DigiJED

Digital Education with Joined Efforts

Ukraine digital:

Ensuring study success in times of crisis

Summer Semester

01.03.2024 - 31.05.2024

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

Prof. Dr. Eduard Siemens

Dr. Maryna Popova

Hochschule Anhalt
University of Applied Sciences

Department of Electrical, Mechanical and Industrial Engineering

Ss. Cyril and Methodius University in Skopje

Prof. Dr. Marija Kalendar,
Head of Department of Computer Technologies and Engineering

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

NTUU "Igor Sikorsky Kyiv Polytechnic Institute"

Odessa National Polytechnic University

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

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

Oles Honchar Dnipro National University

Kharkiv National University of Radio Electronics

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

Distributed Systems & Network Programming


Prof. Dr. Marija Kalendar,
Prof. Dr. Marko Porjazoski
(Ss. Cyril and Methodius University)

Academic year/semester: IV/8

English

4 ECTS

120 hours

Exam

Requisites

Introduction to the concepts of distributed systems and communication between remote processes, distributed architectures, and distributed file systems. TCP and UDP socket programming and implementation of network applications in Python.

Introduction. Features of distributed systems. DS models. Concepts of communication between remote processes. Working with network interfaces. IPv4. IPv6. Sockets. Introduction to Socket Concepts. Types of sockets. TCP and UDP sockets. Block diagram of TCP and UDP socket calls. Python Socket Module. Client/server programming. TCP and UDP client and server. DNS system in network programming. Multiplexing of Socket I/O. Application level libraries to work with the Web, e-mail, ftp. Working with HTTP protocol: httplib () and urllib (). Working with e-mail protocols and FTP. Working with SMTP, POP, and IMAP protocols. Using web site APIs. Security and network programming. Security with SSL and TLS. Concepts of remote invocation. Request-reply protocols. Publish and subscribe systems. Remote Procedure Calls (RPC). Remote Method Invocation (RMI).

Creating Mobile apps with Android

PhD Mykola Hodovychenko,
(Odessa Polytechnic National University)

Academic year/semester: III/6

English/Ukrainian

4 ECTS

120 hours

Credit

Requisites

Machine Learning with Python

PhD 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

PhD Maryna Sydorova
(Oles Honchar Dnipro National University)

Academic year/semester: III/8

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.

IoT and Embedded System Programming

M. Eng. Simeon Trendov
(Anhalt University of Applied Sciences)

Academic year/semester: IV/8

English

4 ECTS

120 hours

Final Project Work

Requisites

Introduction to the concepts of the Internet of Things (IoT) and Embedded Systems, as well as Low Power Wide Area Network (LPWAN) Technologies. Learning to program in C++ and getting familiar with an Arduino UNO.

Introduction. Defining and understanding the terms Internet of Things (IoT) and Embedded Systems. IoT trends. Risks, Privacy and Security. Low Power Wide Area Network (LPWAN) Technologies. Designing an Embedded System. C++ Programming. Getting familiar with an Arduino UNO. Creating first Arduino UNO project. Creating and Programming Embedded Systems. Connecting Sensors and Actuators. Programming Smart Devices. Getting familiar with LoRaWAN, SigFox, Weightless, NB-IoT. Establishing LoRaWAN communication between two devices. Network Parameters.

Results

DigiJED

Bundesministerium für Bildung und Forschung

CERTIFICATE OF EXELLENCE

PROUDLY PRESENTED TO

Name Surname

in recognition of his successful completion of the course

Course Name

as part of the **DigiJED: Digital Education with Joined Efforts** project within the **Ukraine digital: Ensuring study success in times of crisis** program

September 22, 2022 - December 29, 2022

120 Hours	**4 ECTS**	**80 (good)**	**DJOS/202222**
Duration of Course	ECTS	Grade	Certificate No.

DAAD
Deutscher Akademischer Austausch Dienst
German Academic Exchange Service

Prof. Dr. Eduard Siemens
Principal Investigator
Anhalt University of Applied Sciences

03.01.2023
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