simulation of technological processes.

Microelectronics: diffusion; Ionic alloying; epitaxy; oxidation.

Автоматизация технологической подготовки производства (радиотехнических и машиностроительных предприятий)

Dr Teslul W.

Dr Panchak R.
Publications


Thank You for Your attention