



Educational for Drone (eDrone)

(Project Number 574090-EPP-1-2016-1-IT-EPPKA2-CBHE-JP)

WP3, D3.2

ECTS recognition of the course

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The following is the *document control* for revisions to this document.

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Introduction / Foreword

The evaluation of the workload required to achieve the objectives of the course program (objectives specified in terms of the learning outcomes and competences to be acquired) are detailed. In some cases, a Diploma Supplement is designed to provide a standardized description of the nature, level, context, content and status of the course.

The achievements in each country are detailed in the following with the dedicated number of hours.

1. List of learning outcomes

ARMENIA

Due to the CIA courses at OED laboratory in Armenia, the attendees gain both theoretical and practical knowledge. (The Armenian version is available on Annex 2.)

Theoretical knowledge

1. Basics of aerodynamics
2. The use of unmanned aerial vehicles
3. Description of UAVs
 - Features description
 - Types of UAVs
 - Types of screws
 - Modern models of UAVs and their capabilities
4. The structure of UAVs and the principle of operation
 - Automatic controller
 - Engines
 - Screwdrivers
 - Sensitizers, sensors
 - Engine speed control unit
 - Batteries
 - Communication hub
5. Radio systems
 - Metering system
 - Remote control system





- Video monitoring system
- Antennas

6. UAVs flight control

- Navigation
- Types of flight and remote control principle
- Flight control types and modes
- Malfunction analysis
- Calculations of new models of screw drones
- Annex 2. Measures to combat drones
- Annex 3. Fascinating physics
 - Lifting force, moment of force, torque
 - Basics of aerodynamics
 - Difference between helicopter and plane flights
 - Electricity, constant and alternating current
 - Batteries
 - Earth magnetic field, magnets
 - Compass

Skills and practical work

1. Assembling screw drone with components, adjustment, test:

2. Pilot assembly with components, adjustment, test:

3. Flight

- Flight preconditions, review
- Remote control panel, use:
- Mission type flight, planning
- Adjustment

4. Flight

- Mechanical - Remote control flight with a mini quadruple drone
- Mechanical remote control flight by Tschay drone
- Pokr Mher quad-screw flight with mechanical remote control unmanned
- Implementation of the mission 10-15 times
- Flight with video broadcast

5. Post-flight works



- Post-flight registrations
- Post-flight inspections
- Data collection (video and technical), processing
- Flight flow analysis with loggers
- Battery care
- Drone care
- Drone fault analysis: correction

BELARUS

Students of the CIA course at OED can / will be able to:

- Know the rules for using drones for civil purposes;
- Use knowledge in the development and application of drones, as well as related areas in the professional field.
- To navigate the needs of the civil drone market.

GEORGIA

Attendees of the CIA course at OED are/will be able to:

- Understand the regulations for using drones in civil applications;
- Use theoretical knowledge and practical experience in the professional field;
- Understand the software solutions in maintaining and processing information in the field;
- Get the knowledge in Drones engineering;
- Understand the Market needs in the field of drones for civil applications;
- Develop startup mindset for finding out the problems and solutions in the field of drones technology;

MOLDOVA

Attendees are able to:

- understand policies, processes and technologies in the field of drone technology, civil applications, and regulation of drone use.
- use theoretical and applied knowledge in the field of Drone Education;
- apply research methodology in the specialty of Drone Education;
- apply working methods and techniques in the professional field.

2. List of competences to be acquired in each case

ARMENIA

The attendees of eDrone CIA courses will acquire knowledge on the basics of aerodynamics, learn about the use of unmanned aerial vehicles, their features, types, modern models, capabilities, civil applications. The high-level and specialized teachers will show them the structure of UAVs and the



principle of operation, radio systems, UAVs flight control, how the navigation is being organized, how it is controlled remotely, the types of flight control and analysis.

From the practical competences it is worth to mention the testing and assembling screw drone with components, adjustment, pilot assembly with components, adjustment and test.

One of the most important and practical competencies that the attendees will gain from the CIA courses are the flight preconditions, review; remote control panel and use; mission type flight, planning and adjustment. Also, the post-flight works will let the attendees to implement post-flight registrations and inspections, work with data (video and technical), do flight flow analysis with loggers, deal with battery care, drone care, drone fault analysis and corrections.

BELARUS

Competences that are/will be acquired through the CIA courses and OED works:

- Knowledge of the legal framework for regulating unmanned aerial vehicles in the Republic of Belarus and Europe;
- Knowledge in the field of civilian use of drones;
- Good understanding of market needs and practical use of drones;
- Knowledge of the main systems of the service form and the target load of drones, navigation and control of the avionics of drones, the use of equipment for measurement and monitoring, maintenance of drones, engineering of drones;
- Business fundamentals in the development and use of drones;
- Practical drone skills in hands-on sessions at OED;

GEORGIA

Competences that are/will be acquired through the CIA courses and OED works:

- Theoretical knowledge of legislative framework of drones regulations in Georgia and Europe;
- Knowledge of civil applications of drones;
- Sound understanding of Market needs and Drone Education possibilities in the country
- Knowledge of drone architecture, drone avionics, use of measurement and monitoring equipment, drone maintenance, drones engineering;
- Developed Entrepreneurship skills;
- Practical knowledge of drones techniques through the practical works held in OED;

MOLDOVA

Competences and skills to be acquired consist in:

1. Knowledge and understanding skills

The graduated specialist of the continuous professional training program will have:

- theoretical and applied knowledge in the field of Drone Education;
- research methodology in the specialty;



- knowledge of the legislative framework, of the functional obligations of specialists in the field of drone education;
- knowledge in the field of drone technology, including architecture, drone avionics, use of measurement and monitoring equipment, drone maintenance;
- working methods and techniques in the professional field.

2. Application skills:

- understanding policies, processes and technologies in the field of drone technology, civil applications, as well as regulating the use of drones;
- selecting and applying tools and techniques for the transmission and processing of data received by drones;
- use of specialized software for studying the technology, maintenance, architecture and piloting of drones;
- use of modern technologies for drone training;
- use of specialized equipment provided in the Drone Education Office;
- self-evaluation of activities from the perspective of the positions of service held in the professional field;
- application of theoretical knowledge in performing application activities;
- conducting applied research in the field of drone technology, application and regulation.
- applying theoretical and applied knowledge in daily activity.

3. Integration skills:

- appreciating and interpreting the knowledge and skills formed in the professional activity;
- elaboration of projects on the use, maintenance and development of the relevant areas of drones;
- designing lifelong learning needs;
- the ability to communicate in work teams and with users;
- collecting, processing, analyzing and interpreting the results of the accumulated empirical material, formulating conclusions based on its analysis and proposing recommendations.

3. Number of hours presential and self learning for each course

ARMENIA

Presential - 720, self-learning – 80 hours.

BELARUS

Updated courses





<u>Title</u>	<u>Lectures</u>	<u>Practice</u>	<u>Self-learning</u>
<u>Small spacecraft (Bachelor)</u>	<u>30</u>	<u>16</u>	<u>12</u>
<u>GIS technology (Bachelor)</u>	<u>32</u>	<u>30</u>	<u>24</u>
<u>Methods of information processing in the cosmophysical experiment (Bachelor)</u>	<u>24</u>	<u>12</u>	<u>10</u>
<u>Basics of satellite navigation (Bachelor)</u>	<u>24</u>	<u>12</u>	<u>10</u>
<u>Statistical theory of radio navigation systems, radar and remote sensing (Bachelor)</u>	<u>24</u>	<u>28</u>	<u>10</u>
<u>Special laboratory "Study of methods of digital signal processing based on the platform ELVIS" (Bachelor)</u>		<u>20</u>	<u>10</u>

New developed courses

<u>Title</u>	<u>Lectures</u>	<u>Practice</u>	<u>Self-learning</u>
<u>Practical ballistics and navigation (Master)</u>	<u>24</u>	<u>12</u>	<u>10</u>
<u>Neural networks (Bachelor)</u>	<u>24</u>	<u>12</u>	<u>10</u>
<u>Machine and deep learning methods (Master)</u>	<u>24</u>	<u>12</u>	<u>10</u>
<u>Signal and Image Processing (Master)</u>	<u>24</u>	<u>12</u>	<u>10</u>
<u>Big Data Analysis (Master)</u>	<u>24</u>	<u>12</u>	<u>10</u>
<u>Application programming</u>		<u>22</u>	<u>12</u>





<u>Machine learning algorithms (Master)</u>	<u>24</u>	<u>121</u>	<u>10</u>
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GEORGIA

Lectures and Practical work - 35 Hours; Self-Learning - 50 Hours;

MOLDOVA

According to the *Curriculum design* the CIA courses includes both class and individual hours as follow in the next table:

Modul / Subject	Total hours	Class hours			Individual	Evaluation form
		Total	Including			
			Lecture	Practice		
Modul I. Drone Technology	460	120	70	50	340	Test
Drone Architecture	80	20	13	7	60	
Drone Avionic	80	20	13	7	60	
Echipamente pentru măsurători și monitorizare	80	20	10	10	60	
Piloting techniques	80	23	13	10	57	
Prelucrarea datelor măsurătorilor	80	20	14	6	60	
Drone maintenance	60	17	7	10	43	





Modul II. Laws and drone regulation	40	13	7	6	27	Test
Laws and drone regulation	40	13	7	6	27	
Modul III. Civil applications	40	13	7	6	27	Test
Civil applications	40	13	7	6	27	
Practice and final exam	60	4			56	Test
Total	600	150	84	66	450	

Total 600 hours – 20 ECTS

4. Program coefficients and achieved ECTS

ARMENIA

According to the CIA approved curricula, the continuing education program equals to 8 ECTS.

BELARUS

Updated courses : 22 ECTS

New developed courses : 26 ECTS

GEORGIA

N/A. (Within the framework of a life-long learning center after completion of the course, the attendee receives the certification of completion.) .

MOLDOVA

According to the *Curriculum design* the CIA courses the distribution of the 20 ECTS between the courses' modules is:

Drone Technology - 15,33 ECTS





Laws and drone regulation - 1,33 ECTS

Drone applications - 1,33 ECTS

Practice and final test - 2 ECTS.

5. Diploma supplement achieved (or % of progress)

ARMENIA

The attendees will receive certificates after completion of the courses.

BELARUS

At the end of the course, students will receive a credit or exam grade.

GEORGIA

Certificates of completion of course are given to attendees.

MOLDOVA

Diploma supplement achieved is 100%.

Conclusion

All the programs developed have enabled the acquisition of a wide range of knowledge and skills. The team worked to ensure that these translate into acquired and valuable ECTS. In addition, recognitions such as a diploma or university diploma supplement have been edited.





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Belarusian
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