



Modernization of Mechatronics and Robotics for bachelor's degree
in Uzbekistan through Innovative Ideas and Digital Technology
(MechaUz)

609564-EPP-1-2019-1-EL-EPPKA2-CBHE-JP

MechaUz_MechaUz_D.3.3_Organising courses for lectures_V.1

Project Acronym:	MechaUZ
Grant Agreement No.	609564
Deliverable Editor(s)	KEEI
Dissemination level:	Institutional

MechaUz_D.3.3_Organising courses for lectures_V.1

REVISION HISTORY

<i>Version</i>	<i>Date</i>	<i>Organization</i>	<i>Author</i>	<i>Changes</i>
V 1.0	30/08/2023	TUIT	Dostonbek Hasanov	Developing the Report of the WP3.3

DOCUMENT CONTACT INFORMATION

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Approval Table

<i>Version</i>	<i>Date of Approval</i>	<i>Deliverable Name</i>	<i>Approved By</i>
V 1.0	30/08/2023	MechaUz_D.3.2_ Attend advanced Mechatronics trainings_V.1	Seyran Asanov seyran.asanov@polito.it



ABBREVIATIONS

Acronym	Definition
BS	Bachelor science
DoW	Description of Work
EC	European Commission
WP	Work Package
WPL	Work Package Leader
WP3	Work Package 3, Training
MechaUz	Modernization of Mechatronics and Robotics for Bachelor degree in Uzbekistan through Innovative Ideas and Digital Technology
IHU	International Hellenic University (Thessaloniki, Greece)
MHSSE	Ministry of Higher and Secondary Specialised Education System of Uzbekistan (Tashkent, Uzbekistan)
SEERC	The South-East European Research Centre (Thessaloniki, Greece)
VG TU	Vilnius Gediminas Technical University (Vilnius, Lithuania)
LiePU	Liepāja University (Liepāja, Latvia) Vidzeme University of Applied Sciences (Valmiera, Latvia)
IPVC	Polytechnic Institute of Viana do Castelo (Viana do Castelo, Portugal)
AndMI	Andijan machine-building institute (Andijan, Uzbekistan)
TTPU	Turin Polytechnic University in Tashkent (Tashkent, Uzbekistan)
FPI	Fergana Polytechnic Institute (Fergana, Uzbekistan)
TUIT	Tashkent University of Information Technology (Tashkent, Uzbekistan)
KEEI	Karshi Engineering-Economic Institute (Karshi, Uzbekistan)
TSTU	Tashkent State Technical University (Tashkent, Uzbekistan)



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Overview

The main aim of the project is to develop an educational program in Mechatronics and Robotics. In addition, the project not only aims to develop a new program, but also will design several training courses in UZB on how to work effectively and efficiently. In order to solve the existing problems in UZB on this issue, it is needed to improve the state of training staff in the field of Mechatronics. Therefore, it becomes relevant in Uzbek universities to develop fully compatible BSc program with European standards.

After establishment of mechatronics laboratories, training centers and development of new curriculum and teaching program, EU partners/teachers arrived in Uzbekistan and provided hands on training to Uzbek teachers on the new courses and laboratory equipment and sent guest lectures to respective Uzbek HEIs.

Tasks:

- Organizing courses for lecturers for teaching and learning methods – 8 teachers from all HEIs in Uzbekistan must be trained in Uzbekistan.

Training for Lectures were organized and held in TUIT, Uzbekistan.

Training for lecturers

[The training for lecturers](#) was held on May 15-18, 2023, in the city of Tashkent at the Tashkent University of Information Technologies named after Muhammad al-Khorazmi. [The courses](#) were developed by EU partners.

Program overview

Timetable

Date	Activities
DAY 1 Monday, 15 May, 2023	5 th PPM Meeting
DAY 2 Tuesday, 16 May, 2023	Training for lecturers
DAY 3 Wednesday, 17 May, 2023	Training for lecturers
DAY 4 Thursday, 18 May, 2023	Training for lecturers
DAY 5 Friday, 19 May, 2023	Visit to Techno Park

Timetable for activities.

DAY 2 Tuesday, 16 May – Training	
09:30-11:00	Training 1: Robot control systems Prof. Vytautas Bučinskas, Dr. Andrius Dzedzickis (VGTU)
11:00-11:30	Coffee Break
11:30-13:00	Training 1: Robot control systems Prof. Vytautas Bučinskas, Dr. Andrius Dzedzickis (VGTU)
13:00-14:30	Lunch Break
14:30-15:50	Training 2: Application of IoT in environmental monitoring (Theory) Dr. Uldis Žaimis (LiePU)
15:50-16:00	Time Break
16:00-17:00	Training 2: Application of IoT in environmental monitoring (Workshop) Dr. Uldis Žaimis (LiePU)
DAY 3 Wednesday, 17 May – Training	
09:30-11:00	Training 3: Basics of modelling in Ansys Dr. Patriks Morevs (LiePU)
11:00-11:30	Coffee Break
11:30-13:00	Training 4: Internet of Things and Artificial Intelligence (Theory) Dr. Rolando Azevedo (CITIN)
13:00-14:30	Lunch Break
14:30-15:50	Training 4: Internet of Things and Artificial Intelligence (Practical) Dr. Rolando Azevedo (CITIN)
15:50-16:00	Time Break

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16:00-17:00	Training 4: Internet of Things and Artificial Intelligence (Theory/Practical) Dr. Rolando Azevedo (CITIN)
DAY 4 Thursday, 18 May – Training	
09:30-11:00	Training 4: Internet of Things and Artificial Intelligence (Theory) Dr. Rolando Azevedo (CITIN) Room: F building, Meeting room
11:00-11:30	Coffee Break
11:30-13:00	Training 4: Internet of Things and Artificial Intelligence (Practical) Dr. Rolando Azevedo (CITIN)
13:00-14:30	Lunch Break
14:30-16:00	Training 5: Additive Manufacturing: From 3D Modeling to 3D Printing (Online) Mr. Manolis Tzimtzimis (IHU)
16:00-16:30	Time Break
16:30-19:00	Training 6: Mobile Robotics (online) Dr. Konstantinos Dimopoulos (CITY College)

Courses

1. Robot control systems (1-part)

Course description: This course is dedicated to introducing the typical configuration of industrial robot control systems, including aspects of available programming methods and the most popular robot programming languages.

Learning Outcomes: New knowledge about industrial robot control systems composition, popular programming languages, and available programming methods.

2. Robot control systems (2-part)

Course description: This course is dedicated to introducing the typical configuration of industrial robot control systems, including aspects of available programming methods and the most popular robot programming languages.

Learning Outcomes: New knowledge about industrial robot control systems composition, popular programming languages, and available programming methods.

3. Application of IoT in environmental monitoring

Course description: The course provides knowledge and skills in the development of controlled devices, data acquisition and transmission.



Learning Outcomes: Participants will know the basic principles of creating controllable devices; will be able to create sensor connections with several types of programmable controllers, organize data transmission channels, send data to a remote server, and receive processed information; knows the application of program libraries for the microcontroller, software structure, development of work functions (subprograms), code debugging.

4. Application of IoT in environmental monitoring (Workshop)

5. Basics of modelling in Ansys

Course description: The course anticipates introduction of numerical methods to students as well as principles of numerical methods, computer modelling basics, differential equations and also application of numerical methods in modeling software such as Ansys, Comsol, Fluent, Siemens Start CCM+, etc.

Learning Outcomes: Participants know basic numerical methods; students can understand the meaning of numerical methods and spheres of application. Students can apply numerical methods for the solution of differential equations. Students can use Ansys software for modelling simple situations. Participants know the perspectives of numerical methods.

6. Internet of Things and Artificial Intelligence

Course description: The IoT and AI course provides a comprehensive exploration of the theoretical foundations and practical applications of the Internet of Things (IoT) and artificial Intelligence (AI). Participants will delve into the concepts, technologies and methodologies driving the convergence of IoT and AI, gaining knowledge and skills necessary to design, develop, and deploy intelligent IoT systems.

Learning Outcomes: Upon completion of the course, Participants will gain a comprehensive understanding of IoT and AI fundamental, including system design, AI integration, data analysis, scalability and ethical considerations. They will develop practical skills in designing and deploying IoT systems, integrating AI algorithms, and extracting insights from the sensor data. Through hands-on projects, students will apply their knowledge, enhancing their problem-solving abilities.

7. Additive Manufacturing: From 3D Modeling to 3D Printing

Course description: This course introduces the main principles for the additive manufacturing process. First, the Computer Aided Design process will be

briefly explained through specific examples in robotic systems, and the files will be exported to the slicer software, to be prepared for the 3D printing Process. Finally, the most important parameters for the 3D printing process will be analyzed.

Learning Outcomes: Understand the main principles of a CAD model, and identify the key features for the 3D printing process, both to software and hardware operations.

8. Mobile Robotics

Course description: This course is a basic introduction to robotics with strong emphasis on mobile robots, movement, environment sensing and actuation.

Learning Outcomes: Understand the basic concepts in robotics, sensing, actuation and control of mobile robots.

Participants

Partners	Number of participants
Andijan Machine-Building Institute, Uzbekistan	9
Turin Polytechnic University in Tashkent, Uzbekistan	8
Tashkent University of Information Technologies (TUIT), Uzbekistan	10
Fergana Polytechnic Institute (FPI), Uzbekistan	8
Karshi Engineering-Economic Institute, Uzbekistan	8
Tashkent State Technical University named after Islam Karimov (TSTU), Uzbekistan	8
Total number of participants	51

Students (class)		Trainers/Teachers		Researchers		Others	
Total	Female	Total	Female	Total	Female	Total	Female
0	0	42	10	9	1	0	0

Certificates were presented to all participants.