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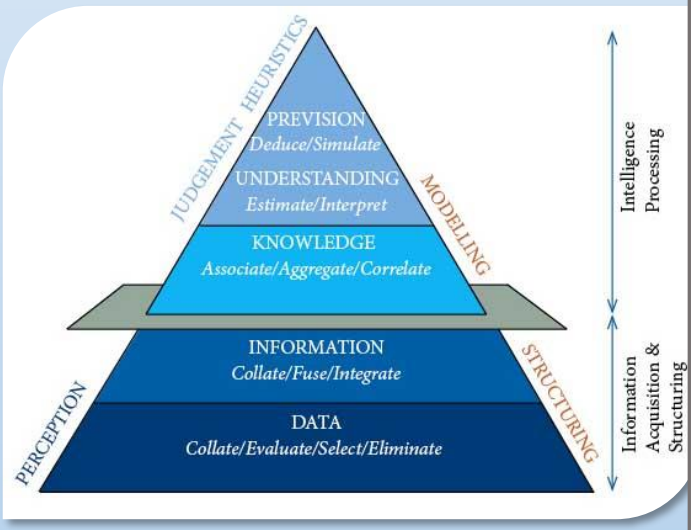

INFORMATION PACKAGE

EDUCATIONAL AND RESEARCH INSTITUTE FOR APPLIED SYSTEM ANALYSIS

Kyiv, 2022

CONTENT

****** Information is current as for the 2022/2023 academic year. In the next academic year, there may be minor changes in the list of training specialties and educational programs/specializations.***

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1. COMMON DESCRIPTION OF INSTITUTE

The leading role of information and computer-oriented scientific and production technology in the development of modern society, based on a combination of human intelligence, computer data processing, and their transmission through a computer network is well known. That is why the **Educational and Research Institute for Applied Systems Analysis (IASA)** provides training of students on promising and relevant areas, which open up new opportunities in the labor market for young specialists-graduates.

Institute for Applied Systems Analysis functions for over 20 years. **IASA** has more than 25 in-force agreements on cooperation with leading world universities and international organizations (EDNES, UNDP, WIPO, UICEE, IGIP, CODATA, ICSU, and others). Institute fulfills a leading role in many international projects and initiatives of the highest international level (UN, UNESCO, UNIDO, and others).

IASA provides interdisciplinary, systematic, comprehensive training and harmonization of its work with the labor market; takes into account in the training process not only the present but also the future state of development of science, technology, and production; creates an island of innovation breakthroughs in a country through a combination of science, advanced education and business on directions, in which **IASA** has strong experience.

Graduates of the **IASA** are working in the positions of systems analysts, managers of information systems development, project managers, and engineers of computer systems and networks in public and commercial manufacturing enterprises, banks, and stock exchanges both in Ukraine and abroad.

The concept of the Institute's educational activities provides:

- the fundamentality of training;
- ensuring interdisciplinarity, consistency, the complexity of training, and harmonization of the Institute's activities with the labor market;
- expanding the presence of the Institute's scientific publications in the world's scientometric databases;
- combination of science, advanced education, and business;
- expansion of cooperation with partner institutions, development of academic mobility programs;
- implementation of the European model of academic freedoms.

2. STRUCTURE

The IASA includes:

1. Department of Mathematical Methods of Systems Analysis;

2. Department of Systems Design

3. Department of Artificial Intelligence as well as

- **Research Center for Systems Research;**
- **Research (experimental) Laboratory of Intelligent Distributed Computing;**
- **Training Laboratory of Systems Analysis.**

3. EDUCATIONAL PROGRAMS

Levels of higher education. Training of students at the **IASA** is carried out at three levels of higher education.

At the first level (Bachelor's course, I-IV academic years) students acquire fundamental knowledge in physics, mathematics, mechanics, computing, informatics, and special disciplines. During the fourth year, they prepare and defend the bachelor's thesis and acquire a Bachelor's degree.

At the second level, (Master's course, I-II academic years) students acquire relevant professional skills including laboratory practice. Applicants prepare to defend a master's thesis and acquire a Master's degree.

The third educational-scientific level – postgraduate studies, I-IV academic years. Applicants defend their dissertations and they are awarded the educational qualification of Doctor of Philosophy (PhD).

Terms of training: Bachelor – 4 years; Master (education-professional program) – 1.5 years; Master (education-scientific program) – 2 years; PhD – 4 years.

1. Department of Mathematical Methods of System Analysis provides training under the following Educational Programs:

Specialty	Educational Program	Levels of higher education		
		First	Second	Third
124 System Analysis	System Analysis and Control	Bachelor EPP	Master EPP	–
	Systems Analysis of Financial Market	–	Master EPP	–
	System Analysis	–	–	PhD

Comment: EPP – Educational-Professional Program
ESP – Educational-Scientific Program

The department trains experts in the areas of system analysis and intelligent decision-making systems, which are capable of designing, building, and maintaining computer systems for analysis, forecasting, control, and design of dynamic processes in the macroeconomic, technical, technological, environmental, and financial objects.

2. Department of System Design provides training under the following Educational Programs:

Specialty	Educational Program	Levels of higher education		
		First	Second	Third
122 Computer Science	Intellectual Service-Oriented Distributed Computing	Bachelor EPP	Master EPP	–
	Computer Science	–	Master ESP	PhD

Comment: EPP – Educational-Professional Program
ESP – Educational-Scientific Program

The department prepares experts in the following fields:

- Computational theory and methods of computer realization and distributed computing environment;
- Programming language theory and data stores;
- Design, development, integration, and maintenance of cloud systems, complexes, and environments for high-performance data processing and computer-aided

design based on parallel and distributed architectures, neural networks, and knowledge extraction and processing models in distributed computing environments.

2. Department of Artificial Intelligence provides training under the following Educational Programs:

Specialty	Educational Program	Levels of higher education		
		First	Second	Third
122 Computer Science	Systems and Methods of Artificial Intelligence	Bachelor EPP	Master EPP	–
	Computer Science	–	–	PhD

Research Center for Systems Research has the following main tasks:

- Research in the field of interdisciplinary systemic problems in the context of conflicting goals, uncertainties of various nature and multifactorial risks;
- Involvement of participants in the educational process in scientific, innovative international activities of the institute;
- The use of research results in the educational process in scientific and innovative activities of the institute.

Research (Experimental) Laboratory of Intelligent Distributed Computing has the following main tasks:

- Research in the field of service-oriented architecture in the processing of large amounts of data, microservice architecture in mathematical modeling, intelligent decision support systems, and blockchain technology in the implementation of virtual learning environments;
- Involvement of participants in the educational process in scientific, innovative international activities of the institute;
- The use of research results in the educational process in scientific and innovative activities of the institute.

Training Laboratory of Systems Analysis:

- Ensures the activities of laboratories in the preparation and conducting of laboratory and practical classes in classrooms and laboratories following the schedule;
- Provides accounting, preservation, updating, and replenishment of training facilities;
- Monitors the proper condition of workplaces, equipment, devices, and computer equipment;
- Provides technical support during laboratory classes;
- Participates in the design of textbooks and methodological support of laboratory work;
- Provides technical and advisory assistance to applicants for higher education.

4. TRAINING AND LABORATORY BASE

IASA is fully provided with facilities for training. The following laboratories operate at the **IASA**:

- Regional Network Academy CISCO – Igor Sikorsky KPI IASA
- Sap University Alliance Program
- SAS Global Academic Program
- Educational Research Laboratory for IC Design «Melexis-KPI"
- Training and Research Laboratory IASA - EPAM Systems
- Training and Research Laboratory IASA – MERATECH
- IASA Laboratory of Digital Signal Processing

All the laboratories are equipped according to modern principles of computer labs. The best conditions are provided for practical training, in particular for training courses CISCO Networking Academy for design, construction, and administration of local and global networks, as well as many areas related to the analytical support of banking activities, etc.

5. RESEARCH ACTIVITY

The main tasks of the scientific activity of the Institute are:

- Conducting basic and applied research in relevant areas of science and technology in order to obtain new scientific knowledge and their use for practical purposes.
- Conducting scientific and technical (experimental) developments based on scientific knowledge obtained from research or practical experience, in order to bring such knowledge to the stage of practical use.
- Provision of scientific and technical services.
- Conducting scientific and scientific-technical examination.
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The main directions of scientific work of **IASA** (subordinate to the Ministry of Education and Science of Ukraine and the National Academy of Sciences of Ukraine are

Direction No1: Development of the system analysis methodology, methods, and means of the system mathematics for solving large-scale interdisciplinary tasks in various fields of the national economy

Direction No2: Development of the theory of nonlinear and multidigit analysis, nonlinear differential operator equations, and variational inclusions inequations, infinite-dimensional analysis methods, theories and methods of optimization, game theory, systems of mathematics

Direction No3: Development of theoretical and applied foundations of global modeling of continuous development processes and evaluation of aggregate principal threats to the safety and quality of life within the framework of the World Data Center "Geoinformatics and Sustainable Development" and the international cooperation of the World's Data System.

Direction No4: Development of theory and instrumental tools of service-oriented computations for creation and maintenance of applied support by composition and control of certain services, development and implementation of the service-oriented interdisciplinary platform of engineering collaborative design in grid/cloud environment. It is a realization of the dream of the programming industry to replace "manual" coding of programs "from and to" by "industrial" build of applications from "standard accessories", as happens in the automotive or other "traditional" industries. Program components in the form of services can be hosted on different nodes of a distributed network and represent independent, loosely connected, replacement services-applications with unified interfaces.

Department of Mathematical Methods of System Analysis

Research and training are carried out in the frameworks of 3 scientific schools of the department. Creative achievements of scientific schools are reflected in scientific innovation and scientific and methodological activities, the preparation of highly qualified scientific personnel.

Scientific schools of the department:

- System analysis and decision-making theory
- Methods and systems of computational intelligence
- Methods of processing and mining of great volumes of data of various nature in the management of projects for sustainable development.

The main directions of scientific activity:

- Development of principles and methods of system analysis;
- Applied research in the field of system analysis;
- Analysis and design of complex information systems;
- Forecasting of public issues;
- Systemic research in the field of global change;
- Implementation of wide-range international relations in the sphere of education and science.

Department of Systems Design

Research work at the Department of System Design is carried out within the framework of the scientific school "Computer service-oriented design in a distributed information environment". As a result of the performed research, a new methodology for the construction of the distributed architecture of problem-oriented software for solving challenging scientific and technical problems was created. Unlike existing approaches, it allows you to dynamically synthesize application software from available online software accessible through the web services interface (both SOAP services and REST services), and the involvement of high-performance computing resources as a grid network, and from cloud infrastructures to meet the specific tasks and requirements of the non-IT end-user.

The main directions of scientific activity of the Department of Systems Design include:

- Development and application of service-oriented and parallel computing and architectures (SOA and SOC), distributed grids - cloud, foggy (peripheral), and serverless computing;
- The use of advanced computing intelligence and neural networks deep learning, mining, and semantic and blockchain technologies in Big Data Mining and Computer-Aided Design;
- Construction of multi-agent systems and infrastructures as services (IaaS), platforms as services (PaaS), software as services (SaaS), data as services (DaaS) for digitalization of society;
- The use of SOCs and SOAs in creating applications for the Internet of Things, Smart Cities, Intelligent Transport, eHealth, and European Open Science Cloud (EOSC) applications.

6. INTERNATIONAL PROJECTS AND COLLABORATION

Institute for Applied System Analysis collaborates on the terms and conditions of the signed agreements and contracts with the following universities:

- UNESCO International Centre for Engineering Education (UICEE) (Melbourne, Australia)
- Austro-Ukrainian Institute for Science and Technology (Vienna, Austria)
- Vienna University of Technology (Vienna, Austria)
- University of Bristol (Bristol, England)
- Liège Institute of Mathematics (Liege, Belgium)
- Budapest University of Technology and Economics (Budapest, Hungary)
- Otto von Guericke University Magdeburg (Magdeburg, Germany)
- Fraunhofer Institute for Integrated Circuits IIS (Dresden, Germany)
- Institute for Semiconductor Physics (Frankfurt an der Oder, Germany)
- Berlin Institute of Technology (Germany)
- Institute of Bioinformatics and Systems Biology (Munich, Germany)
- University of Indianapolis (Athens, Greece)
- Akaki Tsereteli State University (Kutaisi, Georgia)
- Technical University of Denmark (Lyngby, Denmark)
- University of Dublin (Dublin, Ireland)

- University of Alicante (Alicante, Spain)
- University of Barcelona (Barcelona, Spain)
- University of Valencia (Valencia, Spain)
- CEU Cardenal Herrera University (Elche, Spain)
- University of Murcia (Murcia, Spain)
- University of Seville (Seville, Spain)
- Polytechnic University of Turin (Turin, Italy)
- University of Trento (Trento, Italy)
- University of Naples Federico II (Naples, Italy))
- University of Salerno (Salerno, Italy))
- Sapienza University of Rome, (Rome, Italy))
- Chinese University of Hong Kong (Hong Kong, China)
- Central South University (Changsha, China)
- Eindhoven University of Technology (Eindhoven, Netherlands)
- Wrocław University of Technology (Wroclaw, Poland)
- Lodz University of Technology (Lodz, Poland)
- University of Mining and Metallurgy (Krakow, Poland)
- AGH University of Science and Technology (Krakow, Poland)
- University of California Berkeley (, USA)
- University of California Santa Barbara (Santa Barbara, USA)
- Michigan State University (Lansing, USA)
- University of Michigan (Ann Arbor, USA)
- University of California Irvine (Irvine, USA)
- Tampere University of Technology (Tampere, Finland)
- University of Helsinki (Helsinki, Finland)
- Ecole Polytechnique (Paris, France)
- College International de Cannes (Cannes, France)
- Institute of Space and Telecommunications Law (Paris, France)
- Joseph Fourier University (Grenoble, France)
- Paris Institute of Technology (Paris, France)
- Czech Technical University in Prague (Prague, Czech Republic)
- CERN (Geneva, Switzerland)
- Tallinn University of Technology (Tallinn, Estonia)
- Pohang University of Science and Technology (Pohang, South Korea)
- Korea Institute of Science and Technology (Seoul, South Korea)

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Teachers and students of the **IASA** are cooperating with many international organizations, and domestic and foreign companies in the field of education and research (Innovation for High Performance, Intel company, Central-East European Institute for Sustainable Development, Council for Science Technology of Ukraine, firms EUROPRACTICE (England), SPIRE (USA), SAMSUNG (Korea), and HUAWEI/

World Data Center of Geoinformatics and Sustainable Development was established in 2006 as a branch of the World Data Centers of Solar-Terrestrial Physics and Solid Earth Data

Under the EU program, Erasmus+ **IASA** carries out the educational exchange and academic mobility programs with leading educational institutions in France, Germany, Spain, the United Kingdom, the Netherlands, and Hungary.

7. CONTACT INFORMATION

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