DigiJED 3

Digital Education with Joined Efforts

HOCHSCHULE ANHALT University of Applied Sciences

Ukraine digital:

Ensuring study success in times of crisis

Summer Semester

01.03.2025 - 31.05.2025

digijed@gmail.com

General Information

Main Idea

Creation of a didactic concept of collaborative digital learning in the field of information and communication technologies (5-6 training modules per semester)

Target audience

- Technical universities or technical faculties of universities in the regions of Ukraine heavily affected by the war;
- 3rd and 4th-year bachelor's and 1st-year master's students

Cooperation

- Ukrainian teachers, several of whom already work at Anhalt University of Applied Sciences, or some of whom teach from Ukraine;
- German and North Macedonian teachers.

Main Feature

Training modules include not only **courses of classical lectures** through the Zoom platform, but also the performance of **laboratory experiments**

Partners

Hochschule Anhalt
University of Applied Sciences

Prof. Dr. Eduard Siemens   **Dr. Maryna Popova**

Department of Electrical, Mechanical
and Industrial Engineering

NTUU "Igor Sikorsky Kyiv Polytechnic Institute"

Prof. Dr. Nataliia Kussul
Head of the Department
of Mathematical
Modelling and Data
Analysis

Prof. Dr. Mariia Skulysh
Head of the Department
of Information
Technologies in
Telecommunications

Odessa National Polytechnic University

Prof. Dr. Svitlana Antoshchuk
Director of Institute of Computer
System

Oles Honchar Dnipro National University

Dr. Mykhailo Derhachov
Dean of Faculty of Physics,
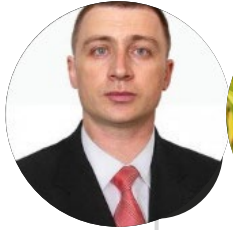Electronics and Computer
Systems

Kharkiv National University of Radio Electronics

Prof. Dr. Oleksandr Lemeshko,
V.V. Popovskyy Department
of Infocommunication
Engineering

ICT Security

**Prof. Dr. Oleksandr Lemeshko,
Dr. Artem Akulinichev
(Kharkiv National University of Radio Electronics)**

Academic year/semester: III/6

Ukrainian

4 ECTS

120 hours

Credit

Requisites

Learning the basics of ICT, network vulnerabilities and weaknesses, risks and ICT protection methods and tools. This course will guide through theoretical and practical skills to design, implement, and support security for devices and data in ICT networks. Understand the importance of ICT security in the modern technological world.

Introduction to basic ICT technology. Network threats, vulnerabilities, and risks (CVSS). Security LAN&WAN. Access Control Lists and Remote Access Security. DHCP, DNS, ARP. Virtual Private Network. VLAN configuration. Routing security: Attacks and protection. Understanding network scanning concepts. Network traffic analysis / log files monitoring (Wireshark, nmap, network sniffers). Discover the network's hosts, IP addresses, and open ports. Vulnerability Scanning. Firewall, Intrusion Detection/Prevention Systems (Snort, Suricata). Dos/DDoS. Cyber Kill Chain framework (Reconnaissance). MITRE ATT&CK.

Machine Learning with Python

Dr Olga Matsuga
(Oles Honchar Dnipro National University)

Academic year/semester: III/6

Ukrainian

4 ECTS

120 hours

Credit

Requisites

This course is an introduction to Machine Learning. It covers topics like supervised and unsupervised learning, introduces machine learning tasks such as classification, regression, clustering and dimensionality reduction, along with approaches to evaluating the machine learning models. Students also learn to use the scikit-learn, pandas and numpy libraries to solve the tasks in lab classes.

Introduction to machine learning. Machine learning tasks (classification, regression, clustering, dimensionality reduction). Data preprocessing. Linear regression model. Logistic regression model. K nearest neighbors classifier. Decision trees. Metrics in classification and regression tasks. Techniques for evaluating performance of regression and classification models. K-means algorithm. Agglomerative hierarchical clustering. Cluster validity measures. Dimensionality reduction approaches. Pandas and numpy libraries for data preprocessing. Scikit-learn library for solving machine learning tasks.

Introduction to Deep Learning

**Dr Maryna Ivanchenko
(Oles Honchar Dnipro National University)**

Academic year/semester: III/6

Ukrainian

4 ECTS

120 hours

Credit

Requisites

The course introduces the current state of deep learning, fundamental foundations, popular architectures, modern technologies and the specifics of training deep neural networks, as well as their application in various applied tasks; provides hands-on skills in developing deep learning models using Tensorflow.

Introduction to deep learning. Fully connected neural networks. Training models (backpropagation, optimizers, underfitting/overfitting, hyperparameters tuning). Convolutional neural network (structure, architectures: ResNet, GoogleNet, Inception, VGG, transfer learning, augmentation). Classification, object detection, segmentation, image retrieval, style transfer, image generation, image captioning etc tasks. Autoencoders and VAE. GANs. Recurrent neural networks. LSTM. Time series forecasting. Word2Vec. Seq2Seq. Attention. Transformer. BERT. GPT. NLP tasks (sentiment analysis, machine translation, generation, summarization etc). Reinforcement learning.

Enterprise apps development with Java

Dr. Mykola Hodovychenko,
(Odessa Polytechnic National University)

Academic year/semester: III/6

English/Ukrainian

4 ECTS

120 hours

Credit

Requisites

Module 1: Introduction to Enterprise Development
This module will lay the foundation for your journey into enterprise development. You'll learn key concepts like design patterns, enterprise architecture, and best security practices.

Module 2: Developing REST and GraphQL APIs
Master the art of building modern APIs with REST and GraphQL, exploring their strengths and weaknesses, and learning how to design and implement APIs that are secure, efficient, and scalable.

Module 3: Working with Databases in Spring
Dive into the world of databases, specifically within the Spring framework. Learn about popular database technologies like SQL and NoSQL and understand how to interact with them effectively in a Spring application.

Module 4: Microservices Architecture and DevOps
Explore the advantages and challenges of building software with microservices and learn how to apply DevOps principles for seamless development, testing, and deployment of your enterprise applications.

Module 5: Practical Project
Put your newly acquired skills to the test by working on a real-world project. You'll apply the knowledge and techniques learned throughout the course to create a complete enterprise application.

5G Technology

Prof. Dr Mariia Skulysh,
(Igor Sikorsky Kyiv Polytechnic Institute)

Academic year/semester: III/6

English/Ukrainian

4 ECTS

120 hours

Credit

Requisites

- Analysis of 3GPP protocols
- 5G Core architecture
- Traffic control procedures (Policy Control)
- GPRS Tunneling Protocol for 5G
- Requirements for 5G base stations
- New 5G radio. Physical layer (modulation, channels, coding)

- Practical work: Testing of 5G network subsystems with open source software.

Results

Scholarship

Student with a disability
- Disability card;
- Certificate of disability pension;
- Certificate of allocation of social assistance;
- Proof of receipt of benefits.

Student with a chronic illness
- Medical certificate
- Extract from medical records

Student who has lost his/her parents (or legal custodians) due to the war
- Death certificate of a parent/legal custodian

Student who has lost his/her property because of the war
- A confirmation from "Diia" about the damage or destruction of your property (flat, house, etc.)

Student who has been affected by the war in any way
- Other evidence of war-related damage

DigiJED Project Coordinator

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