Modernization of Mechatronics and Robotics for Bachelor degree in Uzbekistan through Innovative Ideas and Digital Technology

(MechaUz)

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

MechaUZ_D.1.1_Analysis and Comparison of Teaching Systems_V.1

MechaUZ_D.1.2_Studying Experience of the EU Partners, List of good Practice Examples_V.1

Project Acronym:	MechaUZ
Grant Agreement No.	609564
Deliverable Editor(s)	IHU
Dissemination level:	Institution (Consortium Internal)

Revision History

Version	*Date*	*Organisation*	*Author*	*Changes*
<V #.#>	<dd/mm/yyyy>	<ACRONYM>	<Name>	<Description of changes>

Document Contact Information

Name	*Organization*	*Contact information*
Maria Drakaki	IHU	mdrakak@gmail.com

Approval Table

Version	*Date of Approval*	*Deliverable Name*	*Approved By*
V 1.0	30/02/2021	MechaUZ_D.1.1_ Analysis and Comparison of Teaching Systems_V.1 MechaUZ_D.1.2_ Studying Experience of the EU Partners, List of good Practice Examples_V.1	Seyran Asanov, TTPU Patricks Movers, LiePU

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1. Introduction

Work Package 1 - Task 1.1 description: Analysis and comparison of teaching systems and methods in HEIs of EU and Uzbekistan.

Work Package 1 - Task 1.2 description: Studying experience of the EU partners in the implementation of standards, curriculum and teaching materials in the field of Mechatronics. Compiling a list of good practice examples.

2. Data collection preparation

In order to cover the objectives of WP1 with respect to teaching systems and methods in the field of Mechatronics in the EU-27 countries, UK and Uzbekistan, as well as list of good practice examples , the MechaUZ partners were assigned to complete a report according to the format of a template (MechaUZ - Working Template for WP1). Each partner was responsible for delivering information about the tasks of WP1 for specific countries, according to Table 1 below. The aim was to collect representative information from each country of interest, rather than an exhaustive list of all related teaching systems and methods in that country.

Table 1. List of MechaUZ partners and countries of interest which were assigned to each partner in order to collect data for the tasks of Work Package 1.

MechaUZ partner	Country of interest for data collection
International Hellenic University (IHU)	Greece, Cyprus, Austria, Malta
Polytechnic Institute of Viana do Castelo (IPVC)	Portugal, Spain, France
Liepāja University (LIEPU)	Germany, Poland, LATVIA
SEERC	UK, Bulgaria, Romania
Turin Polytechnic University in Tashkent (TTPU)	Uzbekistan (TTPU), Italy, Sweden, Ireland, Slovakia
Vidzeme University of Applied Sciences (ViA)	Netherland,Estonia
Vilnius Gediminas Technical University (VGTU)	Denmark, Norway, Hungary, Czech Republic
Andijan Machine-Building Institute (AndMI)	Finland, Belgium
Tashkent State Technical University (TSTU)	Uzbekistan (TSTU)
Tashkent University of Information Technology (TUIT)	Uzbekistan (TUIT)

3. Methodology

A template (MechaUZ - Working Template for WP1) was used by the MechaUZ Partners for filling out information required for the completion of tasks in Work Package 1, more specifically tasks 1.1 and 1.2 of Work Package 1. The MechaUZ - Working Template for WP1 has been included in Appendix A. The collected information has been included in appendix B. The template was introduced by IHU in order to ensure that all partners fill out the required information fields and the content is uniform. Discussion on the content (scientific and organisational) of the template took place during the 1st MechaUZ zoom meeting. Continuous communication and feedback was present especially during the data collection phase between partners and IHU (WP1 leader). Discussions on the progress of WP1 as well as progress on data collection and relevant inquiries took place during the 2nd and 3rd zoom meetings.

The template was divided into Part A and Part B. Part A involved information on task 1.1, a description of task 1.1 follows.

Work Package 1 - Task 1.1 description: Analysis and comparison of teaching systems and methods in HEIs of EU and Uzbekistan.

. Part B involved information on task 1.2, a description of task 1.2 follows.

Work Package 1 - Task 1.2 description: Studying experience of the EU partners in the implementation of standards, curriculum and teaching materials in the field of Mechatronics. Compiling a list of good practice examples. **(The Task 1.2 refers to EU Partners only)**

Data on Part A included bachelor and/or master degrees in Mechatronics for EU and Uzbekistan. The programmes listed for each country of interest should cover the essential information about the corresponding teaching systems in the respective countries and therefore the provided list of relevant degree programmes should not be exhaustive. In case Mechatronics programmes were not found for a country of interest, relevant scientific programmes were listed. Information in Part A included (for each identified bachelor/master degree programme)

• Programme title

• Department

• University

• Country

• URL

• Degree of Study Programme

• ECTS

• Duration (in years)

• Language

• Bachelor project

• Teaching methodology (Theory, lab sessions, development of projects, connection with industry, seminars, other)

• Course-specific learning aims/outcomes/competences

• The structure of the Programme

• Profile of the Programme: Distribution of the course subjects.

• Any further comments (Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.).

Information in Part B included a list of good practice examples. Partners were asked to provide their own studying in the implementation of standards, curriculum and teaching materials in the field of Mechatronics. They could also list URL addresses. If the partners wanted to list bachelor degrees in Mechatronics offered by their own University, they should fill out the information according to Part A, except if they had already done so in Part A. Similarly, if they wanted to list Master degrees in Mechatronics or other relevant fields offered by their own University, they should fill out the information according to Part A, except if they had already done so in Part A.

4. WP1 findings

The findings were summarised per country of interest in EU and Uzbekistan. They were processed and analysed further and the results are presented in the Discussion section. Appendix B contains the initial analytical reports per country of interest in EU and Uzbekistan.

UNITED KINGDOM

Three BEng (bachelor of Engineering) degree programmes have been included. Two BEng degree ptogrammes are offered with an MEng degree option.

The degree programmes are listed below.

- **BEng/MEng Mechatronics, School of Engineering, University of Glasgow** (4/5 year degree)

Available at https://www.gla.ac.uk/undergraduate/degrees/mechatronics/#

- **BEng/MEng Mechatronics Engineering, Department of Electrical and Electronic Engineering, University of Manchester** (3 year degree)

Available at https://www.manchester.ac.uk/study/undergraduate/courses/2020/03394/beng-mechatronic-engineering/#course-profile

- **BEng/MEng Mechatronics and Robotic Engineering, Department of Electronic, Electrical and Systems Engineering, University of Birmingham** (3/4 year degree).

Available at https://www.birmingham.ac.uk/undergraduate/courses/eese/mechatronic-robotic-engineering-beng.aspx

Teaching methodology includes lectures, laboratory classes, individual and group projects, connection with industry and tutorials.

Language: English

Bachelor project was part of the programme in two degree programmes, whereas in the third degree programme individual and team projects were mandatory course modules.

The profile of each programme follows (distribution of the course subjects).

BEng/MEng Mechatronics, School of Engineering, University of Glasgow

Subject	**Percentage of the total course modules**
Mechanical Engineering	25%
Electrical/Electronic Engineering	27%
Computer Science/ ICT	13%
Mechatronics	15%
Fundamental subjects	20%

BEng/MEng Mechatronics Engineering, Department of Electrical and Electronic Engineering, University of Manchester

Subject	Percentage of the total course modules
Mechanical Engineering	8%
Electrical/Electronic Engineering	45%
Computer Science/ ICT	16%
Mechatronics	15%
Fundamental subjects	16%

BEng/MEng Mechatronics and Robotic Engineering, Department of Electronic, Electrical and Systems Engineering, University of Birmingham

Mechanical Engineering	16%
Electrical/Electronic Engineering	33%
Computer Science/ ICT	6%
Mechatronics	18%
Fundamental subjects	11%
Projects	16%

List of good practice examples (representative exampes).

1	**University of Manchester** Students meet a personal tutor on a weekly basis to supplement their learning from lectures and laboratory sessions.
2	**University of Glasgow** Electronic design project - Year 2 Mechatronic design project - Year 3 Project M4 - Year 4 (Individual Project – Student chooses a “favorite” field/topic Industrial project M5 - MEng, Year 5

BULGARIA

A BSc (Bachelor of Science) degree programme has been included.

The degree programme is listed below.

• **BSc Mechatronics**, **Faculty of Mechanical Engineering, Technical University of Sofia** (4 year degree)

Available at http://www.tu-plovdiv.bg/en/course.php?course=15

Teaching methodology was not specified. At the website it is stated that "The curriculum is …to a great extent similar to the curricula of the leading universities from Europe and primarily from Germany. This allows the provision of student mobility and exchange of credits when moving from one university to another."

Language: Bulgarian.

Bachelor project was not specified.

The profile of the programme follows (distribution of the course subjects).

BSc Mechatronics, Faculty of Mechanical Engineering, Technical University of Sofia-

Subject	**Percentage of the total course modules**
Mechanical Engineering	subjects not analytically described
Electrical/Electronic Engineering	subjects not analytically described
Computer Science/ ICT	subjects not analytically described
Mechatronics	subjects not analytically described
Fundamental subjects	subjects not analytically described

List of good practice examples (representative examples).

1	Not available

ROMANIA

A BSc degree programme has been included. An MSc is also listed as reference.

The degree programme is listed below.

• **BSc Mechatronics, Faculty of Product Design and Environment, Transilvania University of Brașov** (4 year degree)

Available at http://www.tu-plovdiv.bg/en/course.php?course=15

• **MSc Mechatronic systems for Industry and Medicine, Faculty of Product Design and Environment, Transilvania University of Brașov** (2 year degree)

Available at https://www.unitbv.ro/documente/curriculum-syllabus/Master/2019-2020/DPM_master_SMIM_2019-2020.pdf

Teaching methodology included courses, seminars, laboratories and projects.

Language: English/Romanian.

Bachelor project was part of the programme.

The profile of the programme follows (distribution of the course subjects).

BSc Mechatronics, Faculty of Product Design and Environment, Transilvania University of Brașov

Subject	**Percentage of the total course modules**
Mechanical Engineering	18%
Electrical/Electronic Engineering	22%
Computer Science/ ICT	28%
Mechatronics	12%
Fundamental subjects	20%

List of good practice examples (representative examples).

1	Specialized laboratories equipped with modern CNC machine tools, industrial robots, 3D printer, computers and multimedia equipment
2	Lower, medium and higher class CAD/CAE/CAM software is used such as AutoCAD Mechanical, INVENTOR, SolidWorks, CATIA, FeatureCAM, SinuTrain, etc . The 3D printer type *uPrint* facilitates students in creating true prototypes of products via Rapid Prototyping
3	25 specialized laboratories equipped with 300 units of metal processing machinery including CNC machines, industrial robots, manufacturing and tooling equipment, computer aided measuring equipment and specialized software

ITALY

Four BSc and two MSc degree programmes have been included. Two BSc degree programmes in Mechatronic Engineering, one BSc degree programme in Automation and Control Engineering and one BSc degree programme in Automation Engineering have been included. *The MSc degree programme in Mechatronic Engineering is fully identical to the MSc degree programme offered by TTPU*.

The degree programmes are listed below.

• **BSc Automation and Control Engineering, School of Industrial and Information Engineering, Politecnico di Milano** (3 year degree)

Available at www.polimi.it

• **BSc Mechatronic Engineering, Department of Management and Engineering, Universita degli Studi di Padova** (3 year degree)

Available at www.unipd.it

• **BSc Automation Engineering, Department of Electrical Energy and Information Engineering "Guiglielmo Marconi", University of Bologna** (3 year degree).

Available at www.unibo.it

• **BSc Mechatronic Engineering, Department of Electrical Energy and Information Engineering "Guiglielmo Marconi", University of Bologna** (3 year degree)

Available at www.unibo.it

• **MSc Mechatronic Engineering (Control Technologies for Industries 4.0), Department of Electronics and Telecommunication Politecnico di Torino** (2 year degree)

Available at www.polito.it

Available at https://didattica.polito.it/pls/portal30/sviluppo.offerta_formativa_2019.vis?p_coorte=2020&p_sdu=37&p_cds=55

• **MSc Automation and Control Engineering, School of Industrial and Information Engineering, Politecnico di Milano** (2 year degree)

Available at www.polimi.it

Available at https://www4.ceda.polimi.it/manifesti/manifesti/controller/ManifestoPublic.do?check_para ms=1&aa=2019&k_corso_la=473&lang=EN&polij_device_category=DESKTOP&__pj0=0&__pj1=ae2df38c00bb31965ea8e9f1b1f3990a

Teaching methodology includes theory, tutorials, labs.

Language: Italian (in all BSc degree programmes), English (in the MSc degree programme)

Bachelor project was not part of any BSc degree programme.

The profile of each programme follows (distribution of the course subjects).

BSc Automation and Control Engineering, School of Industrial and Information Engineering, Politecnico di Milano

Subject	Percentage of the total course modules
Mechanical Engineering	21.3
Electrical/Electronic Engineering	19.7
Computer Science/ ICT	12.5
Control Engineering	12.5
Fundamental subjects	34
Mechatronics	0

BSc Mechatronic Engineering, Department of Management and Engineering, Universita degli Studi di Padova

Subject	Percentage of the total course modules
Mechanical Engineering	29.8
Electrical/Electronic Engineering	16.8
Computer Science/ ICT	5
Control Engineering	11.2
Fundamental subjects	34
Mechatronics	3.2

BSc Automation Engineering, Department of Electrical Energy and Information Engineering "Guiglielmo Marconi", University of Bologna

Subject	Percentage of the total course modules
Mechanical Engineering	29.8
Electrical/Electronic Engineering	20
Computer Science/ ICT	5
Control Engineering	11.3
Fundamental subjects	33.9
Mechatronics	0

BSc Mechatronic Engineering, Department of Electrical Energy and Information Engineering "Guiglielmo Marconi", University of Bologna

Subject	Percentage of the total course modules
Mechanical Engineering	30.3
Electrical/Electronic Engineering	20.5
Computer Science/ ICT	14.8
Control Engineering	13.1
Fundamental subjects	21.3
Mechatronics	0

MSc Mechatronic Engineering (Control Technologies for Industries 4.0), Department of Electronics and Telecommunication Politecnico di Torino

Subject	Percentage of the total course modules	
	BSc in IT	**BSc in ME**
Mechanical Engineering	16,67	10
Electrical/Electronic Engineering	8,33	8.33
Computer Science/ ICT	10	10
Control Engineering	25	31.67
Mechatronics & Robotics	15	15
Fundamental subjects	0	0
Thesis	25	25

MSc Automation and Control Engineering, School of Industrial and Information Engineering, Politecnico di Milano

Subject	Percentage of the total course modules
Mechanical Engineering	25
Electrical/Electronic Engineering	8.33
Computer Science/ ICT	16.67
Control Engineering	29.17
Mechatronics &Robotics	4.17
Fundamental subjects	0
Thesis	16.67

List of good practice examples (representative exampes).

1	MSc Mechatronic Engineering (Control Technologies for Industries 4.0), Department of Electronics and Telecommunication, Politecnico di Torino The MSc degree programme has been adapted by TTPU

SWEDEN

A BSc degree ptogramme in Automation Engineering has been included.

The degree programme is listed below.

• **BSc Automation Engineering, University of Gävle** (3 year degree)

Available at www.hig.se

Teaching methodology included theory, tutorials, labs.

Language: Swedish.

Bachelor project was part of the programme.

The profile of the programme follows (distribution of the course subjects).

• **BSc Automation Engineering, University of Gävle**

Subject	**Percentage of the total course modules**
Mechanical Engineering	18.75
Electrical/Electronic Engineering	18.75
Computer Science/ ICT	12.5
Control Engineering	16.66
Fundamental subjects	25
Mechatronics	0
Thesis	8.33

List of good practice examples (representative examples).

1	Not available

SLOVAKIA

Two bachelor degree programmes have been included. One bachelor degree programme in Automotive Mechatronics is listed.

The degree programmes are listed below.

- **Bachelor Automotive Mechatronics, Faculty of Electrical Engineering and Information Technology, Slovak Technical University** (3year degree).

Available at www.stuba.sk

- **Bachelor Mechatronics, Faculty of Electrical Engineering and Information Technology, Slovak Technical University** (3 year degree)

Available at www.stuba.sk

NOT CONFIRMED https://www.stuba.sk/english-1/stu/ects-label/ects-information-package/information-on-degree-programmes/all-programmes.html?page_id=5552&f=0&le=0&l=all&c=0&pg=1&ad=true

Teaching methodology includes Lectures, tutorials, labs,internship.

Language: Slovak

Bachelor project was part of the programme in both degree programmes.

The profile of each programme follows (distribution of the course subjects).

BEng/MEng Automotive Mechatronics, Faculty of Electrical Engineering and Information Technology, Slovak Technical University

Subject	Percentage of the total course modules
Mechanical Engineering	11.67
Electrical/Electronic Engineering	20.81
Control systems	6.1
Computer Science/ ICT	9.14
Mechatronics	9.14
Fundamental subjects	22.84
Others(projects,languages,thesis,humanitarian subjects)	20.3

BEng/MEng Mechatronics in Technological equipment, Faculty of Electrical Engineering and Information Technology, Slovak Technical University (https://www.stuba.sk/english-

1/stu/ects-label/ects-information-package/information-on-degree-programmes/all-programmes.html?page_id=5552&f=0&le=0&l=all&c=0&pg=5&ad=true)

Subject	**Percentage of the total course modules**
Mechanical Engineering	41.15 (30)
Electrical/Electronic Engineering	2.7
Computer Science/ ICT	2.7 (25)
Mechatronics	5.7 (12.7)
Fundamental subjects	23.96 (12.2)
Others (Internship, thesis, humanitarian subjects)	23.79 (17.4)

List of good practice examples (representative exampes).

1	Not available

IRELAND

A BSc degree ptogramme in Robotics and Intelligent devices has been included.

The degree programme is listed below.

- **BSc Robotics and Intelligent devices, Department of Electronic Engineering, National University of Ireland Maynooth** (4 year degree)

Available at www.maynoothuniversity.ie

Teaching methodology included lectures,Tutorials,Labs, internship, thesis.

Language: English.

Bachelor project was part of the programme.

The profile of the programme follows (distribution of the course subjects).

- **BSc Robotics and Intelligent devices, Department of Electronic Engineering, National University of Ireland Maynooth**

Subject	Percentage of the total course modules
Mechanical Engineering	0
Electrical/Electronic Engineering	9.4
Computer Science/ ICT	42.75
Control Engineering	6.25
Mechatronics & Robotics	9.37
Fundamental subjects	11.5
Thesis,industrial work experience	20.8

List of good practice examples (representative examples).

1	Not available

SPAIN

Four bachelor and four master degree programmes have been included. Two bachelor degree programmes in Electronics, Robotics and Mechatronics Engineering, one bachelor degree programme in Mechatronics Engineering and one BSc degree programme in Mechatronics have been included. Three master degree programme in Mechatronics and one master degree programme in Robotics and Automation Engineering have been included.

The degree programmes are listed below.

• **Bachelor Mechatronics Engineering, Faculty of Science and Technology, Vic University** (4 year degree)

Available at https://www.uvic.cat/es/grado/ingenieria-mecatronica

• **Bachelor Mechatronics, La Almudia Polytechnic University School** (4 year degree)

Available at https://eupla.unizar.es/grado-en-ingenieria-mecatronica

• **Bachelor Electronics, Robotics and Mechatronics Engineering, Escuela de Ingenierías Industriales, Málaga University** (4 year degree)

Available at https://www.uma.es/grado-en-ingenieria-electronica-robotica-y-mecatronica

• **Bachelor Electronic, Robotics and Mechatronics Engineering, Escuela Tecnica Superior de Ingenierías, Sevilla University** (4 year degree)

Available at https://www.etsi.us.es/grado/GIERM

• **Master Robotics and Automation Engineering, Escuela Tecnica Superior de Ingenierías, Sevilla University** (2 year degree)

Available at https://www.etsi.us.es/master/miera

• **Master Mechatronics, University of Vigo** (2 year degree)

Available at http://mecatronica.uvigo.es/gl/

• **Master Mechatronics, Polytechnic University of Valencia** (2 year degree)

Available at http://www.upv.es/titulaciones/MUIMECA/indexc.html

• **Master Mechatronics Oviedo University (joint master degree with other universities of France, Russia, Netherlands, Germany and Egypt)** (2 year degree)

Available at http://www.uniovi.es/estudios/masteres/masteres/-/asset_publisher/d0m7JOOPYmoL/content/master-erasmus-mundus-en-ingenieria-mecatronica;jsessionid=C90C6C69F9D4F14DFB6F7D82C5C82609?p_p_auth=hnoGbB8Y&redirect=%2Festudios%2Fmasteres

Teaching methodology differs depending on the university and includes

• Work in small groups using methodologies innovative teachers: project-based learning. Compulsory internships in companies and institutions to gain professional curricular experience, possibility of taking a training program based in job scholarships (Vic University).

Flexibility to be part of studies and internships a abroad through mobility programs in European, American or Asian universities, companies and research centers.

• Classic methodology.

• Classic methodology with bachelor project and optional external intership (La Almudia Polytechnic University).

• Classic methodology with bachelor project (Málaga University).

• Classic methodology with bachelor project (Sevilla University).

• Classic methodology (in the master degree programmes).

Language: Spanish.

Bachelor project was part of the bachelor degree programmes.

The profile of each programme follows (distribution of the course subjects).

Bachelor Mechatronics Engineering, Faculty of Science and Technology, Vic University

Subject	**Percentage of the total course modules**
Mechanical Engineering	15%
Electrical/Electronic Engineering	33%
Computer Science/ ICT	13%
Mechatronics	23%
Fundamental subjects	18%

Bachelor Mechatronics, La Almudia Polytechnic University School

Subject	Percentage of the total course modules
Mechanical Engineering	20%
Electrical/Electronic Engineering	23%
Computer Science/ ICT	10%
Mechatronics	18%
Fundamental subjects	30%

Bachelor Electronics, Robotics and Mechatronics Engineering, Escuela de Ingenierías Industriales, Málaga University

Subject	Percentage of the total course modules
Mechanical Engineering	8%
Electrical/Electronic Engineering	32%
Computer Science/ ICT	10%
Mechatronics	25%
Fundamental subjects	25%

Bachelor Electronic, Robotics and Mechatronics Engineering, Escuela Tecnica Superior de Ingenierías, Sevilla University

Subject	Percentage of the total course modules
Mechanical Engineering	12%
Electrical/Electronic Engineering	45%
Computer Science/ ICT	14%
Mechatronics	5%
Fundamental subjects	25%

Master Robotics and Automation Engineering, Escuela Tecnica Superior de Ingenierías, Sevilla University

Subject	Percentage of the total course modules
Mechanical Engineering	Not specified
Electrical/Electronic Engineering	Not specified
Computer Science/ ICT	Not specified
Mechatronics	Not specified
Fundamental subjects	Not specified

Master Mechatronics, University of Vigo

Subject	Percentage of the total course modules
Mechanical Engineering	Not specified
Electrical/Electronic Engineering	Not specified

Computer Science/ ICT	Not specified
Mechatronics	Not specified
Fundamental subjects	Not specified

Master Mechatronics, Polytechnic University of Valencia

Subject	Percentage of the total course modules
Mechanical Engineering	Not specified
Electrical/Electronic Engineering	Not specified
Computer Science/ ICT	Not specified
Mechatronics	Not specified
Fundamental subjects	Not specified

Master Mechatronics Oviedo University (joint master degree with other universities of France, Russia, Netherlands, Germany and Egypt)

Subject	Percentage of the total course modules
Mechanical Engineering	Not specified
Electrical/Electronic Engineering	Not specified
Computer Science/ ICT	Not specified
Mechatronics	Not specified
Fundamental subjects	Not specified

List of good practice examples (representative exampes).

1	Bachelor Mechatronics Engineering, Faculty of Science and Technology, Vic University Mechatronics include projects and external internship. It is the first degree in Mechatronic Engineering that is taught in the Spanish university framework; 10 years of experience
2	Bachelor Mechatronics, La Almudia Polytechnic University School Mechatronics include projects and manufacturing engineering.
3	Master Mechatronics Oviedo University (joint master degree with other universities of France, Russia, Netherlands, Germany and Egypt) The Joint Master Degree in Mechatronic Engineering, EU4M, welcomes all prospective students interested in becoming professionally qualified to work in the field of Mechatronics and Micro-mechatronics. If you want to be able to work in interdisciplinary and international teams to solve complex mechatronic tasks, if you want to attain the ability to adapt quickly and be flexible in dealing with a variety of tasks and problems from different fields, if you'd like to have a qualification in intercultural communication and to be able to communicate easily in different languages with people from different countries, then JMD EU4M is your master. Join us! All students joining EU4M are requested to sign a Student's Agreement stating all the conditions and regulations accepted when registering for this Master Programme.

	Topics such as tuition fees, study paths, examination rules or permanence requirements among others can be found in this document. http://www.eu4m.eu/ http://www.eu4m.eu/inicio;jsessionid=22C20576A6B16CC9771A21B2755FC3DF

FRANCE

Four bachelor and three master degree programmes have been included. Four bachelor degree programmes in Mechatronics Engineering have been included. One master degree programme in Advanced Mechatronics, a master degree programme in Control for Green Mechatronics and a master degree programme in Mechatronic systems and advanced mechanics have been included.

The degree programmes are listed below.

• **Bachelor Mechatronics Engineering, National Institute of Applied Sciences** (5 year degree) (22 ECTS on 5th year)

Available at http://www.insa-strasbourg.fr/fr/mecatronique/

• **Bachelor Mechatronics Engineer, EIGSI general engineering school in La Rochelle** (5 year degree) (300 ECTS)

Available at https://www.eigsi.fr/formation/ingenieur-mecatronique/

• **Bachelor Mechatronics Engineering, ISTY - INSTITUT DES SCIENCES ET TECHNIQUES DES YVELINES** (3 year degree)

Available at http://www.isty.uvsq.fr/cycle-ingenieur-mecatronique/

• **Bachelor Mechatronics Engineer, Ecole nationale superieure des mines d'Ales (**3 year degree) (300 ECTS)

Available at https://www.eigsi.fr/formation/ingenieur-mecatronique/

• **Master in Advanced Mechatronics, Université Savoie-Mont Blanc (**2 year degree)

Available at http://formations.univ-smb.fr/fr/catalogue/master-XB/sciences-technologies-sante-STS/master-ingenierie-des-systemes-complexes-m1-m2-program-master-ingenierie-des-systemes-complexes-2/m1-m2-advanced-mechatronics-subprogram-advanced-mechatronics.html

• **MSc in Control for Green Mechatronics, University Bourgogne Franche-Comté (UBFC) (**2 year degree)

Available at https://www.ubfc.fr/master-greem/

• **MSc in Mechatronic systems and advanced mechanics, Université de Technologie Compiègne** (UTC) **(**2 year degree)

Available at https://www.utc.fr/formations/diplome-de-master/mention-ingenierie-des-systemes-complexes-isc/parcours-systemes-mecatroniques-smt.html

Teaching methodology differs depending on the university and includes

At the end of the 1st year: a compulsory internship to discover the company (minimum 4 weeks);

At the end of 3rd and 4th year: a compulsory internship in business application (4 weeks minimum);

During the 9th semester: a technological research project (PRT);

In the 5th year, the end of studies project is an in-depth study making an original contribution to the development of techniques in fields related to mechatronics (National Institute of Applied Sciences).

- Learning by training (EIGSI general engineering school in La Rochelle).
- Requires 2 years course in general engineering.

Mixed course: 40% in school and 60% in industrial company (ISTY - INSTITUT DES SCIENCES ET TECHNIQUES DES YVELINES)

- Requires 2 years course in general engineering.

Mixed course: 40% in school and 60% in industrial company (Ecole nationale superieure des mines d'Ales).

- 4 semesters (30 ECTS/semester) based on blended learning allowing the customization of the student cursus according to his/her background, his/her research project and his/her professional project (in Master in Advanced Mechatronics, Université Savoie-Mont Blanc).
- Classical methodology (in MSc in Control for Green Mechatronics, University Bourgogne Franche-Comté).
- Classical methodology (in MSc in Mechatronic systems and advanced mechanics, Université de Technologie Compiègne).

Language: French, French and English (only semester 7) (in EIGSI general engineering school in La Rochelle); French and English (in master degree programmes).

Bachelor project was part of the bachelor degree programmes.

The profile of each programme follows (distribution of the course subjects).

Bachelor Mechatronics Engineering, National Institute of Applied Sciences

Subject	Percentage of the total course modules
Mechanical Engineering	19%
Electrical/Electronic Engineering	15%
Computer Science/ ICT	0%
Mechatronics	22%
Fundamental subjects	45%

Bachelor Mechatronics Engineer, EIGSI general engineering school in La Rochelle

Subject	Percentage of the total course modules
Mechanical Engineering	9%
Electrical/Electronic Engineering	9%
Computer Science/ ICT	7%
Mechatronics	25%
Fundamental subjects	51%

Bachelor Mechatronics Engineering, ISTY - INSTITUT DES SCIENCES ET TECHNIQUES DES YVELINES

Subject	Percentage of the total course modules
Mechanical Engineering	Not specified
Electrical/Electronic Engineering	Not specified
Computer Science/ ICT	Not specified
Mechatronics	Not specified
Fundamental subjects	Not specified

Bachelor Mechatronics Engineer, Ecole nationale superieure des mines d'Ales

Subject	Percentage of the total course modules
Mechanical Engineering	14% (248h)
Electrical/Electronic Engineering	11% (201h)
Computer Science/ ICT	6% (100h)
Mechatronics	49% (882h)
Fundamental subjects	21% (369h)

Master in Advanced Mechatronics, Université Savoie-Mont Blanc

Subject	Percentage of the total course modules
Mechanical Engineering	Not specified

Electrical/Electronic Engineering	Not specified
Computer Science/ ICT	Not specified
Mechatronics	Not specified
Fundamental subjects	Not specified

MSc in Control for Green Mechatronics, University Bourgogne Franche-Comté

Subject	**Percentage of the total course modules**
Mechanical Engineering	Not specified
Electrical/Electronic Engineering	Not specified
Computer Science/ ICT	Not specified
Mechatronics	Not specified
Fundamental subjects	Not specified

MSc in Mechatronic systems and advanced mechanics, Université de Technologie Compiègne

Subject	**Percentage of the total course modules**
Mechanical Engineering	Not specified
Electrical/Electronic Engineering	Not specified
Computer Science/ ICT	Not specified
Mechatronics	Not specified
Fundamental subjects	Not specified

List of good practice examples (representative exampes).

1	Bachelor Mechatronics Engineering, National Institute of Applied Sciences Bachelor project: From the 2nd year, students design and manufacture small robots (mechanical, electronic and programming). From the 3rd year to the 5th year, they develop larger projects as a group (drones, Segways, electric vehicles, etc.). The project makes it possible to apply skills associated with the knowledge seen in scientific and technical teaching, but also to apply techniques of project management and teamwork. INSA Strasbourg is historically the first French establishment to graduate students in mechatronics (1994).

PORTUGAL

Two bachelor and one master degree programmes have been included. Two bachelor degree programmes in Mechatronics Engineering have been included. One master degree programme in Mechatronics Engineering has been included.

The degree programmes are listed below.

• **Bachelor Mechatronics Engineering, Polytechnic Institute of Viana do Castelo** (3 year degree)

Available at http://www.ipvc.pt/engenharia-mecatronica

• **Bachelor Mechatronics Engineering, University of Évora** (3 year degree)

Available at https://www.ect.uevora.pt/ensino/licenciaturas/curso/(codigo)/156

• **Master Mechatronics Engineering, University of Minho** (3 year degree)

Available at https://www.uminho.pt/_layouts/15/uminho.portalum.ui/pages/catalogocursodetail.aspx?cid=2604011&catid=6

Teaching methodology differs depending on the university and includes

• Classic methodology with bachelor project and external intership (IPVC)

• Classic methodology with short bachelor project (University of Évora).

• Classical methodology: 1 year classes and 1 year for dissertation (master degree programme)

Language: Portuguese

French and English (in master degree programmes).

Bachelor project was part of the bachelor degree programmes.

The profile of each programme follows (distribution of the course subjects).

Bachelor Mechatronics Engineering, Polytechnic Institute of Viana do Castelo

Subject	**Percentage of the total course modules**
Mechanical Engineering	17%

Electrical/Electronic Engineering	32%
Computer Science/ ICT	19%
Mechatronics	17%
Fundamental subjects	14%

Bachelor Mechatronics Engineering, University of Évora

Subject	Percentage of the total course modules
Mechanical Engineering	20%
Electrical/Electronic Engineering	30%
Computer Science/ ICT	10%
Mechatronics	8%
Fundamental subjects	32%

Master Mechatronics Engineering, University of Minho

Subject	Percentage of the total course modules
Mechanical Engineering	Not specified
Electrical/Electronic Engineering	Not specified
Computer Science/ ICT	Not specified
Mechatronics	Not specified
Fundamental subjects	Not specified

List of good practice examples (representative exampes).

1	Bachelor Mechatronics Engineering, Polytechnic Institute of Viana do Castelo Mechatronics include projects, external internship and industrial management.

ESTONIA

One bachelor and one master degree programmes have been included. One bachelor degree programme in Integrated Engineering and one master degree programme in Mechatronics have been included.

The degree programmes are listed below.

• **Bachelor Integrated Engineering, School of Engineering, Tallinn University of Technology** (3 year degree)

Available at https://old.taltech.ee/en?id=162866&op=_print#specialty-4

• **Master degree Mechatronics, School of Engineering, TTK University of Applied Sciences** (2 year degree)

Available at https://old.taltech.ee/faculties/school-of-engineering/admission-87/masters-programmes-3/mechatronics-msc-2/

Teaching methodology:

Most of the courses are project based supported by theoretical materials. There are several Practical Project courses on the first year containing the topics of machine control, autonomous and industrial robotics and mechatronics and sensoric systems aimed to work with some real industrial applications by student groups ending with presenting a conference paper as a rule. Examples of this kind projects are "Smart control of collaborative robots", "3D vision serving for robots" and "UAV and UGV control simulation and hardware systems", etc. (TTK University of Applied Sciences)

Language: English (TTK University of Applied Sciences).

Bachelor project was part of the bachelor degree programme.

The profile of each programme follows (distribution of the course subjects).

Bachelor Integrated Engineering, Tallinn University of Technology

Subject	Percentage of the total course modules
Mechanical Engineering	10%
Electrical/Electronic Engineering	17%
Computer Science/ ICT	13%
Mechatronics	23%

Fundamental subjects	33%

Master degree, TTK University of Applied Sciences.

Subject	**Percentage of the total course modules**
General Studies	10
Mechanical Engineering	-
Electrical/Electronic Engineering	-
Computer Science/ ICT	20
Mechatronics	40
Fundamental subjects	30

List of good practice examples (representative exampes).

1	Bachelor Integrated Engineering, School of Engineering, Tallinn University of Technology In study program are connected different fields, such as IT, business and process management, design and product development, mechatronics and the digitalisation of production. High-quality laboratories for this: laboratories for 3D printing, mechatronics, wood, metal, electronics, logistics, mobile services and media, virtual and augmented reality, etc.

NETHERLANDS

One bachelor degree in Mechatronics has been included.

The degree programmes are listed below.

• **Bachelor Mechatronics, Fontys University of Applied Sciences** (3 year degree)

Available at https://fontys.edu/Bachelors-masters/Bachelors/Mechatronics-3/Programme.htm

Teaching methodology:

The program concentrates on a strong collaboration with many companies in the international high tech Brainport region.

Language: English.

Bachelor project was part of the bachelor degree programme.

The profile of each programme follows (distribution of the course subjects).

Bachelor Mechatronics, Fontys University of Applied Sciences.

Subject	**Percentage of the total course modules**
Mechanical Engineering	20
Electrical/Electronic Engineering	20
Computer Science/ ICT	20
Mechatronics	20
Fundamental subjects	20

List of good practice examples (representative examples).

1	N/A

LATVIA

Four bachelor degree programmes have been included. Two bachelor degree programmes in Mechatronics, one bachelor degree programmes in Mechatronics Engineering and one bachelor degree programme in Mechanics and metalworking, heat energy, heat engineering and mechanical engineering have been included.

The degree programmes are listed below.

• **Professional bachelor Mechatronics, Faculty of Science and Engineering, Liepaja University** (4 year degree)

Available at liepu.lv

• **Professional bachelor Mechanics and metalworking, heat energy, heat engineering and mechanical engineering, Faculty of Engineering, Rezekne Academy of Technologies** (5 year degree) (ECTS 270)

Available at ru.lv

• **Professional bachelor Mechatronics, Faculty of Engineering, Vidzeme University of Applied Sciences** (4 year degree)

Available at www.va.lv

• **Professional bachelor Mechatronics Engineering, Faculty of Mechanical Engineering, Riga Technical University** (3 year degree)

Available at rtu.lv

Teaching methodology differs depending on the university and includes

• Dual studies - study time in lectures is combined with work in a branch company. Studies at the University include the acquisition of theory, laboratory work, seminars, project work. Students do internships in a company (Liepaja University).

• The study programme provides deep understanding of Fundamentals of Mechanics. Moreover it places a strong emphasis on analytical engineering science and technicals fundamentals. Acquired skills of theoretical calculations and computer and computer applications help to solve problems in mechanics and lab experiments creating a solid basis for a futher career in industry or further studies in a master programme (Riga Technical University).

Language: Latvian; Latvian/English (Rezekne Academy of Technologies, Riga Technical University).

Bachelor project was part of the bachelor degree programmes.

The profile of each programme follows (distribution of the course subjects).

Professional bachelor Mechatronics, Faculty of Science and Engineering, Liepaja University.

Subject	
Mechanical Engineering	10%
Electrical/Electronic Engineering	15%
Computer Science/ ICT	15%
Mechatronics	20%
Fundamental subjects	24%

Professional bachelor Mechanics and metalworking, heat energy, heat engineering and mechanical engineering, Faculty of Engineering, Rezekne Academy of Technologies

Subject	
Mechanical Engineering	15
Electrical/Electronic Engineering	10
Computer Science/ ICT	15
Mechatronics	22
Fundamental subjects	18
Internships	20

Professional bachelor Mechatronics, Faculty of Engineering, Vidzeme University of Applied Sciences

Subject	Percentage of the total course modules
Mechanical Engineering	6%
Electrical/Electronic Engineering	32%
Computer Science/ ICT	6%
Mechatronics	32%
Fundamental subjects	13.50%

Professional bachelor Mechatronics Engineering, Faculty of Mechanical Engineering, Riga Technical University

Subject	Percentage of the total course modules

Mechanical Engineering	25%
Electrical/Electronic Engineering	12%
Computer Science/ ICT	12.5%
Mechatronics	15%
Fundamental subjects	34%

List of good practice examples (representative exampes).

1	Professional bachelor Mechatronics, Faculty of Science and Engineering, Liepaja University. Dual studies - study time in lectures is combined with work in a branch company. Studies at the University include the acquisition of theory, laboratory work, seminars, project work. Students do internships in a company. https://www.liepu.lv/en/120/faculty-of-science-and-engineering
2.	• Professional bachelor Mechatronics, Faculty of Engineering, Vidzeme University of Applied Sciences (4 year degree)
2	Professional bachelor Mechatronics Engineering, Faculty of Mechanical Engineering, Riga Technical University. The study programme provides deep understanding of Fundamentals of Mechanics. Moreover, it places a strong emphasis on analytical engineering science and technicals fundamentals. Acquired skills of theoretical calculations and computer and computer applications help to solve problems in mechanics and lab experiments creating a solid basis for a further career in industry or further studies in a master programme. Graduates can pursue a mechanical engineer career in both local and international projects as well as in various companies – automobile, shipyards, railway transport, etc., where there is a requirement for expertise in combustion, noise and vibration process control, robotics, quality management, biological engineering, space research, liquid mechanics, water supply, planning machine and mechanism maintenance, consumer goods design, pollution control and mechanical synthesis of new materials. In addition, designers and mechanical engineers can work in companies involved in packaging industry, automation of industrial processes. There are graduates who pursue their career as experts in insurance companies and municipal enterprises.

GERMANY

Three bachelor degree programmes have been included. One bachelor degree programme in Mechatronics, one bachelor degree programmes in Mechatronics Engineering and one bachelor degree programme in Smart Technologies have been included.

The degree programmes are listed below.

• **Bachelor Mechatronics, Faculty of Engineering, Darmstadt TU** (3 year degree)

Available at www.tu-darmstadt.de

• **Bachelor of Science Mechatronics Engineering, German International University** (3 year degree)

Available at http://www.giu-berlin.de/

Teaching methodology differs depending on the university and includes

• The Bachelor program in Mechatronics and even more the Master program have a strong research orientation and are carried by high-research institutions. Teaching methodology include theory, lab sessions, development of projects, connection with industry, seminars (Darmstadt TU).

Language: German.

Bachelor project was part of the bachelor degree programmes.

The profile of each programme follows (distribution of the course subjects).

Bachelor Mechatronics, Faculty of Engineering, Darmstadt TU.

Subject	
Mechanical Engineering	12%
Electrical/Electronic Engineering	28%
Computer Science/ ICT	13%
Mechatronics	16%
Fundamental subjects	31%
Internships	Dual studies - internship is integrated in the study process and is not separated.

Bachelor of Science in Mechatronics Engineering, German International University

Subject	**Percentage of the total course modules**
Mechanical Engineering	12.5%
Electrical/Electronic Engineering	5.8%
Computer Science/ ICT	4.1%
Mechatronics	10.8%
Fundamental subjects	35%

List of good practice examples (representative exampes).

1	N/A

POLAND

Three bachelor degree programmes have been included. One bachelor degree programme in Mechatronics, one bachelor degree programmes in Mechatronics Engineering and one bachelor degree programme in Smart Technologies have been included.

The degree programmes are listed below.

• **Bachelor Mechatronics Engineering, Department of Robotics and Mechatronics, AGH University of Science and Technology** (3.5 year degree) (210 ECTS)

Available at https://www.agh.edu.pl/en

• **Bachelor Mechatronics, Faculty of Mechatronics, Warshaw University Of Technology** (3 year degree)

Available at https://www.pw.edu.pl/

• **Bachelor Mechatronics, Department of Mechanical Engineering, Gdansk University of Technology** (3 year degree)

Available https://pg.edu.pl/

• **Master of Science Mechatronics, Department of Mechatronic Construction, Poznan University of Technology** (1.5 year degree) (90 ECTS)

Available https://www.put.poznan.pl/

Teaching methodology differs depending on the university and includes

• Theory, lab sessions, practice, projects, seminars, industry Apprenticeship (AGH University of Science and Technology).

Language: Polish (Warshaw University Of Technology**);** Polish and English (AGH University of Science and Technology); English (Poznan University of Technology, Gdansk University of Technology).

Bachelor project was part of the bachelor degree programmes.

The profile of each programme follows (distribution of the course subjects).

• **Bachelor Mechatronics Engineering, Department of Robotics and Mechatronics, AGH University of Science and Technology.**

Subject	Percentage of the total course modules
Mechanical Engineering	17%
Electrical/Electronic Engineering	12%
Computer Science/ ICT	12%
Mechatronics	17%
Fundamental subjects	23%

Bachelor Mechatronics, Faculty of Mechatronics, Warshaw University Of Technology

Subject	Percentage of the total course modules
Mechanical Engineering	15%
Electrical/Electronic Engineering	12%
Computer Science/ ICT	12%
Mechatronics	13%
Fundamental subjects	32%

Bachelor Mechatronics, Department of Mechanical Engineering, Gdansk University of Technology

Subject	Percentage of the total course modules
Mechanical Engineering	25%
Electrical/Electronic Engineering	22%
Computer Science/ ICT	10%
Mechatronics	10%
Fundamental subjects	35%

Master of Science Mechatronics, Department of Mechatronic Construction, Poznan University of Technology

Subject	Percentage of the total course modules
Mechanical Engineering	7%
Electrical/Electronic Engineering	5%
Computer Science/ ICT	6%
Mechatronics	10%
Fundamental subjects	14%

List of good practice examples (representative exampes).

1	Bachelor Mechatronics Engineering, Department of Robotics and Mechatronics, AGH University of Science and Technology. Collaboration with industry (required):

	• 4-week professional apprenticeship • University-Industry Internship: Graduation Project Faculty students obtain grants and can study in Germany, France and Great Britain, which results in obtaining a double diploma - one of AGH- UST, and one of the foreign University. A wide scope of studues enables faculty graduates to work in any industrial branch in Poland.

CYPRUS

Two bachelor degree programmes and two master degree programme have been included. One bachelor degree programme in Automotive Engineering and one bachelor degree programmes in Mechanical and Manufacturing Engineering have been included. One master degree programme in Manufacturing and Welding Engineering Design and one in Mechanical and Manufacturing Engineering have been included.

The degree programmes are listed below.

• **Bachelor of Science Automotive Engineering, Department of Mechanical Engineering, Frederick University** (4 year degree)

Available at http://www.frederick.ac.cy/bsc-in-automotive-engineering-program-profile

• **Bachelor of Science Mechanical and Manufacturing Engineering, Department of Mechanical and Manufacturing Engineering, University of Cyprus** (4 year degree)

Available at http://www.ucy.ac.cy/mme/en/undergraduate/general-information

• **Master of Science Mechanical and Manufacturing Engineering, Department of Mechanical and Manufacturing Engineering, University of Cyprus** (1.5 year degree)

Available at http://www.ucy.ac.cy/mme/en/postgraduate/postgraduate-degrees/master-m-sc-in-mechanical-and-manufacturing-engineering

• **Master of Science Manufacturing and Welding Engineering Design, Department of Mechanical Engineering, Frederick University** (1.5 year degree)

Available at http://www.frederick.ac.cy/msc-manufacturing-and-welding-engineering-design-program-profile

Teaching methodology differs depending on the university and includes

• The Program constitutes a balance between the academic and the practical directions.

(Frederick University).

• The educational system in the Department is designed to not only provide high quality education to the students in their selected areas of study, but to also create entrepreneurial students who will be confident to promote innovative ideas for the purpose of generating a new high-technology based industry in Cyprus (University of Cyprus).

Language: Greek (University of Cyprus), English (Frederick University).

Bachelor project was part of the bachelor degree programmes.

The profile of each programme follows (distribution of the course subjects).

Bachelor of Science Automotive Engineering, Department of Mechanical Engineering, Frederick University.

Subject	
Mechanical Engineering	50%
Electrical/Electronic Engineering	9,1%
Computer Science/ ICT	15,9%
Mechatronics	6,8%
Fundamental subjects	18,2%

Bachelor of Science Mechanical and Manufacturing Engineering, Department of Mechanical and Manufacturing Engineering, University of Cyprus

Subject	Percentage of the total course modules
Mechanical Engineering	56.8%
Electrical/Electronic Engineering	2.3%
Computer Science/ ICT	6.8%
Mechatronics	9.1%
Fundamental subjects	25%

Master of Science Mechanical and Manufacturing Engineering, Department of Mechanical and Manufacturing Engineering, University of Cyprus

Subject	Percentage of the total course modules
Mechanical Engineering	
Electrical/Electronic Engineering	
Computer Science/ ICT	
Mechatronics	
Fundamental subjects	

Master of Science Manufacturing and Welding Engineering Design, Department of Mechanical Engineering, Frederick University

Subject	Percentage of the total course modules
Mechanical Engineering	
Electrical/Electronic Engineering	
Computer Science/ ICT	

Mechatronics	
Fundamental subjects	

List of good practice examples (representative exampes).

1	N/A

MALTA

One bachelor degree programme and one master degree programme have been included. One bachelor degree programme in Mechanical Engineering (Manufacturing) one master degree programme in Mechatronics have been included.

The degree programmes are listed below.

- **Bachelor of Engineering (Hons) Mechanical Engineering (Manufacturing), Institute of Engineering and Transport – Mechanical Engineering, Malta College of Arts, Science & Technolog**y (4 year degree)

Available at https://www.mcast.edu.mt/courses/me6-02-19/

- **Master of Science Mechatronics, Institute of Engineering and Transport – Mechanical Engineering, Malta College of Arts, Science & Technolog**y (1.5 year degree)

Available at https://www.mcast.edu.mt/courses/uc7-e12-18/

Language: Malti.

Bachelor project was part of the bachelor degree programme.

The profile of each programme follows (distribution of the course subjects).

Bachelor of Engineering (Hons) Mechanical Engineering (Manufacturing), Malta College of Arts, Science & Technology.

Subject	
Mechanical Engineering	39.5%
Electrical/Electronic Engineering	4.7%
Computer Science/ ICT	14%
Mechatronics	7%
Fundamental subjects	20.9%

Master of Science Mechatronics, Malta College of Arts, Science & Technology.

Subject	
Mechanical Engineering	
Electrical/Electronic Engineering	
Computer Science/ ICT	
Mechatronics	
Fundamental subjects	

List of good practice examples (representative exampes).

1	N/A

AUSTRIA

Two bachelor degree programmes and two master degree programme have been included. One bachelor degree programme in Mechatronics and one bachelor degree programmes in Mechatronics and Business Management have been included. One master degree programme in Mechatronics and one in Mechatronics and Business Management have been included.

The degree programmes are listed below.

• **Bachelor of Science in Engineering (Hons) Mechatronics and Business Management, School of Engineering, University of Applied Sciences Upper Austria** (3 year degree)

Available at https://www.fh-ooe.at/campus-wels/studiengaenge/bachelor/mechatronikwirtschaft/

• **Bachelor of Science Mechatronics, Department of Mechatronics, University of Innsbruck - Joint Study Programme of the University of Innsbruck and the Private University for Health Sciences, Medical Informatics and Technology (UMIT TIROL)** (3 year degree)

Available https://www.uibk.ac.at/studium/angebot/ba-mechatronik.html.en

• **Diplom-Ingenieur/Diplom-Ingenieurin für technisch-wissenschaftliche Berufe (DI oder Dipl.-Ing. Mechatronics and Business Management, School of Engineering, University of Applied Sciences Upper Austria** (2 year degree, part-time)

Available at https://www.fh-ooe.at/en/wels-campus/studiengaenge/master/mechatronics-and-business-management/

• **Master (Diplom-Ingenieurin/Diplom-Ingenieur (Dipl.-Ing. or DI Mechatronics, Department of Mechatronics, University of Innsbruck - Joint Study Programme of the University of Innsbruck and the Private University for Health Sciences, Medical Informatics and Technology (UMIT TIROL)** (2year degree)

Available at http://www.frederick.ac.cy/msc-manufacturing-and-welding-engineering-design-program-profile

Teaching methodology differs depending on the university and includes

• (1) Courses without continuous performance assessment: Lectures (VO) are courses held in lecture format. (2) Courses with continuous performance assessment: 1. Practical courses (UE), 2. Seminars (SE), 3. Lectures with practical elements (VU), 4. Practical training courses (PR) (University of Innsbruck - Joint Study Programme of the University of Innsbruck and the Private University for Health Sciences, Medical Informatics and Technology (UMIT TIROL)).

Language: German.

Bachelor project was part of the bachelor degree programmes.

The profile of each programme follows (distribution of the course subjects).

Bachelor of Science in Engineering (Hons) Mechatronics and Business Management, University of Applied Sciences Upper Austria.

Subject	
Mechanical Engineering	
Electrical/Electronic Engineering	
Computer Science/ ICT	
Mechatronics	
Fundamental subjects	

Bachelor of Science Mechatronics, University of Innsbruck - Joint Study Programme of the University of Innsbruck and the Private University for Health Sciences, Medical Informatics and Technology (UMIT TIROL).

Subject	**Percentage of the total course modules**
Mechanical Engineering	29.6%
Electrical/Electronic Engineering	14.8%
Computer Science/ ICT	18.5%
Mechatronics	18.5%
Fundamental subjects	14.8%

Diplom-Ingenieur/Diplom-Ingenieurin für technisch-wissenschaftliche Berufe (DI oder Dipl.-Ing. Mechatronics and Business Management, University of Applied Sciences Upper Austria.

Subject	**Percentage of the total course modules**
Mechanical Engineering	
Electrical/Electronic Engineering	
Computer Science/ ICT	
Mechatronics	
Fundamental subjects	

Master (Diplom-Ingenieurin/Diplom-Ingenieur (Dipl.-Ing. or DI Mechatronics, University of Innsbruck - Joint Study Programme of the University of Innsbruck and the Private University for Health Sciences, Medical Informatics and Technology (UMIT TIROL)

Subject	**Percentage of the total course modules**
Mechanical Engineering	
Electrical/Electronic Engineering	

Computer Science/ ICT	
Mechatronics	
Fundamental subjects	

List of good practice examples (representative exampes).

1	N/A

GREECE

Two bachelor degree programmes and five master degree programme have been included. One bachelor degree programme in Production and Management Engineering and one bachelor degree programmes in Industrial Engineering and Management have been included. One master degree programme in Mechatronics, one in Automation Systems, one in Advanced Manufacturing Systems, Automation and Robotics, one in Industrial Automation and one in Strategic Product design have been included.

The degree programmes are listed below.

- **Bachelor of Engineering Production Engineering and Management, Department of Production Engineering and Management, Democritus University of Thrace** (5 year degree)

Available at https://pme.duth.gr/en/the-department/

- **Bachelor of Science Industrial Engineering and Management , Department of Industrial Engineering and Management, International Hellenic University** (5 year degree)

Available at http://www.iem.ihu.gr/

- **Master of Science. Mechatronics, Department of Electrical and Computer Engineering, University of Western Macedonia** (1.5 year degree)

Available at https://mechatronics.uowm.gr/index.php?lang=en

- **Master of Science, Strategic Product Design, Department of Science and Technology, International Hellenic University** (1.5 year degree)

Available at https://www.ihu.gr/ucips/postgraduate-programmes/spd

- **Master of Science Automation Systems, Interdepartmental programme, National Technical University of Athens** (1.5 year degree)

Available at http://dpms-as.mech.ntua.gr/

- **Master of Science Industrial Automation, Department of Industrial and Product Design Engineering, University of West Attica** (1.5 year degree)

Available at http://mscinautomation.uniwa.gr/

• **Master of Science Advanced Manufacturing Systems, Automation and Robotics, Department of Mechanical Engineering and Department of Electrical and Computer Engineering, Hellenic Mediterranean University** (1.5 year degree)

Available at hhttps://www.hmu.gr/amsar/el?language=el

Teaching methodology

• Classic methodology.

Language: Greek.

Bachelor project was part of the bachelor degree programmes.

The profile of each programme follows (distribution of the course subjects).

Bachelor of Engineering Production Engineering and Management, Democritus University of Thrace.

Subject	
Mechanical Engineering	30,2%
Electrical/Electronic Engineering	7,5%
Computer Science/ ICT	9,4%
Mechatronics	1,9%
Fundamental subjects	18,9%

Bachelor of Science Industrial Engineering and Management, International Hellenic University.

Subject	**Percentage of the total course modules**
Mechanical Engineering	31,7%
Electrical/Electronic Engineering	23,8%
Computer Science/ ICT	17,5%
Mechatronics	1,6%
Fundamental subjects	15,9%

Master of Science. Mechatronics, University of Western Macedonia.

Subject	Percentage of the total course modules
Mechanical Engineering	
Electrical/Electronic Engineering	
Computer Science/ ICT	
Mechatronics	
Fundamental subjects	

Master of Science, Strategic Product Design, International Hellenic University.

Subject	Percentage of the total course modules
Mechanical Engineering	
Electrical/Electronic Engineering	
Computer Science/ ICT	
Mechatronics	
Fundamental subjects	

Master of Science Automation Systems, Interdepartmental programme, National Technical University of Athens.

Subject	Percentage of the total course modules
Mechanical Engineering	
Electrical/Electronic Engineering	
Computer Science/ ICT	
Mechatronics	
Fundamental subjects	

Master of Science Industrial Automation, Department of Industrial and Product Design Engineering, University of West Attica.

Subject	Percentage of the total course modules
Mechanical Engineering	
Electrical/Electronic Engineering	
Computer Science/ ICT	
Mechatronics	
Fundamental subjects	

Master of Science Advanced Manufacturing Systems, Automation and Robotics, Hellenic Mediterranean University

Subject	Percentage of the total course modules
Mechanical Engineering	
Electrical/Electronic Engineering	
Computer Science/ ICT	
Mechatronics	
Fundamental subjects	

List of good practice examples (representative exampes).

1	Master of Science, Strategic Product Design, International Hellenic University.
2	Bachelor of Science Industrial Engineering and Management, International Hellenic University.

CZECH REPUBLIC

One bachelor degree programme in Mechatronics has been included.

The degree programmes are listed below.

- **Bachelor degree Mechatronics Engineering, University of South Bohemia in České Budějovice** (4 year degree)

Available at www.jcu.cz

Teaching methodology

- Lecture, seminar: 39%; Practice: 61%.

Language: Czech.

Bachelor project was part of the bachelor degree programme.

The profile of each programme follows (distribution of the course subjects).

Bachelor degree Mechatronics Engineering, University of South Bohemia in České Budějovice

Subject	
Mechanical Engineering	
Electrical/Electronic Engineering	
Computer Science/ ICT	
Mechatronics	
Fundamental subjects	

List of good practice examples (representative exampes).

1	N/A
2	

HUNGARY

Two bachelor degree programmes have been included. Two bachelor degree programme in Mechatronics Engineering have been included.

The degree programmes are listed below.

• **Bachelor of Science Mechatronics Engineering, Faculty of Engineering, University of Debrecen** (3.5 year degree)

Available at https://www.edu.unideb.hu/page.php?id=65

• **Bachelor degree Mechatronics Engineering, Department of Bánki Donát Faculty of Mechanical and Safety Engineering, Óbuda University** (3.5 year degree)

Available at http://international.uni-obuda.hu/mechatronics-engineering

Teaching methodology

• Lecture, seminar: 39%; Practice: 61%.

Language: English.

Bachelor project was part of the bachelor degree programmes.

The profile of each programme follows (distribution of the course subjects).

Bachelor degree Mechatronics Engineering, Faculty of Engineering, University of Debrecen

Subject	
Mechanical Engineering	
Electrical/Electronic Engineering	
Computer Science/ ICT	
Mechatronics	
Fundamental subjects	23%

Bachelor degree Mechatronics Engineering, Department of Bánki Donát Faculty of Mechanical and Safety Engineering, Óbuda University

Subject	
Mechanical Engineering	
Electrical/Electronic Engineering	
Computer Science/ ICT	
Mechatronics	
Fundamental subjects	23%

List of good practice examples (representative exampes).

1	N/A
2	

NORWAY

One bachelor degree programme in Informatics: Robotics and Intelligent Systems, one master degree programme in Informatics: Robotics and Intelligent Systems and one master degree programme in have been included.

The degree programmes are listed below.

- **Bachelor degree Informatics: Robotics and Intelligent Systems, Department of Informatics, Faculty of Mathematics and Natural Sciences, Oslo University** (3 year degree)

Available at https://www.uio.no/

- **Master degree Informatics: Robotics and Intelligent Systems, Department of Informatics, Faculty of Mathematics and Natural Sciences, Oslo University** (2 year degree)

Available at https://www.uio.no/english/

- **Master degree Mechatronics, Faculty of Engineering and Science, University of Agder** (2 year degree)

Available at https://www.uia.no/en

Teaching methodology

- Information on teaching and working methods are given in the course descriptions for each course. A range of different teaching and working methods will be used, including lectures, individual and group exercises, laboratory work and project work. Besides facilitating the students' academic development, teaching methods are selected with a view to developing the students' ability to solve practical problems and work in teams. Project work, both individually and in groups, will train the students in the application of theoretical knowledge and tools to identify and analyse specific problems and develop new systems and products. It will also develop the students' ability to cooperate and communicate effectively. Regarding master's thesis: For every student/group there will be 5 compulsory guidance meetings (University of Agder).

Language: Norwegian, English (University of Agder).

Bachelor project was not part of the bachelor degree programme.

The profile of each programme follows (distribution of the course subjects).

Bachelor degree Informatics: Robotics and Intelligent Systems, Department of Informatics, Faculty of Mathematics and Natural Sciences, Oslo University

Subject	
Mechanical Engineering	
Electrical/Electronic Engineering	
Computer Science/ ICT	
Mechatronics	
Fundamental subjects	

Master degree Informatics: Robotics and Intelligent Systems, Department of Informatics, Faculty of Mathematics and Natural Sciences, Oslo University

Subject	
Mechanical Engineering	
Electrical/Electronic Engineering	
Computer Science/ ICT	
Mechatronics	
Fundamental subjects	

Master degree Mechatronics, Faculty of Engineering and Science, University of Agder

Subject	
Mechanical Engineering	
Electrical/Electronic Engineering	
Computer Science/ ICT	
Mechatronics	
Fundamental subjects	

List of good practice examples (representative exampes).

1	N/A
2	

DENMARK

Two bachelor degree programmes have been included. One bachelor degree programme in Mechatronics (Engineering) and one bachelor degree programme in Mechatronics have been included.

The degree programmes are listed below.

• **Bachelor of Engineering Mechatronics (Engineering), University of Southern Denmark (SDU)** (3.5 year degree)

Available at https://www.sdu.dk/en

• **Bachelor of Science in Engineering Mechatronics, University of Southern Denmark (SDU)** (3 year degree)

Available at https://www.sdu.dk/en

Teaching methodology

• Industrial Engineering Training, English (Bachelor of Engineering Mechatronics, SDU).

Language: Danish, English (Bachelor of Engineering Mechatronics, SDU); English (Bachelor of Science Mechatronics, SDU).

Bachelor project was part of the bachelor degree programme.

The profile of each programme follows (distribution of the course subjects).

Bachelor of Engineering Mechatronics (Engineering), University of Southern Denmark

Subject	
Mechanical Engineering	
Electrical/Electronic Engineering	
Computer Science/ ICT	
Mechatronics	
Fundamental subjects	

Bachelor of Science in Engineering Mechatronics , University of Southern Denmark

Subject	
Mechanical Engineering	
Electrical/Electronic Engineering	
Computer Science/ ICT	
Mechatronics	
Fundamental subjects	

List of good practice examples (representative exampes).

1	N/A

LITHUANIA

Two bachelor degree programmes and two master degree programmes have been included. One bachelor degree programme in Mechatronics and Robotics and one bachelor degree programme in Mechatronics have been included. One master degree programme in Mechatronics Systems and one master degree programme, namely dual degree program “Mechatronics”have been included.

The degree programmes are listed below.

• **Bachelor degree in Mechatronics and Robotics, Department of Mechatronics, Robotics and Digital Manufacturing, Vilnius Gediminas Technical University, VGTU** (4 year degree)

Available at https://www.vgtu.lt/#Home

• **Bachelor degree in Mechatronics, Department of Mechanical Engineering, Kaunas Technology University** (4 year degree)

Available at https://en.ktu.edu/

• **Master degree in Mechatronics Systems, Department of Mechatronics, Robotics and Digital Manufacturing, Vilnius Gediminas Technical University, VGTU** (2 year degree)

Available at https://www.vgtu.lt/#Home

• **Master degree dual degree program “Mechatronics”, Department of Mechatronics, Robotics and Digital Manufacturing, Vilnius Gediminas Technical University, VGTU** (2 year degree)

Available at https://www.vgtu.lt/#Home

Teaching methodology

• Double degree study programme: first study year in VGTU and second study year in Braunschweig Technical University (Germany) (Master degree dual degree program “Mechatronics”).

Language: Lithuanian, English (Bachelor degree in Mechatronics and Robotics, Bachelor degree in Mechatronics, Master degree in Mechatronics Systems); English (Master degree dual degree program “Mechatronics”).

Bachelor project was part of the bachelor degree programme.

The profile of each programme follows (distribution of the course subjects).

Bachelor degree in Mechatronics and Robotics, Department of Mechatronics, Robotics and Digital Manufacturing, Vilnius Gediminas Technical University, VGTU

Subject	
Mechanical Engineering	
Electrical/Electronic Engineering	
Computer Science/ ICT	
Mechatronics	
Fundamental subjects	

Master degree in Mechatronics Systems, Department of Mechatronics, Robotics and Digital Manufacturing, Vilnius Gediminas Technical University, VGTU

Subject	
Mechanical Engineering	
Electrical/Electronic Engineering	
Computer Science/ ICT	
Mechatronics	
Fundamental subjects	

Master degree dual degree program "Mechatronics", Department of Mechatronics, Robotics and Digital Manufacturing, Vilnius Gediminas Technical University, VGTU

Subject	
Mechanical Engineering	
Electrical/Electronic Engineering	
Computer Science/ ICT	
Mechatronics	
Fundamental subjects	

List of good practice examples (representative exampes).

1	Bachelor degree in Mechatronics and Robotics, Department of Mechatronics, Robotics and Digital Manufacturing, Vilnius Gediminas Technical University, VGTU VGTU *Bachelor of Mechatronics and Robotics* study programme has been awarded the **Investor's Spotlight** mark of quality, certifying that the study programme meets the needs of foreign investors and is a leader in fostering the competences essential for modern business.

	investors' spotlight
2	Master degree in Mechatronics Systems, Department of Mechatronics, Robotics and Digital Manufacturing, Vilnius Gediminas Technical University, VGTU
3	Master degree dual degree program "Mechatronics", Department of Mechatronics, Robotics and Digital Manufacturing, Vilnius Gediminas Technical University, VGTU
4	Bachelor degree in Mechatronics, Department of Mechanical Engineering, Kaunas Technology University **Main competences** – Adapt systems for machinery control in various companies operating in the fields from production to designing; – To control production processes and understand needs and possibilities for their robotisation; – To analyse problematic areas of facilities management and adapt modern robotic systems for increase of efficiency; – To design and realise modern robotic systems according to the market needs. **Interdisciplinarity of this study programme provides wide range of career possibilities for work in various industries, public sector, space or military industry. Students learn at the most modern laboratories of the Baltic Region and after graduation they are able to:** – Design, install and provide maintenance to stationary and mobile robots and their systems; – Realise modern algorithms for control of machinery and the ones based on artificial intellect; – To combine classic mechatronics solutions, classical control algorithms, possibilities of artificial intellect and information technologies.

FINLAND

A Bachelor degree ptogramme in Mechanical Engineering has been included.

The degree programme is listed below.

• **Bachelor Mechanical Engineering, School of Engineering Science, LUT University** (3 year degree)

Available at http://www.lut.fi

Teaching methodology is classic methodology.

Language: Finnish.

Bachelor project was part of the programme.

The profile of the programme follows (distribution of the course subjects).

• **Bachelor Mechanical Engineering, School of Engineering Science, LUT University**

Subject	**Percentage of the total course modules**
Mechanical Engineering	19%
Electrical/Electronic Engineering	15%
Computer Science/ ICT	0%
Mechatronics	22%
Fundamental subjects	45%

List of good practice examples (representative examples).

1	Not available

BELGIUM

A Bachelor of Science degree ptogramme in Mechanical Engineering has been included.

The degree programme is listed below.

• **BSc Engineering Technology, KU Leuven** (3 year degree)

Available at https://onderwijsaanbod.kuleuven.be/opleidingen/e/CQ_51601481.htm#activetab=diploma_omschrijving

Teaching methodology includes learning by training.

Language: English.

Bachelor project was part of the programme.

The profile of the programme follows (distribution of the course subjects).

• **Bachelor Mechanical Engineering, School of Engineering Science, LUT University**

Mechanical Engineering	10%
Electrical/Electronic Engineering	10%
Computer Science/ ICT	20%
Mechatronics	9%
Fundamental subjects	51%
Mechanical Engineering	10%

List of good practice examples (representative examples).

1	Not available

UZBEKISTAN

The degree programmes are listed below.

- **BSc/MSc Mechatronics and Robotics, Department of Mechatronics and Robotics, Tashkent State Technical university (TSTU)** (4 year degree)

Available at http://tdtu.uz/en/faculty-of-electronics-and-automation/department-of-mechatronics-and-robotics/

- **BSc Computer Engineering, Department of Computer Systems , Tashkent university of information technologies (TUIT)** (4 year degree)

Available at https://tuit.uz

- **MSc Mechatronic Engineering (Control Technologies for Industries 4.0), Department of Electronics and Telecommunication , TTPU** (2 year degree)

Available at www.polito.it

Available at https://didattica.polito.it/pls/portal30/sviluppo.offerta_formativa_2019.vis?p_coorte=2020&p_sdu=37&p_cds=55

Teaching methodology includes theory, tutorials, labs (in MSc degree programme) ; theory, lab sessions, practice, projects, seminars, industry internship (in BSc in Computer Engineering); Theory, lab sessions, development of projects, connection with industry, seminars, other (in BSc in Mechatronics and Robotics).

Language: Uzbek, Russian, English (in the MSc degree programme)

Bachelor project was part of both BSc degree programmes.

The profile of each programme follows (distribution of the course subjects).

BSc Mechatronics and Robotics, Department of Mechatronics and Robotics, Tashkent State Technical university (TSTU)

Subject	Mechanical Engineering
Mechanical Engineering	10%
Electrical/Electronic Engineering	10%
Computer Science/ ICT	20%
Mechatronics	9%

Fundamental subjects	51%

BSc Computer Engineering, Department of Computer Systems , Tashkent university of information technologies (TSTU)

Subject	Percentage of the total course modules
Mechanical Engineering	0
Electrical/Electronic Engineering	7
Computer Science/ ICT	57
Mechatronics	9
Fundamental subjects	27

MSc Mechatronic Engineering (Control Technologies for Industries 4.0), Department of Electronics and Telecommunication , TTPU

Subject	Percentage of the total course modules	
	BSc in IT	**BSc in ME**
Mechanical Engineering	16,67	10
Electrical/Electronic Engineering	8,33	8.33
Computer Science/ ICT	10	10
Control Engineering	25	31.67
Mechatronics & Robotics	15	15
Fundamental subjects	0	0
Thesis	25	25

List of good practice examples (representative exampes).

1	BSc/MSc Mechatronics and Robotics, Department of Mechatronics and Robotics, Tashkent State Technical university (TSTU).
2	MSc Mechatronic Engineering (Control Technologies for Industries 4.0), Department of Electronics and Telecommunication , TTPU

5. DISCUSSION

5.1 Mechatronics Definition based on the studied degree programmes

There is no unique definition of Mechatronics. As a result, different Mechatronics degree programmes, at both the bachelor and master degree level, present their own perspective of Mechatronics. Table 1 includes Mechatronics definitions presented at the EU (including UK) and Uzbek universities.

5.2 Mechatronics and Mechatronics related programme titles at a bachelor degree level

Different degree programme titles are offered in EU, UK and Uzbekistan. Programme titles include Mechatronics, Mechatronics Engineering and combined degrees, as well as related degrees such as Automation Engineering, at the bachelor degree level.

More specifically, the different bachelor degree titles offered in EU and Uzbekistan included in the MechaUZ analysis of WP1 are listed in Table 2 below. Representative degree programmes have been included.

In total, 52 bachelor degree programmes from 26 countries are shown in Table 2, in EU and UK. Regarding Uzbekistan, 2 bachelor degree programmes have been included.

Degree programmes in EU and UK include Mechatronics, Mechatronics Engineering, combined degrees such as Mechatronics and Robotics**,** Mechatronics and Business Management and Automotive Mechatronics. Other degree programmes include Automation Engineering, Automation and Control Engineering, Informatics: Robotics and Intelligent Systems, Automotive Engineering, Mechanical and Manufacturing Engineering, Production Engineering and Management and Industrial Engineering and Management.

In Uzbekistan, degree programmes include Mechatronics and Robotics and Computer Engineering.

5.3 Mechatronics and Mechatronics related programme titles at a master degree level

Different programme titles are offered at the various EU, UK and Uzbek universities. Programme titles include Mechatronics, Mechatronics Engineering and combined degrees, as well as related degrees such as Automation Engineering, at the bachelor degree level. Different programme titles are offered at the various EU universities. Programme titles include Mechatronics, Mechatronics Engineering and combined degrees, as well as related degrees such as Automation Engineering, at the bachelor degree level.

Table 3 includes the included master degree titles found in EU, UK and Uzbekistan. Representative degree programmes have been included

29 master degree programmes from 14 countries are shown in Table 3, in EU and UK. Regarding Uzbekistan, 2 master degree programmes have been included.

Degree programmes in EU and UK include Mechatronics, Mechatronics Engineering and combined degrees such as Mechatronics and Robotic Engineering, Mechatronic systems for Industry and Medicine, Control for Green Mechatronics, Mechatronic systems and advanced mechanics and Mechatronics and Business Management. Other degree programmes include Informatics: Robotics and Intelligent Systems, Automation and Control Engineering, Automation Systems, Robotics and Automation Engineering , Strategic Product Design, Manufacturing and Welding Engineering Design and Mechanical and Manufacturing Engineering.

In Uzbekistan, master degree programmes include Mechatronic Engineering and Mechatronics and Robotics.

5.4 Bachelor thesis

Bachelor thesis is an integral part of more than 95% of the bachelor degree programmes.

5.5 Department/School

The Departments/Faculties/Schools of the bachelor and master degree programmes in Mechatronics or related degrees are shown in Tables 4 and 5, respectively.

Relevant information was not available for all studied bachelor/master degree programmes (for instance, France and Portugal?).

Based on available information shown in Table 4, for 34 bachelor degree programmes , Faculty of Engineering, School of Engineering, Faculty of Science and Technology was shown in 7 bachelor degree programmes (20,6%). Department (or Faculty) of Electrical and Electronic Engineering, as well as Department of Electrical and Electronic Engineering combined with other disciplines (such as with systems engineering) was shown in 5 bachelor degree programmes (14.7%). Department (or Faculty) of Mechanical Engineering, as well as Department (or Faculty) of Mechanical Engineering combined with other disciplines (such as safety engineering) was shown in 5 bachelor degree programmes (14.7%). Department (or Faculty) of Industrial and Management Engineering, as well as related Departments (such as Department of Management Engineering) was listed in 5 bachelor degree programmes

(20.6%). Department (or Faculty) of Mechatronics/Mechatronics Engineering, as well as Department (or Faculty) of Mechatronics/Mechatronics Engineering combined with other disciplines was shown in 6 bachelor degree programmes (17.6%).

Based on available information shown in Table 5, for 19 bachelor degree programmes , Faculty of Engineering, School of Engineering, Faculty of Science and Technology was shown in 4 master degree programmes (21.1%).Department (or Faculty) of Electrical and Electronic Engineering, as well as Department of Electrical and Electronic Engineering combined with other disciplines (such as with systems engineering) was shown in 6 master degree programmes (31.6%).

Department (or Faculty) of Mechanical Engineering, as well as Department (or Faculty) of Mechanical Engineering combined with other disciplines was shown in 3 master degree programmes (15.6%). School of Industrial and Information Engineering was shown in 1 master degree programme (5.3%). Department (or Faculty) of Mechatronics/Mechatronics Engineering, as well as Department (or Faculty) of Mechatronics/Mechatronics Engineering combined with other disciplines was shown in 5 master degree programmes (26.3%).

5.6 Programme duration

The duration of the bachelor degree programmes in Mechatronics or related degrees in EU, UK and Uzbekistan is shown in Table 6.

Based on Table 6, 16 bachelor degree programmes have a duration of 4 years (34.8%), 22 programmes have a duration of 3 years (47.8%), 4 programmes have a duration of 3.5 years (8.7%) and 4 programmes have a duration of 5 years (8.7%).

5.7 Teaching methodology

Teaching methodology includes different combinations of lectures, laboratory classes, individual and group projects, connection with industry, internships and tutorials. Laboratory work is integrated in all bachelor degree programmes. High tech laboratories are highlighted in some degree programmes. Tables 7 and 8 show the teaching methodology used in the bachelor and master degree programmes, respectively

5.8 Language

The majority of the degree programmes are taught in the corresponding national languages. However, English is used in a number of degree programmes. In particular, Tables 9 and 10 show the language used in the bachelor and master degree programmes, respectively.

Based on information for 50 bachelor degree programmes in Mechatronics or related to Mechatronics bachelor degree programmes, shown in Table 9, 10 bachelor degree programmes are taught in English (20%). 7 bachelor degree programmes are taught both in English and the corresponding national language (14%), and 2 bachelor degree programmes are taught in the corresponding national language and Russian (4%). 62% of the bachelor degree programmes are taught in the corresponding national language.

Based on information for 29 master degree programmes in Mechatronics or related to Mechatronics degree programmes, shown in Table 10, 11 master degree programmes are taught exclusively in English (37.9%). 5 master degree programmes are taught both in English and the corresponding national language (26.3%), and 1 master degree programme is taught in the corresponding national language and Russian (3.4%). 32.4% of the master degree programmes are taught exclusively in the corresponding national language.

5.9 The course profiles by subjects

For each identified course at a bachelor degree programme, the course profile was described in a Table, shown below, which includes the main fields of study.

Subject	**Percentage of the total course modules**
Mechanical Engineering	
Electrical/Electronic Engineering	
Computer Science/ ICT	
Mechatronics	
Fundamental subjects	

Based on the bachelor degree programmes, Tables 11, 12, 13, 14 and 15 show the course percentages for mechanical engineering, electrical/electronic engineering, computer Science/ ICT, mechatronics and fundamental subjects, respectively, identified at each country.

5.10 ECTS units

EU bachelor and master degree programmes follow the standard ECTS standards (60 ECTS per semester (year ?)).

5.11 List of good practices

MechaUZ EU partners identified the good practices in the academic field of Mechatronics, at a bachelor and master degree level, mainly based on the experience from their own universities' taught Mechatronics or related programmes.

Table 16 shows the academic degree programmes which were identified as good practice examples per EU partner based on their experience as well as relevant highlighted details.

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Table 1. Mechatronics definitions presented at specific EU and Uzbek universities.

Degree programme	Mechatronics definition
BEng Mechatronics, School of Engineering, University of Glasgow (UK)	Mechatronics is a fusion of mechanical, electrical and control engineering. In order to compete successfully in a global market, modern manufacturing companies must have the ability to integrate electronics, control, software and mechanical engineering into a range of innovative products and systems. Graduates of this programme will have this interdisciplinary knowledge, skill and approach to engineering.
BEng Mechatronics Engineering, Department of Electrical and Electronic Engineering, University of Manchester (UK)	Mechatronics is the marriage of mechanical engineering with smart electronics and is vital to subjects such as industrial automation and robotics. To interact with an object, a mechatronic system must know where the object is, be able to move the object and place it in the required new position. The electronics require information from sensors that can detect position, orientation, and visual or audio signals. The electrical inputs from the sensors have to be interpreted and the appropriate signals sent out to the actuators to perform the required operation. A good understanding of feedback control is also required to be able to make changes in the system from one steady position to another without oscillations or unpredictable movements. In this course you will learn the techniques necessary for the design and implementation of such intelligent mechatronic systems.
BEng/MEng Mechatronics and Robotic Engineering, Department of Electronic, Electrical and Systems Engineering, University of Birmingham (UK)	Our stimulating Mechatronic and Robotic Engineering BEng degree programme combines mechanical, computer, and electronic and electrical engineering to address the challenges of designing and deploying intelligent technologies. You will gain strong theoretical and practical skills and collaborate with global experts.
BSc Mechatronics, Faculty	Mechatronics is an interdisciplinary engineering field

of Mechanical Engineering, Technical University of Sofia (Bulgaria)	comprising various components, such as mechanical systems /units, mechanisms, devices, appliances, machines and different sets of engineering equipment; electronic systems /microelectronics, power electronics, sensors and actuators etc./; information systems /computing devices, software packages, modeling, 3D design, engineering analysis, simulation
Bachelor Automotive Mechatronics, Faculty of Electrical Engineering and Information Technology, Slovak Technical University	Bachelor's degree program prepares qualified and creative mechatronics, who have the necessary knowledge of mathematics, physics, computer science, electrical engineering, mechanics and machine construction. The study program allows to gain knowledge of the principles of mechatronic systems from the perspective of control, electronics, mechanics, and programming but also in terms of the actual design of mechatronic systems. The main focus is on mechatronic systems and e-mobility. It develops the ability to analyze the technical problems and finding optimal solutions using a comprehensive view of the problem, which allows mechatronics. It combines a deep knowledge of natural science and technical aspects of the problems, ensuring great versatility in the application of a graduate in industrial practice.
MSc Mechatronic Engineering (Control Technologies for Industries 4.0), Department of Electronics and Telecommunication Politecnico di Torino	A mechatronic system or device can be defined as one for the design of which you need a wealth of cross curricular knowledge, mainly, but not only, of electronics, mechanics, machinery and electrical drives, automatic control and information technology. Graduates in Mechatronic Engineering gain a scientific and technical knowledge of mechatronic systems that is "transversal" by nature as it crosses over electronics, mechanics, electrical drives, automatic control and information technology. The mechatronic engineer is therefore a technical professional with an extensive and broad-spectrum preparation that allows her/him to communicate with specialists in different fields, while working in the areas of design, engineering, manufacturing, operation and maintenance of mechatronic systems and equipment, and managing of laboratories and plants.
Bachelor Mechatronics Engineering, Faculty of Science and Technology, Vic University (Spain)	The degree in Mechatronics Engineering focuses on interdisciplinary techniques and knowledge of mechanics, electronics, control and computer science to conceive new ways or producing, developing new products and designing new machines. You will be able to incorporate knowledge of these disciplines to provide solutions that go beyond those that could be obtained individually.
Bachelor Mechatronics	Mechatronics engineers are involved in the development of

Engineering, National Institute of Applied Sciences (France)	automated systems that use techniques from different disciplines: mechanics, electronics, computer science and automatic controls. They are involved throughout the life cycle of industrial products: research and development, preliminary design, development, industrialization, operation. Mechatronics is present in all sectors of industry: transport, consumer goods, capital goods… Robots, autonomous vehicles, active suspensions, etc. are examples of products resulting from mechatronic product development.
Bachelor Mechatronics Engineer, EIGSI general engineering school in La Rochell (France)	This major is designed to meet the needs of industry faced with increasingly complex systems. The objective of the "Mechatronics" major is to train multi-skilled systems engineers able to: > analyse a system to develop each component of the product, making the best choices throughout the project, > understand the interactions of electronics, informatics, automatics, thermal systems, optical systems, materials, etc. > resolve a wide variety of industrial problems, both in terms of products and processes.
Master Mechatronics Engineering, University of Minho (Portugal)	The MSc in Mechatronics Engineering deals with interdisciplinary domains of mechanical and electronic engineering. Mechatronics is fundamental to the study and development of the products project. Modern products are constituted by mechanisms, electrical or electronic circuits, and therefore a combination of these areas is needed to design, develop and manufacture a successful product. Mechatronics allows the creation of simpler, more economical, safer and more versatile systems. Examples of mechatronic products are as follows: ABS systems, robots, industrial
Bachelor Mechatronics Engineering, Polytechnic Institute of Viana do Castelo (Portugal)	The bachelor's degree in mechatronics engineering has a multidisciplinary character, incorporating areas such as computer science, electronics, mechanics, automation and control. The bachelor's degree seeks to train professionals with a long-range profile, allowing them to find solid skills in industrial computing, electronics, mechanics, automation and control, allowing the integration of theoretical and practical knowledge essential to the exercise of project and industrial maintenance.
Master of Science Mechatronics, Department of Mechatronic Construction, Poznan University of Technology (Poland)	The course is intended for mechatronic engineers who want to broaden their education in the area of mechatronic design. In the course, the synergistic combination of mechanical engineering, electronics and control engineering is integrated in the design process. The course study on mechatronic design involves a theoretical and practical approach. It assures the

	balance between theory/ analysis with modelling and hardware implementation in mechanics, electronics and computer applications in control… One of the features which distinguishes mechatronic designers from others, is their ability for the replacement of some mechanical functions with electronic and software ones. The main learning objective for mechatronic design is to teach students how to be able to design and investigate mechanical, electrical, and microcontroller systems and integrate them together.
Bachelor Mechatronics Engineering, University of Évora (Portugal)	Mechatronics Engineering consistently incorporates scientific valences from the courses in Mechanical, Electrotechnical and Informatics Engineering, in parallel with the respective practical skills of professional relevance, useful for the exercise of new design functions, as well as for the production and maintenance of industrial processes and products.
Master of Science Mechatronics, Institute of Engineering and Transport – Mechanical Engineering, Malta College of Arts, Science & Technology	The Master of Science in Mechatronics programme provides students with a broad range of knowledge and skills in the field of automation and control of production processes and equipment, as well as in the field of mechatronic devices and systems control. It focuses on the study of network technologies (e.g. Ethernet, Industrial Protocol, Profinet, Modbus, Profibus, Devicenet, Control Net), and development of SCADA system (Supervisory Control and Data Acquisition) construction. Practical use of real-time systems is also an important part of the programme. Students shall apply the theoretical principles of industrial robotics and mechatronics, mechatronic and robotic actuators, and modern technologies of microcontroller applications.
Bachelor of Science in Engineering (Hons) Mechatronics and Business Management, School of Engineering, University of Applied Sciences Upper Austria (Austria)	The field of Mechatronics is inter-disciplinary, international and requires engineering experts who are flexible and equipped with business economics knowledge and social and communicative competences. Graduates of this course continue, expand and broaden their careers in engineering, production, manufacturing, product and production plant planning, project management, sales, marketing, controlling and business management.
Bachelor of Science Mechatronics, Department of Mechatronics, University of Innsbruck - Joint Study Programme of the University of Innsbruck and the Private University for Health Sciences, Medical Informatics and	Mechatronics includes all techniques to develop systems, processes, devices and products whose essential characteristics are created by the integration and interaction of mechanical, electronic and information-processing components. This results in the development of systems that have a high degree of functionality, efficiency and capacity.

Technology (UMIT TIROL) (Austria)	
Master of Science Mechatronics, Department of Mechatronics, University of Innsbruck - Joint Study Programme of the University of Innsbruck and the Private University for Health Sciences, Medical Informatics and Technology (UMIT TIROL) (Austria)	The students of the Master's Degree Programme in Mechatronics study techniques to develop systems, processes, devices and products whose essential characteristics are created by the integration and interaction of mechanical, electronic and information-processing components. This results in the development of systems that have a high degree of functionality, efficiency and capacity.
Bachelor Mechatronics, Fontys University of Applied Sciences (Netherlands)	Mechatronics is a combination of electrical engineering, mechanical engineering and computer science. In this program, you are a thinker and a doer. You find out how to make your devices safer and easier to use. And of course: you design them! Think of an automated car wash, a production robot or in healthcare a wheelchair or robot arm replacement. Mechatronics has become an indispensable worling field. We teach you the theory and practical knowledge and learn you to be a specialist in systematic design techniques including the control of robotic products and machinery. From design to making a robot: the bachelor program Mechatronics has a focus on robotics and control technology

Table 2. The bachelor degree programme titles offered in EU, UK and Uzbekistan, included in the MechaUZ WP1 analysis. Representative degree programmes (in EU and UK) have been included in the analysis.

Bachelor degree	**Programme title**	**University**	**Country**
BEng	Mechatronics	University of Glasgow	United Kingdom
BEng	Mechatronics Engineering	University of Manchester	United Kingdom
BEng	Mechatronics and Robotic Engineering	University of Birmingham	United Kingdom
BSc	Mechatronics	Technical University of Sofia	Bulgaria
BSc	Mechatronics	Transilvania University of Brașov	Romania
BSc	Mechatronic Engineering	Universita degli Studi di Padova	Italy
BSc	Mechatronic Engineering	University of Bologna	Italy

BSc	Automation and Control Engineering	Politecnico di Milano	Italy
BSc	Automation Engineering	University of Bologna	Italy
BSc	Automation Engineering	University of Gävle	Sweden
BEng	Automotive Mechatronics	Slovak Technical University	Slovakia
BSc	Robotics and Intelligent devices	National University of Ireland Maynooth	Ireland
Bachelor	Mechatronics Engineering	Vic University	Spain
Bachelor	Mechatronics	La Almudia Polytechnic University School	Spain
Bachelor	Electronics, Robotics and Mechatronics Engineering	Málaga University	Spain
Bachelor	Electronic, Robotics and Mechatronics Engineering	Sevilla University	Spain
Bachelor	Mechatronics Engineering	National Institute of Applied Sciences	France
Bachelor	Mechatronics Engineering	EIGSI general engineering school in La Rochelle	France
Bachelor	Mechatronics Engineering	ISTY - INSTITUT DES SCIENCES ET TECHNIQUES DES YVELINES	France
Bachelor	Mechatronics Engineering	Ecole nationale superieure des mines d'Ales	France
Bachelor	Mechatronics Engineering	Polytechnic Institute of Viana do Castelo	Portugal
Bachelor	Mechatronics Engineering	University of Évora	Portugal
Bachelor	Integrated Engineering	Tallinn University of Technology	Estonia
Bachelor	Mechatronics	Fontys University of Applied Sciences	Netherlands
Professional bachelor	Mechatronics	Liepaja University	Latvia
Professional bachelor	Mechatronics	Vidzeme University of Applied Sciences	Latvia

Professional bachelor	Mechatronics Engineering	Riga Technical University	Latvia
Professional bachelor	Mechanics and metalworking, heat energy, heat engineering and mechanical engineering	Rezekne Academy of Technologies	Latvia
Bachelor	Mechatronics	Darmstadt TU	Germany
BSc	Mechatronics Engineering	German International University	Germany
Bachelor	Mechatronics Engineering	University of Science and Technology	Poland
Bachelor	Mechatronics	Warshaw University Of Technology	Poland
Bachelor	Mechatronics	Gdansk University of Technology	Poland
BSc	Automotive Engineering	Frederick University	Cyprus
BSc	Mechanical and Manufacturing Engineering	University of Cyprus	Cyprus
BEng (Hons)	Mechanical Engineering (Manufacturing)	Malta College of Arts, Science & Technology	Malta
BSc in Engineering (Hons)	Mechatronics and Business Management	University of Applied Sciences Upper Austria	Austria
BSc	Mechatronics	University of Innsbruck - Joint Study Programme of the University of Innsbruck and the Private University for Health Sciences, Medical Informatics and Technology (UMIT TIROL)	Austria
BEng	Production Engineering and Management	Democritus University of Thrace	Greece
BSc	Industrial Engineering and Management	International Hellenic University	Greece
Bachelor	Mechatronics Engineering	University of South Bohemia in České Budějovice	Czech Republic
BSc	Mechatronics Engineering	University of Debrecen	Hungary
Bachelor	Mechatronics	Óbuda University	Hungary

	Engineering		
Bachelor	Informatics: Robotics and Intelligent Systems	Oslo University	Norway
BEng	Mechatronics (Engineering)	University of Southern Denmark	Denmark
BSc in Engineering	Mechatronics	University of Southern Denmark	Denmark
Bachelor	Mechanical Engineering	LUT School of Engineering Scienceri	Finland
BSc	Engineering Technology	KU Leuven	Belgium
Bachelor	Mechatronics and Robotics	Vilnius Gediminas Technical University	Lithuania
Bachelor	Mechatronics	Kaunas Technology University	Lithuania
BSc	Mechatronics and Robotics	Tashkent State Technical university	Uzbekistan
BSc	Computer Engineering	Tashkent university of information technologies	Uzbekistan

Table 3. The master degree programme titles offered in EU, UK and Uzbekistan, included in the MechaUZ WP1 analysis. . Representative degree programmes (in EU and UK) have been included in the analysis.

Master degree	**Programme title**	**University**	**Country**
MEng	Mechatronics	University of Glasgow	United Kingdom
MEng	Mechatronics Engineering	University of Manchester	United Kingdom
MEng	Mechatronics and Robotic Engineering	University of Birmingham	United Kingdom
MSc	Mechatronic systems for Industry and Medicine	Transilvania University of Brașov	Romania
MSc	Mechatronic Engineering (Control Technologies for Industries 4.0)	Politecnico di Torino	Italy
MSc	Automation and Control Engineering	Politecnico di Milano	Italy
Master	Robotics and Automation Engineering	Sevilla University	Spain
Master	Mechatronics	University of Vigo	Spain
Master	Mechatronics	Polytechnic	Spain

		University of Valencia	
Master	Mechatronics	Oviedo University (joint master degree with other universities from France, Russia, Netherlands, Germany and Egypt))	Spain
Master	Advanced Mechatronics	Université Savoie-Mont Blanc	France
MSc	Control for Green Mechatronics	University Bourgogne Franche-Comté	France
MSc	Mechatronic systems and advanced mechanics	Université de Technologie Compiègne	France
Master	Mechatronics Engineering	University of Minho	Portugal
Master	Mechatronics	TTK University of Applied Sciences	Estonia
MSc	Mechatronics	Poznan University of Technology	Poland
MSc	Mechanical and Manufacturing Engineering	University of Cyprus	Cyprus
MSc	Manufacturing and Welding Engineering Design	Frederick University	Cyprus
MSc	Mechatronics	Malta College of Arts, Science & Technology	Malta
Master (Diplom-Ingenieur/Diplom-Ingenieurin für technisch-wissenschaftliche Berufe (DI oder Dipl.-Ing.)	Mechatronics and Business Management	University of Applied Sciences Upper Austria	Austria
Master (Diplom-Ingenieurin/Diplom-Ingenieu) (Dipl.-Ing. or DI)	Mechatronics	University of Innsbruck - Joint Study Programme of the University of Innsbruck and the Private University for Health Sciences, Medical Informatics and Technology	Austria

		(UMIT TIROL)	
MSc	Mechatronics	University of Western Macedonia	Greece
MSc	Strategic Product Design	International Hellenic University	Greece
MSc	Automation Systems	National Technical University of Athens	Greece
Master	Informatics: Robotics and Intelligent Systems	Oslo University	Norway
Master	Mechatronics	University of Agder	Norway
Master	Mechatronics Systems	Vilnius Gediminas Technical University	Lithuania
Master	dual degree program “Mechatronics”	Vilnius Gediminas Technical University	Lithuania
MSc	Mechatronic Engineering (Control Technologies for Industries 4.0),	TTPU	Uzbekistan

Table 4. The Departments/Faculties/Schools of the bachelor degree programmes in EU, UK and Uzbekistan, included in the MechaUZ WP1 analysis. Representative degree programmes (in EU and UK) have been included in the analysis.

Bachelor degree programme title	**Department/Faculty/School**	**University**	**Country**
Mechatronics	School of Engineering	University of Glasgow	United Kingdom
Mechatronics Engineering	Department of Electrical and Electronic Engineering	University of Manchester	United Kingdom
Mechatronics and Robotic Engineering	Department of Electronic, Electrical and Systems Engineering	University of Birmingham	United Kingdom
Mechatronics	Faculty of Mechanical Engineering	Technical University of Sofia	Bulgaria
Mechatronics	Faculty of Product Design and Environment	Transilvania University of Brașov	Romania
Mechatronic Engineering	Department of Management and Engineering	Universita degli Studi di Padova	Italy
Mechatronic Engineering	Department of Electrical Energy and Information Engineering “Guiglielmo	University of Bologna	Italy

	Marconi”		
Automation and Control Engineering	School of Industrial and Information Engineering	Politecnico di Milano	Italy
Automation Engineering	Department of Electrical Energy and Information Engineering “Guiglielmo Marconi”	University of Bologna	Italy
Automation Engineering	-	University of Gävle	Sweden
Automotive Mechatronics	Faculty of Electrical Engineering and Information Technology	Slovak Technical University	Slovakia
Robotics and Intelligent devices	Department of Electronic Engineering	National University of Ireland Maynooth	Ireland
Mechatronics Engineering	Faculty of Science and Technology	Vic University	Spain
Mechatronics	-	La Almudia Polytechnic University School	Spain
Electronics, Robotics and Mechatronics Engineering	Escuela de Ingenierías Industriales	Málaga University	Spain
Electronic, Robotics and Mechatronics Engineering	Escuela Tecnica Superior de Ingenierías Engineering	Sevilla University	Spain
Mechatronics Engineering	-	National Institute of Applied Sciences	France
Mechatronics Engineering	-	EIGSI general engineering school in La Rochelle	France
Mechatronics Engineering	-	ISTY - INSTITUT DES SCIENCES ET TECHNIQUES DES YVELINES	France
Mechatronics Engineering	-	Ecole nationale superieure des mines d’Ales	France
Mechatronics Engineering	-	Polytechnic Institute of Viana do Castelo	Portugal
Mechatronics Engineering	-	University of Évora	Portugal
Integrated Engineering	School of Engineering	Tallinn University of Technology	Estonia
Mechatronics	-	Fontys University of Applied Sciences	Netherlands

Mechatronics	Faculty of Science and Engineering	Liepaja University	Latvia
Mechatronics	Faculty of Engineering	Vidzeme University of Applied Sciences	Latvia
Mechatronics Engineering	Faculty of Mechanical Engineering	Riga Technical University	Latvia
Mechanics and metalworking, heat energy, heat engineering and mechanical engineering	Faculty of Engineering	Rezekne Academy of Technologies	Latvia
Mechatronics	Faculty of Engineering	Darmstadt TU	Germany
Mechatronics Engineering	-	German International University	Germany
Mechatronics Engineering	Department of Robotics and Mechatronics	AGH University of Science and Technology	Poland
Mechatronics	Mechatronics	Warshaw University Of Technology	Poland
Mechatronics	Mechatronics	Gdansk University of Technology	Poland
Automotive Engineering	Department of Mechanical Engineering	Frederick University	Cyprus
Mechanical and Manufacturing Engineering	Department of Mechanical and Manufacturing Engineering	University of Cyprus	Cyprus
Mechanical Engineering (Manufacturing)	Institute of Engineering and Transport – Mechanical Engineering	Malta College of Arts, Science & Technology	Malta
Mechatronics and Business Management	School of Engineering	University of Applied Sciences Upper Austria	Austria
Mechatronics	Department of Mechatronics	University of Innsbruck - Joint Study Programme of the University of Innsbruck and the Private University for Health Sciences, Medical Informatics and Technology (UMIT TIROL)	Austria
Production	Department of	Democritus University	Greece

Engineering and Management	Production Engineering and Management	of Thrace	
Industrial Engineering and Management	Department of Industrial Engineering and Management	International Hellenic University	Greece
Mechatronics Engineering	-	University of South Bohemia in České Budějovice	Czech Republic
Mechatronics Engineering	Faculty of Engineering	University of Debrecen	Hungary
Mechatronics Engineering	Department of Bánki Donát Faculty of Mechanical and Safety Engineering	Óbuda University	Hungary
Informatics: Robotics and Intelligent Systems	Department of Informatics	Oslo University	Norway
Mechatronics (Engineering)	-	University of Southern Denmark	Denmark
Mechatronics	-	University of Southern Denmark	Denmark
Mechatronics and Robotics	Department of Mechatronics, Robotics and Digital Manufacturing,	Vilnius Gediminas Technical University	Lithuania
Mechatronics	Department of Mechanical Engineering	Kaunas Technology University	Lithuania
Engineering Technology	-	KU Leuven	Belgium
Mechatronics and Robotics	Department of Mechatronics and Robotics	Tashkent State Technical university	Uzbekistan
Computer Engineering	Department of Computer Systems	Tashkent university of information technologies	Uzbekistan

Table 5. The Departments/Faculties/Schools of the master degree programme titles offered in EU, UK and Uzbekistan, included in the MechaUZ WP1 analysis. Representative degree programmes (in EU and UK) have been included in the analysis.

Master degree programme title	Department/Faculty/School	**University**	**Country**
Mechatronics	School of Engineering	University of Glasgow	United Kingdom
Mechatronics	Department of Electrical	University of	United Kingdom

Engineering	and Electronic Engineering	Manchester	
Mechatronics and Robotic Engineering	Department of Electronic, Electrical and Systems Engineering	University of Birmingham	United Kingdom
Mechatronic systems for Industry and Medicine	Faculty of Mechanical Engineering	Transilvania University of Brașov	Romania
Mechatronic Engineering (Control Technologies for Industries 4.0)	Department of Electronics and Telecommunication	Politecnico di Torino	Italy
Automation and Control Engineering	School of Industrial and Information Engineering	Politecnico di Milano	Italy
Robotics and Automation Engineering	Escuela Tecnica Superior de Ingenierías	Sevilla University	Spain
Mechatronics	-	University of Vigo	Spain
Mechatronics	-	Polytechnic University of Valencia	Spain
Mechatronics	Mechatronics	Oviedo University (joint master degree with other universities from France, Russia, Netherlands, Germany and Egypt))	Spain
Advanced Mechatronics	-	Université Savoie-Mont Blanc	France
Control for Green Mechatronics	-	University Bourgogne Franche-Comté	France
Mechatronic systems and advanced mechanics	-	Université de Technologie Compiègne	France
Mechatronics Engineering	-	University of Minho	Portugal
Mechatronics	School of Engineering	TTK University of Applied Sciences	Estonia
Mechatronics	Department of Mechatronic Construction	Poznan University of Technology	Poland
Mechanical and Manufacturing Engineering	Mechanical and Manufacturing Engineering	University of Cyprus	Cyprus
Manufacturing and Welding Engineering	Department of Mechanical Engineering	Frederick University	Cyprus

Design			
Mechatronics	Institute of Engineering and Transport – Mechanical Engineering	Malta College of Arts, Science & Technology	Malta
Mechatronics and Business Management	School of Engineering	University of Applied Sciences Upper Austria	Austria
Mechatronics	Department of Mechatronics	University of Innsbruck - Joint Study Programme of the University of Innsbruck and the Private University for Health Sciences, Medical Informatics and Technology (UMIT TIROL)	Austria
Mechatronics	Department of Electrical and Computer Engineering	University of Western Macedonia	Greece
Strategic Product Design	Department of Science and Technology	International Hellenic University	Greece
Automation Systems	Interdepartmental programme	National Technical University of Athens	Greece
Informatics: Robotics and Intelligent Systems	Department of Informatics	Oslo University	Norway
Mechatronics	Faculty of Engineering and Science	University of Agder	Norway
Mechatronics Systems	Mechatronics Systems	Vilnius Gediminas Technical University	Lithuania
dual degree program “Mechatronics”	dual degree program “Mechatronics”	Vilnius Gediminas Technical University	Lithuania
Mechatronic Engineering (Control Technologies for Industries 4.0),	Department of Electronics and Telecommunication	TTPU	Uzbekistan

Table 6. Duration of the bachelor degree programmes in Mechatronics or related degrees in EU, UK and Uzbekistan.

Bachelor degree programme title	Programme duration (in years)	University	Country
Mechatronics	4	University of Glasgow	United Kingdom

Mechatronics Engineering	3	University of Manchester	United Kingdom
Mechatronics and Robotic Engineering	3	University of Birmingham	United Kingdom
Mechatronics	4	Technical University of Sofia	Bulgaria
Mechatronics	4	Transilvania University of Brașov	Romania
Mechatronic Engineering	3	Universita degli Studi di Padova	Italy
Mechatronic Engineering	3	University of Bologna	Italy
Automation and Control Engineering	3	Politecnico di Milano	Italy
Automation Engineering	3	University of Bologna	Italy
Automation Engineering	3	University of Gävle	Sweden
Automotive Mechatronics	3	Slovak Technical University	Slovakia
Robotics and Intelligent devices	4	National University of Ireland Maynooth	Ireland
Mechatronics Engineering	4	Vic University	Spain
Mechatronics	4	La Almudia Polytechnic University School	Spain
Electronics, Robotics and Mechatronics Engineering	4	Málaga University	Spain
Electronic, Robotics and Mechatronics Engineering	4	Sevilla University	Spain
Mechatronics Engineering	5	National Institute of Applied Sciences	France
Mechatronics Engineering	5	EIGSI general engineering school in La Rochelle	France
Mechatronics Engineering	3	ISTY - INSTITUT DES SCIENCES ET TECHNIQUES DES YVELINES	France
Mechatronics Engineering	3	Ecole nationale superieure des mines	France

		d'Ales	
Mechatronics Engineering	3	Polytechnic Institute of Viana do Castelo	Portugal
Mechatronics Engineering	3	University of Évora	Portugal
Integrated Engineering	3	Tallinn University of Technology	Estonia
Mechatronics	3	Fontys University of Applied Sciences	Netherlands
Mechatronics	4	Liepaja University	Latvia
Mechatronics	4	Vidzeme University of Applied Sciences	Latvia
Mechatronics Engineering	3	Riga Technical University	Latvia
Mechanics and metalworking, heat energy, heat engineering and mechanical engineering	5	Rezekne Academy of Technologies	Latvia
Mechatronics	3	Darmstadt TU	Germany
Mechatronics Engineering	3	German International University	Germany
Mechatronics Engineering	3.5	AGH University of Science and Technology	Poland
Mechatronics	3	Warshaw University Of Technology	Poland
Mechatronics	3	Gdansk University of Technology	Poland
Automotive Engineering	4	Frederick University	Cyprus
Mechanical and Manufacturing Engineering	4	University of Cyprus	Cyprus
Mechanical Engineering (Manufacturing)	4	Malta College of Arts, Science & Technology	Malta
Mechatronics and Business Management	3	University of Applied Sciences Upper Austria	Austria
Mechatronics	3	University of Innsbruck - Joint Study Programme of the University of	Austria

		Innsbruck and the Private University for Health Sciences, Medical Informatics and Technology (UMIT TIROL)	
Production Engineering and Management	5	Democritus University of Thrace	Greece
Industrial Engineering and Management	5	International Hellenic University	Greece
Mechatronics Engineering	4	University of South Bohemia in České Budějovice	Czech Republic
Mechatronics Engineering	3.5	University of Debrecen	Hungary
Mechatronics Engineering	3.5	Óbuda University	Hungary
Informatics: Robotics and Intelligent Systems	3	Oslo University	Norway
Mechatronics (Engineering)	3.5	University of Southern Denmark	Denmark
Mechatronics	3	University of Southern Denmark	Denmark
Mechatronics and Robotics	4	Vilnius Gediminas Technical University	Lithuania
Mechatronics	4	Kaunas Technology University	Lithuania
Engineering Technology	3	KU Leuven	Belgium
Mechatronics and Robotics	4	Tashkent State Technical university	Uzbekistan
Computer Engineering	4	Tashkent university of information technologies	Uzbekistan

Table 7. Teaching methodology of the bachelor degree programmes in Mechatronics or related degrees in EU, UK and Uzbekistan.

Bachelor degree	Teaching methodology	University	Country

programme title			
Mechatronics	Lectures, laboratory classes, individual and group projects, connection with industry and tutorials	University of Glasgow	United Kingdom
Mechatronics Engineering	Lectures, laboratory classes, individual and group projects, connection with industry and tutorials	University of Manchester	United Kingdom
Mechatronics and Robotic Engineering	Lectures, laboratory classes, individual and group projects, connection with industry and tutorials	University of Birmingham	United Kingdom
Mechatronics		Technical University of Sofia	Bulgaria
Mechatronics		Transilvania University of Brașov	Romania
Mechatronic Engineering	Theory, tutorials, labs	Universita degli Studi di Padova	Italy
Mechatronic Engineering	Theory, tutorials, labs	University of Bologna	Italy
Automation and Control Engineering	Theory, tutorials, labs	Politecnico di Milano	Italy
Automation Engineering		University of Bologna	Italy
Automation Engineering	Theory, tutorials, labs	University of Gävle	Sweden
Automotive Mechatronics	-	Slovak Technical University	Slovakia
Robotics and Intelligent devices	Lectures,Tutorials,Labs, internship, thesis	National University of Ireland Maynooth	Ireland
Mechatronics Engineering	Work in small groups using methodologies innovative teachers: project-based learning. Compulsory internships in companies and institutions to gain professional curricular experience, possibility of taking a training program based in job scholarships. Flexibility to be part of studies and internships a abroad through mobility programs in European, American or Asian universities, companies and research centers	Vic University	Spain

Mechatronics	Classic methodology with bachelor project and optional external intership	La Almudia Polytechnic University School	Spain
Electronics, Robotics and Mechatronics Engineering	Classic methodology with bachelor project	Málaga University	Spain
Electronic, Robotics and Mechatronics Engineering	Classic methodology with bachelor project	Sevilla University	Spain
Mechatronics Engineering	At the end of the 1st year: a compulsory internship to discover the company (minimum 4 weeks); At the end of 3rd and 4th year: a compulsory internship in business application (4 weeks minimum); During the 9th semester: a technological research project (PRT); In the 5th year, the end of studies project is an in-depth study making an original contribution to the development of techniques in fields related to mechatronics	National Institute of Applied Sciences	France
Mechatronics Engineering	Learning by training	EIGSI general engineering school in La Rochelle	France
Mechatronics Engineering	Requires 2 years course in general engineering. Mixed course: 40% in school and 60% in industrial company	ISTY - INSTITUT DES SCIENCES ET TECHNIQUES DES YVELINES	France
Mechatronics Engineering	Requires 2 years course in general engineering. Mixed course: 40% in school and 60% in industrial company	Ecole nationale superieure des mines d'Ales	France
Mechatronics Engineering	Classic methodology with bachelor project and external internship.	Polytechnic Institute of Viana do Castelo	Portugal
Mechatronics Engineering	Classic methodology with short bachelor project	University of Évora	Portugal
Integrated Engineering	-	Tallinn University of Technology	Estonia

Mechatronics	The program concentrates on a strong collaboration with many companies in the international high tech Brainport region.	Fontys University of Applied Sciences	Netherlands
Mechatronics	Dual studies - study time in lectures is combined with work in a branch company. Studies at the University include the acquisition of theory, laboratory work, seminars, project work. Students do internships in a company	Liepaja University	Latvia
Mechatronics	-	Vidzeme University of Applied Sciences	Latvia
Mechatronics Engineering	-	Riga Technical University	Latvia
Mechanics and metalworking, heat energy, heat engineering and mechanical engineering	-	Rezekne Academy of Technologies	Latvia
Mechatronics	The Bachelor program in Mechatronics and even more the Master program have a strong research orientation and are carried by high-research institutions. Teaching methodology include theory, lab sessions, development of projects, connection with industry, seminars	Darmstadt TU	Germany
Mechatronics Engineering	Classic methodology	German International University	Germany
Mechatronics Engineering	Theory, lab sessions, practice, projects, seminars, industry Apprenticeship	AGH University of Science and Technology	Poland
Mechatronics	-	Warshaw University Of Technology	Poland
Mechatronics	-	Gdansk University of Technology	Poland
Automotive Engineering	The Program constitutes a balance between the academic and the practical	Frederick University	Cyprus

	directions.		
Mechanical and Manufacturing Engineering	The educational system in the Department is designed to not only provide high quality education to the students in their selected areas of study, but to also create entrepreneurial students who will be confident to promote innovative ideas for the purpose of generating a new high-technology based industry in Cyprus	University of Cyprus	Cyprus
Mechanical Engineering (Manufacturing)	-	Malta College of Arts, Science & Technology	Malta
Mechatronics and Business Management	-	University of Applied Sciences Upper Austria	Austria
Mechatronics	• (1) Courses without continuous performance assessment: Lectures (VO) are courses held in lecture format. (2) Courses with continuous performance assessment: 1. Practical courses (UE), 2. Seminars (SE), 3. Lectures with practical elements (VU), 4. Practical training courses (PR) (University of Innsbruck - Joint Study Programme of the University of Innsbruck and the Private University for Health Sciences, Medical Informatics and Technology.	University of Innsbruck - Joint Study Programme of the University of Innsbruck and the Private University for Health Sciences, Medical Informatics and Technology (UMIT TIROL)	Austria
Production Engineering and Management	Classic methodology	Democritus University of Thrace	Greece
Industrial Engineering and Management	Classic methodology	International Hellenic University	Greece
Mechatronics Engineering	Lecture, seminar: 39%; Practice: 61%.	University of South Bohemia in České Budějovice	Czech Republic
Mechatronics Engineering	Lecture, seminar: 39%; Practice: 61%.	University of Debrecen	Hungary
Mechatronics Engineering	Lecture, seminar: 39%; Practice: 61%.	Óbuda University	Hungary

Informatics: Robotics and Intelligent Systems	-	Oslo University	Norway
Mechatronics (Engineering)	Industrial Engineering Training	University of Southern Denmark	Denmark
Mechatronics	-	University of Southern Denmark	Denmark
Mechatronics and Robotics	-	Vilnius Gediminas Technical University	Lithuania
Mechatronics	-	Kaunas Technology University	Lithuania
Engineering Technology	Learning by training	KU Leuven	Belgium
Mechatronics and Robotics	Theory, lab sessions, development of projects, connection with industry, seminars, other	Tashkent State Technical university	Uzbekista n
Computer Engineering	Theory, lab sessions, practice, projects, seminars, industry internship	Tashkent university of information technologies	Uzbekista n

Table 8. Teaching methodology of the master degree programmes in Mechatronics or related degrees in EU, UK and Uzbekistan.

Master degree programme title	Teaching methodology	University	Country
Mechatronics	Lectures, laboratory classes, individual and group projects, connection with industry and tutorials	University of Glasgow	United Kingdom
Mechatronics Engineering	Lectures, laboratory classes, individual and group projects, connection with industry and tutorials	University of Manchester	United Kingdom
Mechatronics and Robotic Engineering	Lectures, laboratory classes, individual and group projects, connection with industry and tutorials	University of Birmingham	United Kingdom
Mechatronic systems for Industry and	-	Transilvania University of Brașov	Romania

Medicine			
Mechatronic Engineering (Control Technologies for Industries 4.0)	Theory, tutorials, labs	Politecnico di Torino	Italy
Automation and Control Engineering	Theory, tutorials, labs	Politecnico di Milano	Italy
Robotics and Automation Engineering	Classic methodology	Sevilla University	Spain
Mechatronics	Classic methodology	University of Vigo	Spain
Mechatronics	Classic methodology	Polytechnic University of Valencia	Spain
Mechatronics	Classic methodology	Oviedo University (joint master degree with other universities from France, Russia, Netherlands, Germany and Egypt))	Spain
Advanced Mechatronics	4 semesters (30 ECTS/semester) based on blended learning allowing the customization of the student cursus according to his/her background, his/her research project and his/her professional project	Université Savoie-Mont Blanc	France
Control for Green Mechatronics	Classical methodology	University Bourgogne Franche-Comté	France
Mechatronic systems and advanced mechanics	Classical methodology	Université de Technologie Compiègne	France
Mechatronics Engineering	Classical methodology: 1 year classes and 1 year for dissertation	University of Minho	Portugal
Mechatronics	Most of the courses are project based supported by theoretical materials. There are several Practical Project courses on	TTK University of Applied Sciences	Estonia

	the first year containing the topics of machine control, autonomous and industrial robotics and mechatronics and sensoric systems aimed to work with some real industrial applications by student groups ending with presenting a conference paper as a rule. Examples of this kind projects are "Smart control of collaborative robots", "3D vision serving for robots" and "UAV and UGV control simulation and hardware systems", etc.		
Mechatronics	-	Poznan University of Technology	Poland
Mechanical and Manufacturing Engineering	-	University of Cyprus	Cyprus
Manufacturing and Welding Engineering Design	-	Frederick University	Cyprus
Mechatronics	-	Malta College of Arts, Science & Technology	Malta
Mechatronics and Business Management		University of Applied Sciences Upper Austria	Austria
Mechatronics	(1) Courses without continuous performance assessment: Lectures (VO) are courses held in lecture format. (2) Courses with continuous performance assessment: 1. Practical courses (UE), 2. Seminars (SE), 3. Lectures with practical elements (VU), 4. Practical training courses (PR) (University of Innsbruck - Joint Study Programme of the University of Innsbruck and the Private University for Health Sciences, Medical Informatics and Technology	University of Innsbruck - Joint Study Programme of the University of Innsbruck and the Private University for Health Sciences, Medical Informatics and Technology (UMIT TIROL)	Austria
Mechatronics	Classic methodology	University of Western Macedonia	Greece
Strategic Product Design	Classic methodology	International Hellenic	Greece

		University	
Automation Systems	Classic methodology	National Technical University of Athens	Greece
Informatics: Robotics and Intelligent Systems	-	Oslo University	Norway
Mechatronics	Information on teaching and working methods are given in the course descriptions for each course. A range of different teaching and working methods will be used, including lectures, individual and group exercises, laboratory work and project work. Besides facilitating the students' academic development, teaching methods are selected with a view to developing the students' ability to solve practical problems and work in teams. Project work, both individually and in groups, will train the students in the application of theoretical knowledge and tools to identify and analyse specific problems and develop new systems and products. It will also develop the students' ability to cooperate and communicate effectively. Regarding master's thesis: For every student/group there will be 5 compulsory guidance meetings	University of Agder	Norway
Mechatronics Systems	-	Vilnius Gediminas Technical University	Lithuania
dual degree program “Mechatronics”	Double degree study programme: first study year in VGTU and second study year in Braunschweig Technical University (Germany)	Vilnius Gediminas Technical University	Lithuania
Mechatronic Engineering (Control Technologies for Industries 4.0),	Theory, lab sessions, development of projects, connection with industry, seminars, other	TTPU	Uzbekistan

Table 9. The language of the bachelor bachelor degree programmes in Mechatronics or related degrees in EU, UK and Uzbekistan.

Bachelor degree programme title	**Language**	**University**	**Country**
Mechatronics	English	University of Glasgow	United Kingdom
Mechatronics Engineering	English	University of Manchester	United Kingdom
Mechatronics and Robotic Engineering	English	University of Birmingham	United Kingdom
Mechatronics	Bulgarian	Technical University of Sofia	Bulgaria
Mechatronics	English/Romanian	Transilvania University of Brașov	Romania
Mechatronic Engineering	Italian	Universita degli Studi di Padova	Italy
Mechatronic Engineering	Italian	University of Bologna	Italy
Automation and Control Engineering	Italian	Politecnico di Milano	Italy
Automation Engineering	Italian	University of Bologna	Italy
Automation Engineering	Swedish	University of Gävle	Sweden
Automotive Mechatronics	Slovak	Slovak Technical University	Slovakia
Robotics and Intelligent devices		National University of Ireland Maynooth	Ireland
Mechatronics Engineering	Spanish	Vic University	Spain
Mechatronics	Spanish	La Almudia Polytechnic University School	Spain
Electronics, Robotics and Mechatronics Engineering	Spanish	Málaga University	Spain
Electronic, Robotics and	Spanish	Sevilla University	Spain

Mechatronics Engineering			
Mechatronics Engineering	French	National Institute of Applied Sciences	France
Mechatronics Engineering	French and English (only semester 7)	EIGSI general engineering school in La Rochelle	France
Mechatronics Engineering	French	ISTY - INSTITUT DES SCIENCES ET TECHNIQUES DES YVELINES	France
Mechatronics Engineering	French	Ecole nationale superieure des mines d'Ales	France
Mechatronics Engineering	Portuguese	Polytechnic Institute of Viana do Castelo	Portugal
Mechatronics Engineering	Portuguese	University of Évora	Portugal
Integrated Engineering	English	Tallinn University of Technology	Estonia
Mechatronics	English	Fontys University of Applied Sciences	Netherlands
Mechatronics	Latvian	Liepaja University	Latvia
Mechatronics	Latvian	Vidzeme University of Applied Sciences	Latvia
Mechatronics Engineering	Latvian/English	Riga Technical University	Latvia
Mechanics and metalworking, heat energy, heat engineering and mechanical engineering	Latvian/English	Rezekne Academy of Technologies	Latvia
Mechatronics	German	Darmstadt TU	Germany
Mechatronics Engineering	German	German International University	Germany
Mechatronics Engineering	Polish and English	AGH University of Science and Technology	Poland
Mechatronics	Polish	Warshaw University Of Technology	Poland
Mechatronics	English	Gdansk University of Technology	Poland
Automotive Engineering	English	Frederick University	Cyprus

Mechanical and Manufacturing Engineering	Greek	University of Cyprus	Cyprus
Mechanical Engineering (Manufacturing)	Malti	Malta College of Arts, Science & Technology	Malta
Mechatronics and Business Management	German	University of Applied Sciences Upper Austria	Austria
Mechatronics	German	University of Innsbruck - Joint Study Programme of the University of Innsbruck and the Private University for Health Sciences, Medical Informatics and Technology (UMIT TIROL)	Austria
Production Engineering and Management	Greek	Democritus University of Thrace	Greece
Industrial Engineering and Management	Greek	International Hellenic University	Greece
Mechatronics Engineering	Czech	University of South Bohemia in České Budějovice	Czech Republic
Mechatronics Engineering	English	University of Debrecen	Hungary
Mechatronics Engineering	English	Óbuda University	Hungary
Informatics: Robotics and Intelligent Systems	Norwegian	Oslo University	Norway
Mechatronics (Engineering)	Danish, English	University of Southern Denmark	Denmark
Mechatronics	English	University of Southern Denmark	Denmark
Mechatronics and Robotics	Lithuanian, English	Vilnius Gediminas Technical University	Lithuania
Mechatronics	Lithuanian, English	Kaunas Technology University	Lithuania

Engineering Technology	English	KU Leuven	Belgium
Mechatronics and Robotics	Uzbek, Russian	Tashkent State Technical university	Uzbekistan
Computer Engineering	Uzbek, Russian	Tashkent university of information technologies	Uzbekistan

Table 10. The language of the master bachelor degree programmes in Mechatronics or related degrees in EU, UK and Uzbekistan.

Master degree programme title	**Language**	**University**	**Country**
Mechatronics	English	University of Glasgow	United Kingdom
Mechatronics Engineering	English	University of Manchester	United Kingdom
Mechatronics and Robotic Engineering	English	University of Birmingham	United Kingdom
Mechatronic systems for Industry and Medicine	English/Romanian	Transilvania University of Brașov	Romania
Mechatronic Engineering (Control Technologies for Industries 4.0)	English	Politecnico di Torino	Italy
Automation and Control Engineering	English	Politecnico di Milano	Italy
Robotics and Automation Engineering	Spanish	Sevilla University	Spain
Mechatronics	Spanish	University of Vigo	Spain
Mechatronics	Spanish	Polytechnic University of Valencia	Spain
Mechatronics	Spanish	Oviedo University (joint master degree with other universities from France, Russia, Netherlands, Germany and Egypt))	Spain

Advanced Mechatronics	French and English	Université Savoie-Mont Blanc	France
Control for Green Mechatronics	French and English	University Bourgogne Franche-Comté	France
Mechatronic systems and advanced mechanics	French and English	Université de Technologie Compiègne	France
Mechatronics Engineering	Portuguese	University of Minho	Portugal
Mechatronics	English	TTK University of Applied Sciences	Estonia
Mechatronics	English	Poznan University of Technology	Poland
Mechanical and Manufacturing Engineering	Greek	University of Cyprus	Cyprus
Manufacturing and Welding Engineering Design	English	Frederick University	Cyprus
Mechatronics	Malti	Malta College of Arts, Science & Technology	Malta
Mechatronics and Business Management	German	University of Applied Sciences Upper Austria	Austria
Mechatronics	German	University of Innsbruck - Joint Study Programme of the University of Innsbruck and the Private University for Health Sciences, Medical Informatics and Technology (UMIT TIROL)	Austria
Mechatronics	Greek	University of Western Macedonia	Greece
Strategic Product Design	English	International Hellenic University	Greece
Automation Systems	Greek	National Technical University of Athens	Greece
Informatics: Robotics and Intelligent	Norwegian	Oslo University	Norway

Systems			
Mechatronics	English	University of Agder	Norway
Mechatronics Systems	Lithuanian, English	Vilnius Gediminas Technical University	Lithuania
dual degree program "Mechatronics"	English	Vilnius Gediminas Technical University	Lithuania
Mechatronic Engineering (Control Technologies for Industries 4.0),	Uzbek, Russian, English (in the MSc degree programme)	TTPU	Uzbekistan

Table 11. Percentage of the course subject - Mechanical engineering in the profile of the bachelor degree programmes in Mechatronics or related degrees in EU, UK and Uzbekistan.

Bachelor degree programme title	**Percentage of the course subject - Mechanical engineering**	**University**	**Country**
Mechatronics	25	University of Glasgow	United Kingdom
Mechatronics Engineering	8	University of Manchester	United Kingdom
Mechatronics and Robotic Engineering	16	University of Birmingham	United Kingdom
Mechatronics	-	Technical University of Sofia	Bulgaria
Mechatronics	18	Transilvania University of Brașov	Romania
Mechatronic Engineering	29.8	Universita degli Studi di Padova	Italy
Mechatronic Engineering	29.8	University of Bologna	Italy
Automation and Control Engineering	21.3	Politecnico di Milano	Italy
Automation Engineering	30.3	University of Bologna	Italy
Automation Engineering	18.75	University of Gävle	Sweden
Automotive Mechatronics	11.67	Slovak Technical University	Slovakia

Robotics and Intelligent devices	0	National University of Ireland Maynooth	Ireland
Mechatronics Engineering	15	Vic University	Spain
Mechatronics	20	La Almudia Polytechnic University School	Spain
Electronics, Robotics and Mechatronics Engineering	8	Málaga University	Spain
Electronic, Robotics and Mechatronics Engineering	12	Sevilla University	Spain
Mechatronics Engineering	19	National Institute of Applied Sciences	France
Mechatronics Engineering	9	EIGSI general engineering school in La Rochelle	France
Mechatronics Engineering	-	ISTY - INSTITUT DES SCIENCES ET TECHNIQUES DES YVELINES	France
Mechatronics Engineering	14	Ecole nationale superieure des mines d'Ales	France
Mechatronics Engineering	17	Polytechnic Institute of Viana do Castelo	Portugal
Mechatronics Engineering	20	University of Évora	Portugal
Integrated Engineering	10	Tallinn University of Technology	Estonia
Mechatronics	20	Fontys University of Applied Sciences	Netherlands
Mechatronics	10	Liepaja University	Latvia
Mechatronics	6	Vidzeme University of Applied Sciences	Latvia
Mechatronics Engineering	25	Riga Technical University	Latvia
Mechanics and metalworking, heat energy, heat engineering and mechanical engineering	15	Rezekne Academy of Technologies	Latvia
Mechatronics	12	Darmstadt TU	Germany

Mechatronics Engineering	12.5	German International University	Germany
Mechatronics Engineering	17	AGH University of Science and Technology	Poland
Mechatronics	15	Warshaw University Of Technology	Poland
Mechatronics	25	Gdansk University of Technology	Poland
Automotive Engineering	50	Frederick University	Cyprus
Mechanical and Manufacturing Engineering	56.8	University of Cyprus	Cyprus
Mechanical Engineering (Manufacturing)	39.5	Malta College of Arts, Science & Technology	Malta
Mechatronics and Business Management	-	University of Applied Sciences Upper Austria	Austria
Mechatronics	29.6	University of Innsbruck - Joint Study Programme of the University of Innsbruck and the Private University for Health Sciences, Medical Informatics and Technology (UMIT TIROL)	Austria
Production Engineering and Management	30.2	Democritus University of Thrace	Greece
Industrial Engineering and Management	31.7	International Hellenic University	Greece
Mechatronics Engineering	-	University of South Bohemia in České Budějovice	Czech Republic
Mechatronics Engineering	-	University of Debrecen	Hungary
Mechatronics Engineering	-	Óbuda University	Hungary
Informatics: Robotics and	-	Oslo University	Norway

Intelligent Systems			
Mechatronics (Engineering)	-	University of Southern Denmark	Denmark
Mechatronics	-	University of Southern Denmark	Denmark
Mechatronics and Robotics	-	Vilnius Gediminas Technical University	Lithuania
Engineering Technology	10	KU Leuven	Belgium
Mechatronics	-	Kaunas Technology University	Lithuania
Mechatronics and Robotics	16	Tashkent State Technical university	Uzbekistan
Computer Engineering	0	Tashkent university of information technologies	Uzbekistan

Table 12. Percentage of the course subject - electrical/electronic engineering in the profile of the bachelor degree programmes in Mechatronics or related degrees in EU, UK and Uzbekistan.

Bachelor degree programme title	Percentage of the course subject - Electrical/Electronic Engineering	University	Country
Mechatronics	27	University of Glasgow	United Kingdom
Mechatronics Engineering	45	University of Manchester	United Kingdom
Mechatronics and Robotic Engineering	33	University of Birmingham	United Kingdom
Mechatronics	-	Technical University of Sofia	Bulgaria
Mechatronics	22	Transilvania University of Brașov	Romania
Mechatronic Engineering	16.8	Universita degli Studi di Padova	Italy
Mechatronic Engineering	20	University of Bologna	Italy
Automation and Control Engineering	19.7	Politecnico di Milano	Italy
Automation Engineering	20.5	University of Bologna	Italy
Automation Engineering	18.75	University of Gävle	Sweden

Automotive Mechatronics	20.81	Slovak Technical University	Slovakia
Robotics and Intelligent devices	9.4	National University of Ireland Maynooth	Ireland
Mechatronics Engineering	33	Vic University	Spain
Mechatronics	23	La Almudia Polytechnic University School	Spain
Electronics, Robotics and Mechatronics Engineering	32	Málaga University	Spain
Electronic, Robotics and Mechatronics Engineering	45	Sevilla University	Spain
Mechatronics Engineering	15	National Institute of Applied Sciences	France
Mechatronics Engineering	9	EIGSI general engineering school in La Rochelle	France
Mechatronics Engineering	-	ISTY - INSTITUT DES SCIENCES ET TECHNIQUES DES YVELINES	France
Mechatronics Engineering	11	Ecole nationale superieure des mines d'Ales	France
Mechatronics Engineering	32	Polytechnic Institute of Viana do Castelo	Portugal
Mechatronics Engineering	30	University of Évora	Portugal
Integrated Engineering	17	Tallinn University of Technology	Estonia
Mechatronics	20	Fontys University of Applied Sciences	Netherlands
Mechatronics	15	Liepaja University	Latvia
Mechatronics	32	Vidzeme University of Applied Sciences	Latvia
Mechatronics Engineering	12	Riga Technical University	Latvia
Mechanics and metalworking, heat energy, heat engineering and mechanical	10	Rezekne Academy of Technologies	Latvia

engineering			
Mechatronics	28	Darmstadt TU	Germany
Mechatronics Engineering	5.8	German International University	Germany
Mechatronics Engineering	12	AGH University of Science and Technology	Poland
Mechatronics	12	Warshaw University Of Technology	Poland
Mechatronics	22	Gdansk University of Technology	Poland
Automotive Engineering	9.1	Frederick University	Cyprus
Mechanical and Manufacturing Engineering	2.3	University of Cyprus	Cyprus
Mechanical Engineering (Manufacturing)	4.7	Malta College of Arts, Science & Technology	Malta
Mechatronics and Business Management	-	University of Applied Sciences Upper Austria	Austria
Mechatronics	14.8	University of Innsbruck - Joint Study Programme of the University of Innsbruck and the Private University for Health Sciences, Medical Informatics and Technology (UMIT TIROL)	Austria
Production Engineering and Management	7.5	Democritus University of Thrace	Greece
Industrial Engineering and Management	23.8	International Hellenic University	Greece
Mechatronics Engineering	-	University of South Bohemia in České Budějovice	Czech Republic
Mechatronics Engineering	-	University of Debrecen	Hungary
Mechatronics Engineering	-	Óbuda University	Hungary

Informatics: Robotics and Intelligent Systems	-	Oslo University	Norway
Mechatronics (Engineering)	-	University of Southern Denmark	Denmark
Mechatronics	-	University of Southern Denmark	Denmark
Mechatronics and Robotics	-	Vilnius Gediminas Technical University	Lithuania
Engineering Technology	10	KU Leuven	Belgium
Mechatronics	-	Kaunas Technology University	Lithuania
Mechatronics and Robotics	16	Tashkent State Technical university	Uzbekistan
Computer Engineering	7	Tashkent university of information technologies	Uzbekistan

Table 13. Percentage of the course subject - computer Science/ ICT in the profile of the bachelor degree programmes in Mechatronics or related degrees in EU, UK and Uzbekistan.

Bachelor degree programme title	**Percentage of the course subject – Computer Science/ICT**	**University**	**Country**
Mechatronics	13	University of Glasgow	United Kingdom
Mechatronics Engineering	16	University of Manchester	United Kingdom
Mechatronics and Robotic Engineering	6	University of Birmingham	United Kingdom
Mechatronics	-	Technical University of Sofia	Bulgaria
Mechatronics	28	Transilvania University of Brașov	Romania
Mechatronic Engineering	5	Universita degli Studi di Padova	Italy
Mechatronic Engineering	5	University of Bologna	Italy
Automation and Control Engineering	12.5	Politecnico di Milano	Italy
Automation Engineering	14.8	University of Bologna	Italy

Automation Engineering	12.5	University of Gävle	Sweden
Automotive Mechatronics	9.14	Slovak Technical University	Slovakia
Robotics and Intelligent devices	42.75	National University of Ireland Maynooth	Ireland
Mechatronics Engineering	13	Vic University	Spain
Mechatronics	10	La Almudia Polytechnic University School	Spain
Electronics, Robotics and Mechatronics Engineering	10	Málaga University	Spain
Electronic, Robotics and Mechatronics Engineering	14	Sevilla University	Spain
Mechatronics Engineering	0	National Institute of Applied Sciences	France
Mechatronics Engineering	7	EIGSI general engineering school in La Rochelle	France
Mechatronics Engineering	-	ISTY - INSTITUT DES SCIENCES ET TECHNIQUES DES YVELINES	France
Mechatronics Engineering	6	Ecole nationale superieure des mines d'Ales	France
Mechatronics Engineering	19	Polytechnic Institute of Viana do Castelo	Portugal
Mechatronics Engineering	10	University of Évora	Portugal
Integrated Engineering	13	Tallinn University of Technology	Estonia
Mechatronics	20	Fontys University of Applied Sciences	Netherlands
Mechatronics	15	Liepaja University	Latvia
Mechatronics	6	Vidzeme University of Applied Sciences	Latvia
Mechatronics Engineering	12.5	Riga Technical University	Latvia
Mechanics and metalworking, heat energy, heat	15	Rezekne Academy of Technologies	Latvia

engineering and mechanical engineering			
Mechatronics	13	Darmstadt TU	Germany
Mechatronics Engineering	4.1	German International University	Germany
Mechatronics Engineering	12	AGH University of Science and Technology	Poland
Mechatronics	12	Warshaw University Of Technology	Poland
Mechatronics	10	Gdansk University of Technology	Poland
Automotive Engineering	15.9	Frederick University	Cyprus
Mechanical and Manufacturing Engineering	6.8	University of Cyprus	Cyprus
Mechanical Engineering (Manufacturing)	14	Malta College of Arts, Science & Technology	Malta
Mechatronics and Business Management	-	University of Applied Sciences Upper Austria	Austria
Mechatronics	18.5	University of Innsbruck - Joint Study Programme of the University of Innsbruck and the Private University for Health Sciences, Medical Informatics and Technology (UMIT TIROL)	Austria
Production Engineering and Management	9.4	Democritus University of Thrace	Greece
Industrial Engineering and Management	17.5	International Hellenic University	Greece
Mechatronics Engineering	-	University of South Bohemia in České Budějovice	Czech Republic
Mechatronics Engineering	-	University of Debrecen	Hungary

Mechatronics Engineering	-	Óbuda University	Hungary
Informatics: Robotics and Intelligent Systems	-	Oslo University	Norway
Mechatronics (Engineering)	-	University of Southern Denmark	Denmark
Mechatronics	-	University of Southern Denmark	Denmark
Mechatronics and Robotics	-	Vilnius Gediminas Technical University	Lithuania
Mechatronics	-	Kaunas Technology University	Lithuania
Engineering Technology	20	KU Leuven	Belgium
Mechatronics and Robotics	18	Tashkent State Technical university	Uzbekistan
Computer Engineering	57	Tashkent university of information technologies	Uzbekistan

Table 14. Percentage of the course subject - Mechatronics in the profile of the bachelor degree programmes in Mechatronics or related degrees in EU, UK and Uzbekistan.

Bachelor degree programme title	**Percentage of the course subject - Mechatronics**	**University**	**Country**
Mechatronics	15	University of Glasgow	United Kingdom
Mechatronics Engineering	15	University of Manchester	United Kingdom
Mechatronics and Robotic Engineering	18	University of Birmingham	United Kingdom
Mechatronics	-	Technical University of Sofia	Bulgaria
Mechatronics	12	Transilvania University of Brașov	Romania
Mechatronic Engineering	3.2	Universita degli Studi di Padova	Italy
Mechatronic Engineering	0	University of Bologna	Italy
Automation and Control Engineering	0	Politecnico di Milano	Italy

Automation Engineering	0	University of Bologna	Italy
Automation Engineering	0	University of Gävle	Sweden
Automotive Mechatronics	9.14	Slovak Technical University	Slovakia
Robotics and Intelligent devices	9.37	National University of Ireland Maynooth	Ireland
Mechatronics Engineering	23	Vic University	Spain
Mechatronics	18	La Almudia Polytechnic University School	Spain
Electronics, Robotics and Mechatronics Engineering	25	Málaga University	Spain
Electronic, Robotics and Mechatronics Engineering	5	Sevilla University	Spain
Mechatronics Engineering	22	National Institute of Applied Sciences	France
Mechatronics Engineering	25	EIGSI general engineering school in La Rochelle	France
Mechatronics Engineering	-	ISTY - INSTITUT DES SCIENCES ET TECHNIQUES DES YVELINES	France
Mechatronics Engineering	49	Ecole nationale superieure des mines d'Ales	France
Mechatronics Engineering	17	Polytechnic Institute of Viana do Castelo	Portugal
Mechatronics Engineering	8	University of Évora	Portugal
Integrated Engineering	23	Tallinn University of Technology	Estonia
Mechatronics	20	Fontys University of Applied Sciences	Netherlands
Mechatronics	20	Liepaja University	Latvia
Mechatronics	32	Vidzeme University of Applied Sciences	Latvia
Mechatronics Engineering	15	Riga Technical University	Latvia
Mechanics and	22	Rezekne Academy of	Latvia

metalworking, heat energy, heat engineering and mechanical engineering		Technologies	
Mechatronics	16	Darmstadt TU	Germany
Mechatronics Engineering	10.8	German International University	Germany
Mechatronics Engineering	17	AGH University of Science and Technology	Poland
Mechatronics	13	Warshaw University Of Technology	Poland
Mechatronics	10	Gdansk University of Technology	Poland
Automotive Engineering	6.8	Frederick University	Cyprus
Mechanical and Manufacturing Engineering	9.1	University of Cyprus	Cyprus
Mechanical Engineering (Manufacturing)	7	Malta College of Arts, Science & Technology	Malta
Mechatronics and Business Management	-	University of Applied Sciences Upper Austria	Austria
Mechatronics	18.5	University of Innsbruck - Joint Study Programme of the University of Innsbruck and the Private University for Health Sciences, Medical Informatics and Technology (UMIT TIROL)	Austria
Production Engineering and Management	1.9	Democritus University of Thrace	Greece
Industrial Engineering and Management	1.6	International Hellenic University	Greece
Mechatronics Engineering	-	University of South Bohemia in České Budějovice	Czech Republic

Mechatronics Engineering	-	University of Debrecen	Hungary
Mechatronics Engineering	-	Óbuda University	Hungary
Informatics: Robotics and Intelligent Systems	-	Oslo University	Norway
Mechatronics (Engineering)	-	University of Southern Denmark	Denmark
Mechatronics	-	University of Southern Denmark	Denmark
Mechatronics and Robotics	-	Vilnius Gediminas Technical University	Lithuania
Mechatronics	-	Kaunas Technology University	Lithuania
Engineering Technology	9	KU Leuven	Belgium
Mechatronics and Robotics	33	Tashkent State Technical university	Uzbekistan
Computer Engineering	9	Tashkent university of information technologies	Uzbekistan

Table 15. Percentage of the course subject - fundamental subjects in the profile of the bachelor degree programmes in Mechatronics or related degrees in EU, UK and Uzbekistan.

Bachelor degree programme title	**Percentage of the course subject – Fundamental subjects**	**University**	**Country**
Mechatronics	20	University of Glasgow	United Kingdom
Mechatronics Engineering	16	University of Manchester	United Kingdom
Mechatronics and Robotic Engineering	11	University of Birmingham	United Kingdom
Mechatronics	-	Technical University of Sofia	Bulgaria
Mechatronics	20	Transilvania University of Brașov	Romania
Mechatronic Engineering	34	Universita degli Studi di Padova	Italy
Mechatronic Engineering	33.9	University of Bologna	Italy

Automation and Control Engineering	34	Politecnico di Milano	Italy
Automation Engineering	21.3	University of Bologna	Italy
Automation Engineering	25	University of Gävle	Sweden
Automotive Mechatronics	22.84	Slovak Technical University	Slovakia
Robotics and Intelligent devices	11.5	National University of Ireland Maynooth	Ireland
Mechatronics Engineering	18	Vic University	Spain
Mechatronics	30	La Almudia Polytechnic University School	Spain
Electronics, Robotics and Mechatronics Engineering	25	Málaga University	Spain
Electronic, Robotics and Mechatronics Engineering	25	Sevilla University	Spain
Mechatronics Engineering	45	National Institute of Applied Sciences	France
Mechatronics Engineering	51	EIGSI general engineering school in La Rochelle	France
Mechatronics Engineering	-	ISTY - INSTITUT DES SCIENCES ET TECHNIQUES DES YVELINES	France
Mechatronics Engineering	21	Ecole nationale superieure des mines d'Ales	France
Mechatronics Engineering	14	Polytechnic Institute of Viana do Castelo	Portugal
Mechatronics Engineering	32	University of Évora	Portugal
Integrated Engineering	33	Tallinn University of Technology	Estonia
Mechatronics	20	Fontys University of Applied Sciences	Netherlands
Mechatronics	24	Liepaja University	Latvia
Mechatronics	13.5	Vidzeme University of Applied Sciences	Latvia
Mechatronics	34	Riga Technical	Latvia

Engineering		University	
Mechanics and metalworking, heat energy, heat engineering and mechanical engineering	18	Rezekne Academy of Technologies	Latvia
Mechatronics	31	Darmstadt TU	Germany
Mechatronics Engineering	35	German International University	Germany
Mechatronics Engineering	23	AGH University of Science and Technology	Poland
Mechatronics	32	Warshaw University Of Technology	Poland
Mechatronics	35	Gdansk University of Technology	Poland
Automotive Engineering	18.2	Frederick University	Cyprus
Mechanical and Manufacturing Engineering	25	University of Cyprus	Cyprus
Mechanical Engineering (Manufacturing)	20.9	Malta College of Arts, Science & Technology	Malta
Mechatronics and Business Management	-	University of Applied Sciences Upper Austria	Austria
Mechatronics	14.8	University of Innsbruck - Joint Study Programme of the University of Innsbruck and the Private University for Health Sciences, Medical Informatics and Technology (UMIT TIROL)	Austria
Production Engineering and Management	18.9	Democritus University of Thrace	Greece
Industrial Engineering and Management	15.9	International Hellenic University	Greece
Mechatronics	-	University of South	Czech Republic

Engineering		Bohemia in České Budějovice	
Mechatronics Engineering	-	University of Debrecen	Hungary
Mechatronics Engineering	-	Óbuda University	Hungary
Informatics: Robotics and Intelligent Systems	-	Oslo University	Norway
Mechatronics (Engineering)	-	University of Southern Denmark	Denmark
Mechatronics	-	University of Southern Denmark	Denmark
Mechatronics and Robotics	-	Vilnius Gediminas Technical University	Lithuania
Mechatronics	-	Kaunas Technology University	Lithuania
Engineering Technology	51	KU Leuven	Belgium
Mechatronics and Robotics	17	Tashkent State Technical university	Uzbekistan
Computer Engineering	27	Tashkent university of information technologies	Uzbekistan

Table 16. The bachelor degree programmes which were identified as good practice examples by the EU partners based on their experience as well as relevant highlighted details.

Bachelor degree programme title	**Percentage of the course subject - Electrical/Electronic Engineering**	**University**	**Country**
Mechatronics Engineering	Mechatronics include projects and external internship. It is the first degree in Mechatronic Engineering that is taught in the Spanish university framework; 10 years of experience	Vic University	Spain
Mechatronics	Mechatronics include projects and manufacturing engineering.	La Almudia Polytechnic University School	Spain
Electronics, Robotics and	The Joint Master Degree in Mechatronic Engineering, EU4M,	Málaga University	Spain

Mechatronics Engineering	welcomes all prospective students interested in becoming professionally qualified to work in the field of Mechatronics and Micro-mechatronics.		
Mechatronics Engineering	Bachelor project: From the 2nd year, students design and manufacture small robots (mechanical, electronic and programming). From the 3rd year to the 5th year, they develop larger projects as a group (drones, Segways, electric vehicles, etc.). The project makes it possible to apply skills associated with the knowledge seen in scientific and technical teaching, but also to apply techniques of project management and teamwork. INSA Strasbourg is historically the first French establishment to graduate students in mechatronics (1994).	National Institute of Applied Sciences	France
Mechatronics Engineering	Mechatronics include projects, external intership and industrial management. http://www.ipvc.pt/engenharia-mecatronica	Polytechnic Institute of Viana do Castelo	Portugal
Integrated Engineering	In study program are connected different fields, such as IT, business and process management, design and product development, mechatronics and the digitalisation of production. High-quality laboratories for this: laboratories for 3D printing, mechatronics, wood, metal, electronics, logistics, mobile services and media, virtual and augmented reality, etc.	Tallinn University of Technology	Estonia
Mechatronics	Dual studies - study time in lectures is combined with work in	Liepaja University	Latvia

	a branch company. Studies at the University include the acquisition of theory, laboratory work, seminars, project work. Students do internships in a company. https://www.liepu.lv/en/120/faculty-of-science-and-engineering		
Mechatronics	www.va.lv	Vidzeme University of Applied Sciences	Latvia
Mechatronics Engineering	The study programme provides deep understanding of Fundamentals of Mechanics. Moreover, it places a strong emphasis on analytical engineering science and technicals fundamentals. Acquired skills of theoretical calculations and computer and computer applications help to solve problems in mechanics and lab experiments creating a solid basis for a further career in industry or further studies in a master programme. Graduates can pursue a mechanical engineer career in both local and international projects as well as in various companies – automobile, shipyards, railway transport, etc., where there is a requirement for expertise in combustion, noise and vibration process control, robotics, quality management, biological engineering, space research, liquid mechanics, water supply, planning machine and mechanism maintenance, consumer goods design, pollution control and mechanical synthesis of new materials. In addition, designers and	Riga Technical University	Latvia

	mechanical engineers can work in companies involved in packaging industry, automation of industrial processes. There are graduates who pursue their career as experts in insurance companies and municipal enterprises.		
Mechanics and metalworking, heat energy, heat engineering and mechanical engineering		Rezekne Academy of Technologies	Latvia
Mechatronics Engineering	Collaboration with industry (required): • 4-week professional apprenticeship • University-Industry Internship: Graduation Project Faculty students obtain grants and can study in Germany, France and Great Britain, which results in obtaining a double diploma - one of AGH- UST, and one of the foreign University. A wide scope of studues enables faculty graduates to work in any industrial branch in Poland.	AGH University of Science and Technology	Poland
Industrial Engineering and Management	The degree programme emerged from a merger of two previous bachelor degree progammes: Automation Engineering and Automotive Engineering. http://www.iem.ihu.gr/	International Hellenic University	Greece
Mechatronics and Robotics	Bachelor degree in Mechatronics and Robotics, Department of Mechatronics, Robotics and Digital Manufacturing, Vilnius Gediminas Technical University, VGTU VGTU *Bachelor of Mechatronics and Robotics* study programme	Vilnius Gediminas Technical University	Lithuania

	has been awarded the Investor's Spotlight mark of quality, certifying that the study programme meets the needs of foreign investors and is a leader in fostering the competences essential for modern business.		
Mechatronics	Main competences – Adapt systems for machinery control in various companies operating in the fields from production to designing; – To control production processes and understand needs and possibilities for their robotisation; – To analyse problematic areas of facilities management and adapt modern robotic systems for increase of efficiency; – To design and realise modern robotic systems according to the market needs. Interdisciplinarity of this study programme provides wide range of career possibilities for work in various industries, public sector, space or military industry. Students learn at the most modern laboratories of the Baltic Region and after graduation they are able to: – Design, install and provide maintenance to stationary and mobile robots and their systems; – Realise modern algorithms for control of machinery and the ones based on artificial intellect; – To combine classic mechatronics solutions, classical	Kaunas Technology University	Lithuania

	control algorithms, possibilities of artificial intellect and information technologies.		

Table 17. The master degree programmes which were identified as good practice examples by the EU partners based on their experience as well as relevant highlighted details.

Master degree programme title	Good practice example -Details	University	Country
Mechatronics	Master Mechatronics Oviedo University (joint master degree with other universities of France, Russia, Netherlands, Germany and Egypt) The Joint Master Degree in Mechatronic Engineering, EU4M, welcomes all prospective students interested in becoming professionally qualified to work in the field of Mechatronics and Micro-mechatronics. If you want to be able to work in interdisciplinary and international teams to solve complex mechatronic tasks, if you want to attain the ability to adapt quickly and be flexible in dealing with a variety of tasks and problems from different fields, if you'd like to have a qualification in intercultural communication and to be able to communicate easily in different languages with people from different countries, then JMD EU4M is your master. Join us! All students joining EU4M are requested to sign a Student's Agreement stating all the conditions and regulations accepted when registering for this Master Programme. Topics such as tuition fees, study paths, examination rules or permanence requirements among others can be found in this document. http://www.eu4m.eu/	Oviedo University (joint master degree with other universities from France, Russia, Netherlands, Germany and Egypt))	Spain

	http://www.eu4m.eu/inicio;jsessionid=22C20576A6B16CC9771A21B2755FC3DF		
Strategic Product Design	Available at: https://www.ihu.gr/ucips/postgraduate-programmes/spd The newly equipped Digital Manufacturing and Materials Characterization Laboratory (DMMC Lab) is available for students of Strategic Product Design programme to use under the guidance of technically competent personnel. The Laboratory is also used for external collaborations with industry partners, funded research projects and other academic activities. Lab's equipment is summarized as follows: Portable 3D scanner Artec Eva, with white light technology and 0,5mm precision with texture scanning capabilities Desktop 3D scanner NextEngine with Laser technology 0,1mm precision with texture scanning capabilities Portable Kinect sensor 3D printer FormLabs1+ stereolithography technology (SLA) with 25μm precision 3D printer 3DTouch Fused Deposition Modelling (FDM) technology with 125μm precision 3D printer BCN 3D Sigma Fused Deposition Modelling (FDM) technology with 50μm precision 3D printer Markforged MarkTwo Composite Filament Fabrication Technology with 100μm precision 3D printer Sinterit Lisa Selective Laser Sintering with 100μm precision 4 axis CNC machine Roland MDX40a Coordinate Measurement Machine (CMM) attached to Roland MDX40a. Available information at: https://www.ihu.gr/ucips/digital-manufacturing-and-materials-characterization-laboratory-dmmc-lab.	International Hellenic University	Greece
Mechatronics		Vilnius	Lithuan

Systems	-	Gediminas Technical University	ia
dual degree program "Mechatronics"	-	Vilnius Gediminas Technical University	Lithuania

APPENDIX A

Work Package 1 - Task 1.1 description: Analysis and comparison of teaching systems and methods in HEIs of EU and Uzbekistan.

Work Package 1 - Task 1.2 description: Studying experience of the EU partners in the implementation of standards, curriculum and teaching materials in the field of Mechatronics. Compiling a list of good practice examples. **(The Task 1.2 refers to EU Partners only)**

PART A – Work Package 1 – Task 1.1

• *For each identified course relevant to Mechatronics fill out the following information*:*

Programme title[1]	
Department	
University	
Country	
URL	
Degree of Study Programme[2]	
ECTS[3]	
Duration[4]	
Language[5]	
Bachelor project[6]	
Teaching methodology[7]	

[1] E.g. Mechatronics.

[2] E.g. Bachelor of Science.

[3] Total number of credits.

[4] In years.

[5] Language used for teaching.

[6] Yes or no.

[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences

The structure of the Programme.

Year 1 – Semester 1*
Module 1
Module 2
...
Year 1 – Semester 1
Module 1
...

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: ------------

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	
Electrical/Electronic Engineering	
Computer Science/ ICT	
Mechatronics	
Fundamental subjects	

Please list any further comments in the space below[9]

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

* Repeat the procedure for each identified course.

PART B – Work Package 1 – Task 1.2 (refers to EU Partners only)

• Please provide your own studying in the implementation of standards, curriculum and teaching materials in the field of Mechatronics. You can also list URL addresses.

• If you want to list bachelor degrees in Mechatronics offered by your University, fill out the information according to Part A, except if you have already done so in Part A. Similarly, if you want to list Master degrees in Mechatronics or other relevant fields offered by your University, fill out the information according to Part A, except if you have already done so in Part A.

List of good practice examples.

1	
2	
…	…

APPENDIX B

The template is going to be used by the MechaUZ Partners for filling out information required for the completion of tasks in Work Package 1, more specifically tasks 1.1 and 1.2 of Work Package 1.

Work Package 1 - Task 1.1 description: Analysis and comparison of teaching systems and methods in HEIs of EU and Uzbekistan.

Work Package 1 - Task 1.2 description: Studying experience of the EU partners in the implementation of standards, curriculum and teaching materials in the field of Mechatronics. Compiling a list of good practice examples. **(The Task 1.2 refers to EU Partners only)**

PART A – Work Package 1 – Task 1.1

• *For each identified course relevant to Mechatronics fill out the following information*:*

Programme title[1]	Mechatronics
Department	Faculty of Science and Engineering
University	Liepaja University
Country	Latvia
URL	liepu.lv
Degree of Study Programme[2]	Professional bachelor degree
ECTS[3]	240
Duration[4]	4
Language[5]	Latvian
Bachelor project[6]	Yes
Teaching methodology[7]	Dual studies - study time in lectures combined with work in a branch company. Studies at the University include the acquisition of theory, laboratory work, seminars, and project work. Students do internships in a company.
~~External Internship~~	

[1] E.g. Mechatronics.

[2] E.g. Bachelor of Science.

[3] Total number of credits.

[4] In years.

[5] Language used for teaching.

[6] Yes or no.

[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences
The goals of the professional higher education study program "Mechatronics" are: • to promote the growth of specialists in the sectors of the national economy in which modern electromechanical equipment is managed with integrated application of electronics and computer equipment • to promote the development of computer control in the region and the country; • to provide conditions for obtaining high-quality and competitive higher professional education in computer control by preparing specialists who are able to carry out academic and applied research in computer control science (branch of science - 2.2. Electrical engineering, electronics, information and communication technologies); • to provide an opportunity for bachelors of the study program “Mechatronics”, continuing their education, to obtain a master's degree in engineering, mechatronics, adaptronics, transport, etc. areas, as well as the relevant professional competencies; • to promote the development of a creative, responsible and motivated personality for lifelong learning.

The structure of the Programme.

Year 1 – Semester 1*
Module 1 Year I:Introduction to studies, research and technology Industry legislation Office software Technical English Environmental and civil protection Mathematics Programming Electronics basics Metrology and measurement techniques Electricity and magnetism Mechanics and flows Electronics engineering project Introduction to mechanics Databases Internet of Things
Module 2 Year II: Business Management Project management Human Resource Management Metrology and measurement techniques

Algorithms and data structures Technical graphics Electronics engineering project Electronics Construction Materials, structures Production technologies Study work I Sensors Robot control I Internships
…
Module 3 Year III: Business communication Comprehensive quality management Thermodynamics Operating systems and computer architecture Technical graphics Study work II Electrical engineering and electric drive Internet of Things Robot control Artificial Intelligence Simulation and mathematical modeling Software engineering Innovation management Internships
Module 4 Year IV: Production organization and management Cyber security Internships Smart technology project Cloud computing project Study work III Bachelor Thesis
…

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address:

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	10%
Electrical/Electronic Engineering	15%
Computer Science/ ICT	15%
Mechatronics	20%

Fundamental subjects	24%

Please list any further comments in the space below[9]

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

S2

Programme title[1]	Mechatronics
Department	Faculty of Engineering
University	Vidzeme University
Country	Latvia
URL	va.lv
Degree of Study Programme[2]	Professional bachelor degree
ECTS[3]	240
Duration[4]	4
Language[5]	Latvian
Bachelor project[6]	Yes
Teaching methodology[7]	Classic methodology with bachelor project
~~Internship~~	Yes

[1] E.g. Mechatronics.
[2] E.g. Bachelor of Science.
[3] Total number of credits.
[4] In years.
[5] Language used for teaching.
[6] Yes or no.
[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences
To prepare qualified specialists - mechatronics engineers for professional work in companies of various economic sectors, where mechatronic systems development, design and automation of technological processes are performed, as well as in companies where management of electrical equipment with integrated electronics and computer equipment is performed. To prepare qualified specialists whose theoretical and practical knowledge, as well as skills, abilities and attitudes would meet the requirements of the modern labor market.

The structure of the Programme.

Year 1 – Semester 1*
Module 1
Module 2
Year 1. Mathematics, English, Economics, Russian, Basics of computer systems administration, Physics, Mechanical engineering drawing, Basics of programming, Introduction to the specialty, English, Labor, environmental and civil protection, Physics, Mathematics in engineering calculations, Materials

learning, Computer architecture, Probability theory and mathematical statistics, Technical mechanics and material resistance, Electropneumatic automation. **Year 2.** Introduction to communication and practical personnel management, Probability theory and mathematical statistics, Adjustments, tolerances and technical measurements, Electrical engineering, Theory of machines and mechanisms, Development of electrical documentation, Automation elements, their structure, operation, application, Electropneumatic automation, Coursework, Basics of electric machines, Computer programs in engineering mechanics, Electronics, Electrical measurements, Power supply and electrical apparatus, Design basics, Sensors and their application, Practice. **Year 3.** Project management in engineering, Electric drive, Production and service organization, Automated design, Internet of things and sensor networks, PLC application and programming, Industrial automated process visualization, PLC programming, Elective courses, Study work, Practice. **Year 4.** Robots and robot control systems, Automatic control system design, PLC programming, Industrial automated process visualization, Elective courses, Study work, Practice, Bachelor's thesis
Year 1 – Semester 1
Module 1
…

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address:

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	6%
Electrical/Electronic Engineering	32%
Computer Science/ ICT	6%
Mechatronics	32%
Fundamental subjects	13.50%

Please list any further comments in the space below[9]

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

S3

Programme title[1]	Mechanics and metalworking, heat energy, heat engineering and mechanical engineering
Department	
University	Rezekne Academy of Technologies
Country	Latvia
URL	ru.lv
Degree of Study Programme[2]	Professional bachelor degree
ECTS[3]	270
Duration[4]	5
Language[5]	Lv/En
Bachelor project[6]	Yes
Teaching methodology[7]	
~~Internship~~	Yes

[1] E.g. Mechatronics.
[2] E.g. Bachelor of Science.
[3] Total number of credits.
[4] In years.
[5] Language used for teaching.
[6] Yes or no.
[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences
Mechatronics is a field of engineering based on machines, electronics, and hardware and control systems technologies. Mechatronic engineers use their notions of machinery, electronics, hardware and control to see and improve the system as a whole and deal with all aspects of these mechatronic systems regarding design, operation, maintenance, repair and renewal.

The structure of the Programme.

Year 1 – Semester 1*
Module 1
Module 2
…
Year 1 – Semester 1
Module 1

…

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: https://www.rta.lv/study_programmes?sp_id=59

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	15%
Electrical/Electronic Engineering	10%
Computer Science/ ICT	10%
Mechatronics	15%
Fundamental subjects	22%

Please list any further comments in the space below[9]

Diploma must contain grades of three subjects - mathematics, foreign languages (English, German, French, or Russian), informatics.

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

S4

Programme title[1]	Mechatronics, Engineering
Department	Faculty of Mechanical Engineering
University	Riga Technical University
Country	Latvia
URL	rtu.lv
Degree of Study Programme[2]	Professional bachelor degree
ECTS[3]	180
Duration[4]	3 years
Language[5]	LV/EN
Bachelor project[6]	Yes
Teaching methodology[7]	Classic methodology with bachelor project
~~Internship~~	Yes

[1] E.g. Mechatronics.
[2] E.g. Bachelor of Science.
[3] Total number of credits.
[4] In years.
[5] Language used for teaching.
[6] Yes or no.
[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences
The study programme provides deep understanding of Fundamentals of Mechanics. Moreover, it places a strong emphasis on analytical engineering science and technicals fundamentals. Acquired skills of theoretical calculations and computer and computer applications help to solve problems in mechanics and lab experiments creating a solid basis for a futher career in industry or further studies in a master programme.

The structure of the Programme.

Year 1 – Semester 1*
Module 1
Module 2
Subjects: Mathematics, Physics, Mechanics, Electrical Engineering and Electronics, General Chemistry, Structures and Properties of Engineering Materials, Descriptive Geometry and Engineering Graphics, Fundamentals of Computer Science, Economics, Supplementary Mathematics (for mechanical engineering), Probability Theory and Mathematical Statistics, Introduction to the Field of Study, Theoretical Mechanics (for mechanical engineers),

Resistance of Materials (for mechanical engineering), Material Science, Heat Study, Construction of Machines and Mechanisms, Engineering Measurements and Experiments, Fluid Mechanics, Fluid Mechanics, Numerical Analysis in Engineering Mechanics, Engineering Mechanics Problems, Hydro- and Gas Dynamics, Technical Thermodynamics and Heat Exchange, Methodology and Technique of Design, Machine Dynamics and Strength, Methods and Technology of Process Control, Electro, Pneumo and Hydro automatics.
Year 1 – Semester 1
Module 1
…

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: https://fsd.rtu.lv/riga-technical-university-rtu/bachelors-studies/engineering-technology-mechanics-and-mechanical-engineering-bachelors/

Other sources:

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	25%
Electrical/Electronic Engineering	12%
Computer Science/ ICT	12.5%
Mechatronics	15%
Fundamental subjects	34%

Please list any further comments in the space below[9]

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

S1M

Programme title[1]	Mechatronics
Department	Faculty of Engineering
University	Darmstadt TU
Country	Germany
URL	www.tu-darmstadt.de
Degree of Study Programme[2]	Academic bachelor degree
ECTS[3]	180
Duration[4]	3
Language[5]	De
Bachelor project[6]	Yes
Teaching methodology[7]	
~~Internship~~	Yes

[1] E.g. Mechatronics.
[2] E.g. Bachelor of Science.
[3] Total number of credits.
[4] In years.
[5] Language used for teaching.
[6] Yes or no.
[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences
The Bachelor program in Mechatronics and even more the Master program have a strong research orientation and are carried by high-research institutions. Teaching methodology include theory, lab sessions, development of projects, connection with industry, seminars. In the "Mechatronics" bachelor's degree course, students receive solid specialist training in the mathematical, theoretical and application-oriented basics of "Mechatronics". In addition, the choice of a specialization in the bachelor's course prepares the in-depth specialization in a sub-discipline of "mechatronics" in a master's course based on this. The Bachelor's degree enables students to participate in the planning and implementation of complex, innovative mechatronic components and systems on a scientific basis. In addition to the technical skills, interdisciplinary or non-technical qualifications are imparted. In particular, professional and research qualifications are imparted in order to be able to use the acquired knowledge responsibly in work, society and science.

The structure of the Programme.

Year 1 – Semester 1*
Module 1
Module 2
…
Year 1 – Semester 1
Module 1
…

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: Distribution of courses by study years: https://www.tu-darmstadt.de/media/daa_responsives_design/02_studium_medien/01_studieninteressierte_medien/02_studienangebot_medien/bachelor_of_science_1/mechatronik_b__sc__1/studienplan_83/bsc_mechatronik_pdf.en.pdf

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	12%
Electrical/Electronic Engineering	28%
Computer Science/ ICT	13%
Mechatronics	16%
Fundamental subjects	31%

Please list any further comments in the space below[9]

Dual studies - internship is integrated in the study process and is not separated.

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

S2M

Programme title[1]	**Mechatronics Engineering**
Department	**Bachelor of Science in Mechatronics Engineering**
University	German International University
Country	Germany
URL	http://www.giu-berlin.de/
Degree of Study Programme[2]	Bachelor
ECTS[3]	180
Duration[4]	3
Language[5]	German
Bachelor project[6]	Yes
Teaching methodology[7]	Classic methodology
~~Internship~~	No

[1] E.g. Mechatronics.
[2] E.g. Bachelor of Science.
[3] Total number of credits.
[4] In years.
[5] Language used for teaching.
[6] Yes or no.
[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences
To Design components and systems in a creative and innovative way that integrate computers, sensors and actuators in mechanical systems to meet desired needs, apply knowledge of math, science, technical knowledge and mechatronics engineering to formulate and solve engineering problems in a creative and innovative way. To integrate theory and practice and solve problems across different subject areas, use a wide range of analytical tools, techniques, equipment and software packages pertaining to the discipline and develop required computer programs, conduct experiments and analyze and interpret the resultant data.

The structure of the Programme.

Year 1 – Semester 1*
Module 1
Module 2
…
Year 1 – Semester 1

Module 1
…

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: http://www.giu-berlin.de/en/academic-programs/engineering/bachelor-of-science-in-mechatronics.aspx

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	12.5%
Electrical/Electronic Engineering	5.8%
Computer Science/ ICT	4.1%
Mechatronics	10.8%
Fundamental subjects	35%

Please list any further comments in the space below[9]

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

S3M

Programme title[1]	Mechatronics
Department	Faculty of Engineering and Robotics
University	AGH University of Science and Technology
Country	Poland
URL	www.agh.edu.pl
Degree of Study Programme[2]	Bachelor Degree
ECTS[3]	210
Duration[4]	3.5
Language[5]	English
Bachelor project[6]	Yes
Teaching methodology[7]	Classic methodology
~~Internship~~	No

[1] E.g. Mechatronics.

[2] E.g. Bachelor of Science.

[3] Total number of credits.

[4] In years.

[5] Language used for teaching.

[6] Yes or no.

[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences
Interdisciplinary studies in the area of engineering and technology. Mechatronics combines such fields as mechanics, electronics, controlling and computer engineering. Graduates in Mechatronics are able to analyse, design and manufacture, operate and service complex interdisciplinary products. Students are able to recognize real engineering problems and be ready to work as part of engineering teams in many different fields of industry, including automation, aviation, house equioment, consumer electronics, defence, software, manufacturing etc. The studies consist of general and technical courses. General courses include mathematics, physics, chemistry, materials science, computer and control science.

The structure of the Programme.

Year 1 – Semester 1*
Module 1
Module 2

Year 1 – Semester 1
Module 1
…

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: http://www.international.agh.edu.pl/eng/regular-studies/education-offer/first-cycle-degree-programmes/mechatronic-engineering/

https://sylabusy.agh.edu.pl/en/1/2/15/1/4/5/55

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	17%
Electrical/Electronic Engineering	12%
Computer Science/ ICT	12%
Mechatronics	17%
Fundamental subjects	23%

Please list any further comments in the space below[9]

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

S4M

Programme title[1]	Mechatronics
Department	Faculty of Mechatronics
University	Warshaw University Of Technology
Country	Poland
URL	https://www.pw.edu.pl/
Degree of Study Programme[2]	Bachelor Degree
ECTS[3]	210
Duration[4]	3
Language[5]	Polish
Bachelor project[6]	Yes
Teaching methodology[7]	Classic methodology
~~Internship~~	No

[1] E.g. Mechatronics.
[2] E.g. Bachelor of Science.
[3] Total number of credits.
[4] In years.
[5] Language used for teaching.
[6] Yes or no.
[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences
Automatics and Robotics, diagnostics of industrial processes, precise and electronic devices, apparatus for precision and biomedical engineering. Visualisation of structures and diagnostics of physiological processes, photonics and microsystems, mechatronic systems, multimedia technologies, metrology and quality engineering, dynamics of machines and machine elements.

The structure of the Programme.

Year 1 – Semester 1*
Module 1
Module 2
…
Year 1 – Semester 1
Module 1
…

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: https://www.pw.edu.pl/engpw/Academics/Faculties/Faculty-of-Mechatronics

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	15%
Electrical/Electronic Engineering	12%
Computer Science/ ICT	12%
Mechatronics	13%
Fundamental subjects	32%

Please list any further comments in the space below[9]

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

P1

Programme title[1]	Mechatronics
Department	Mechatronic Construction
University	Poznan University of Technology
Country	Poland
URL	https://www.put.poznan.pl/
Degree of Study Programme[2]	Master Degree
ECTS[3]	90
Duration[4]	3
Language[5]	En
Bachelor project[6]	Yes
Teaching methodology[7]	Lectures, classes, laboratory classes, projects practice.
~~External intership~~	No

[1] E.g. Mechatronics.
[2] E.g. Bachelor of Science.
[3] Total number of credits.
[4] In years.
[5] Language used for teaching.
[6] Yes or no.
[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences
https://www.put.poznan.pl/sites/default/files/attachments/19_studies_msc_mechatronics_constructions_5_0.pdf

The structure of the Programme.

Year 1 – Semester 1*
Module 1
Module 2
…
Year 1 – Semester 1
Module 1
…

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address:

https://www.put.poznan.pl/sites/default/files/attachments/19_studies_msc_mechatronics_constructions_5_0.pdf

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	7%
Electrical/Electronic Engineering	5%
Computer Science/ ICT	6%
Mechatronics	10%
Fundamental subjects	14%

Please list any further comments in the space below[9]

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

P2

Programme title[1]	Mechatronics
Department	Mechanical Engineering
University	Gdansk University of Technology
Country	Poland
URL	https://pg.edu.pl/
Degree of Study Programme[2]	Bachelor degree
ECTS[3]	175
Duration[4]	3
Language[5]	En
Bachelor project[6]	Yes
Teaching methodology[7]	
~~Intership~~	Yes

[1] E.g. Mechatronics.
[2] E.g. Bachelor of Science.
[3] Total number of credits.
[4] In years.
[5] Language used for teaching.
[6] Yes or no.
[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences
Mechatronics Engineering consistently incorporates scientific valences from the courses in Mechanical, Electrotechnical and Informatics Engineering, in parallel with the respective practical skills of professional relevance, useful for the exercise of new design functions, as well as for the production and maintenance of industrial processes and products. With an employability rate of 100%, this degree seeks to function as a partner of the regional, national and international industry, promptly facilitating the student's involvement in research projects, providing contacts and business internships since the 1st year. It reflects some influence of component companies for the automotive industry, namely, the Évora plant of the multinational Tyco Electronics.

The structure of the Programme.

Year 1 – Semester 1*
Module 1
Module 2

Semester 1: Information Technology, materials science, mathematics, physics. Semester 2: Material removal processes, materials technology, mechanics (metrology and measurement systems), physics. Semester 3: Fundamentals of machine of Machine design, material science, mathematics, Mechanics, Physical education, Thermodynamics. Semester 4: Electrical engineering, electronics, Fluid Mechanics, Welding technology. Semester 5: Automation and Robotics, Fundamentals of Machine design, Hydraulics and Pneumatics, Manufacturing Engineering, Methodology of teamwork, Work Safety and Ergonomics. Semester 6: Environmental management and ecology. Semester 7: Intellectual Property Protection, Professional practice.

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: https://ects.pg.edu.pl/timesheet?courseId=12227

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	25%
Electrical/Electronic Engineering	22%
Computer Science/ ICT	10%
Mechatronics	10%
Fundamental subjects	35%

Please list any further comments in the space below[9]

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

PART B – Work Package 1 – Task 1.2 (refers to EU Partners only)

• Please provide your own studying in the implementation of standards, curriculum and teaching materials in the field of Mechatronics. You can also list URL addresses.
• If you want to list bachelor degrees in Mechatronics offered by your University, fill out the information according to Part A, except if you have already done so in Part A. Similarly, if you want to list Master degrees in Mechatronics or other relevant fields offered by your University, fill out the information according to Part A, except if you have already done so in Part A.

List of good practice examples.

1	
2	
…	…

The template is going to be used by the MechaUZ Partners for filling out information required for the completion of tasks in Work Package 1, more specifically tasks 1.1 and 1.2 of Work Package 1.

Work Package 1 - Task 1.1 description: Analysis and comparison of teaching systems and methods in HEIs of EU and Uzbekistan.

Work Package 1 - Task 1.2 description: Studying experience of the EU partners in the implementation of standards, curriculum and teaching materials in the field of Mechatronics. Compiling a list of good practice examples. **(The Task 1.2 refers to EU Partners only)**

PART A – Work Package 1 – Task 1.1

• *For each identified course relevant to Mechatronics fill out the following information*:*

Programme title[1]	Mechatronics
Department	Faculty of Science and Engineering
University	Liepaja University
Country	Latvia
URL	liepu.lv
Degree of Study Programme[2]	Professional bachelor degree
ECTS[3]	240
Duration[4]	4
Language[5]	Latvian
Bachelor project[6]	Yes
Teaching methodology[7]	Dual studies - study time in lectures combined with work in a branch company. Studies at the University include the acquisition of theory, laboratory work, seminars, and project work. Students do internships in a company.
~~External Internship~~	

[1] E.g. Mechatronics.

[2] E.g. Bachelor of Science.

[3] Total number of credits.

[4] In years.

[5] Language used for teaching.

[6] Yes or no.

[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences
The goals of the professional higher education study program "Mechatronics" are: • to promote the growth of specialists in the sectors of the national economy in which modern electromechanical equipment is managed with integrated application of electronics and computer equipment • to promote the development of computer control in the region and the country; • to provide conditions for obtaining high-quality and competitive higher professional education in computer control by preparing specialists who are able to carry out academic and applied research in computer control science (branch of science - 2.2. Electrical engineering, electronics, information and communication technologies); • to provide an opportunity for bachelors of the study program "Mechatronics", continuing their education, to obtain a master's degree in engineering, mechatronics, adaptronics, transport, etc. areas, as well as the relevant professional competencies; • to promote the development of a creative, responsible and motivated personality for lifelong learning.

The structure of the Programme.

Year 1 – Semester 1*
Module 1 Year I:Introduction to studies, research and technology Industry legislation Office software Technical English Environmental and civil protection Mathematics Programming Electronics basics Metrology and measurement techniques Electricity and magnetism Mechanics and flows Electronics engineering project Introduction to mechanics Databases Internet of Things
Module 2 Year II: Business Management Project management Human Resource Management

Metrology and measurement techniques Algorithms and data structures Technical graphics Electronics engineering project Electronics Construction Materials, structures Production technologies Study work I Sensors Robot control I Internships
…
Module 3 Year III: Business communication Comprehensive quality management Thermodynamics Operating systems and computer architecture Technical graphics Study work II Electrical engineering and electric drive Internet of Things Robot control Artificial Intelligence Simulation and mathematical modeling Software engineering Innovation management Internships
Module 4 Year IV: Production organization and management Cyber security Internships Smart technology project Cloud computing project Study work III Bachelor Thesis
…

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address:

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	10%
Electrical/Electronic Engineering	15%

Computer Science/ ICT	15%
Mechatronics	20%
Fundamental subjects	24%

Please list any further comments in the space below[9]

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

S2

Programme title[1]	Mechatronics
Department	Faculty of Engineering
University	Vidzeme University
Country	Latvia
URL	va.lv
Degree of Study Programme[2]	Professional bachelor degree
ECTS[3]	240
Duration[4]	4
Language[5]	Latvian
Bachelor project[6]	Yes
Teaching methodology[7]	Classic methodology with bachelor project
~~Internship~~	Yes

[1] E.g. Mechatronics.
[2] E.g. Bachelor of Science.
[3] Total number of credits.
[4] In years.
[5] Language used for teaching.
[6] Yes or no.
[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences
To prepare qualified specialists - mechatronics engineers for professional work in companies of various economic sectors, where mechatronic systems development, design and automation of technological processes are performed, as well as in companies where management of electrical equipment with integrated electronics and computer equipment is performed. To prepare qualified specialists whose theoretical and practical knowledge, as well as skills, abilities and attitudes would meet the requirements of the modern labor market.

The structure of the Programme.

Year 1 – Semester 1*
Module 1
Module 2
Year 1. Mathematics, English, Economics, Russian, Basics of computer systems administration, Physics, Mechanical engineering drawing, Basics of programming, Introduction to the specialty, English, Labor, environmental and civil protection, Physics, Mathematics in engineering calculations, Materials

learning, Computer architecture, Probability theory and mathematical statistics, Technical mechanics and material resistance, Electropneumatic automation. **Year 2.** Introduction to communication and practical personnel management, Probability theory and mathematical statistics, Adjustments, tolerances and technical measurements, Electrical engineering, Theory of machines and mechanisms, Development of electrical documentation, Automation elements, their structure, operation, application, Electropneumatic automation, Coursework, Basics of electric machines, Computer programs in engineering mechanics, Electronics, Electrical measurements, Power supply and electrical apparatus, Design basics, Sensors and their application, Practice. **Year 3.** Project management in engineering, Electric drive, Production and service organization, Automated design, Internet of things and sensor networks, PLC application and programming, Industrial automated process visualization, PLC programming, Elective courses, Study work, Practice. **Year 4.** Robots and robot control systems, Automatic control system design, PLC programming, Industrial automated process visualization, Elective courses, Study work, Practice, Bachelor's thesis
Year 1 – Semester 1
Module 1
…

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address:

Profile of the Programme: Distribution of the course subjects.

Subject	Percentage of the total course modules
Mechanical Engineering	6%
Electrical/Electronic Engineering	32%
Computer Science/ ICT	6%
Mechatronics	32%
Fundamental subjects	13.50%

Please list any further comments in the space below[9]

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

S3

Programme title[1]	Mechanics and metalworking, heat energy, heat engineering and mechanical engineering
Department	
University	Rezekne Academy of Technologies
Country	Latvia
URL	ru.lv
Degree of Study Programme[2]	Professional bachelor degree
ECTS[3]	270
Duration[4]	5
Language[5]	Lv/En
Bachelor project[6]	Yes
Teaching methodology[7]	
~~Internship~~	Yes

[1] E.g. Mechatronics.
[2] E.g. Bachelor of Science.
[3] Total number of credits.
[4] In years.
[5] Language used for teaching.
[6] Yes or no.
[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences
Mechatronics is a field of engineering based on machines, electronics, and hardware and control systems technologies. Mechatronic engineers use their notions of machinery, electronics, hardware and control to see and improve the system as a whole and deal with all aspects of these mechatronic systems regarding design, operation, maintenance, repair and renewal.

The structure of the Programme.

Year 1 – Semester 1*
Module 1
Module 2
…
Year 1 – Semester 1
Module 1

...

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: https://www.rta.lv/study_programmes?sp_id=59

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	15%
Electrical/Electronic Engineering	10%
Computer Science/ ICT	10%
Mechatronics	15%
Fundamental subjects	22%

Please list any further comments in the space below[9]

Diploma must contain grades of three subjects - mathematics, foreign languages (English, German, French, or Russian), informatics.

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

S4

Programme title[1]	Mechatronics, Engineering
Department	Faculty of Mechanical Engineering
University	Riga Technical University
Country	Latvia
URL	rtu.lv
Degree of Study Programme[2]	Professional bachelor degree
ECTS[3]	180
Duration[4]	3 years
Language[5]	LV/EN
Bachelor project[6]	Yes
Teaching methodology[7]	Classic methodology with bachelor project
~~Internship~~	Yes

[1] E.g. Mechatronics.
[2] E.g. Bachelor of Science.
[3] Total number of credits.
[4] In years.
[5] Language used for teaching.
[6] Yes or no.
[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences
The study programme provides deep understanding of Fundamentals of Mechanics. Moreover, it places a strong emphasis on analytical engineering science and technicals fundamentals. Acquired skills of theoretical calculations and computer and computer applications help to solve problems in mechanics and lab experiments creating a solid basis for a futher career in industry or further studies in a master programme.

The structure of the Programme.

Year 1 – Semester 1*
Module 1
Module 2
Subjects: Mathematics, Physics, Mechanics, Electrical Engineering and Electronics, General Chemistry, Structures and Properties of Engineering Materials, Descriptive Geometry and Engineering Graphics, Fundamentals of Computer Science, Economics, Supplementary Mathematics (for mechanical engineering), Probability Theory and Mathematical Statistics, Introduction to the Field of Study, Theoretical Mechanics (for mechanical engineers),

Resistance of Materials (for mechanical engineering), Material Science, Heat Study, Construction of Machines and Mechanisms, Engineering Measurements and Experiments, Fluid Mechanics, Fluid Mechanics, Numerical Analysis in Engineering Mechanics, Engineering Mechanics Problems, Hydro- and Gas Dynamics, Technical Thermodynamics and Heat Exchange, Methodology and Technique of Design, Machine Dynamics and Strength, Methods and Technology of Process Control, Electro, Pneumo and Hydro automatics.
Year 1 – Semester 1
Module 1
…

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: https://fsd.rtu.lv/riga-technical-university-rtu/bachelors-studies/engineering-technology-mechanics-and-mechanical-engineering-bachelors/

Other sources:

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	25%
Electrical/Electronic Engineering	12%
Computer Science/ ICT	12.5%
Mechatronics	15%
Fundamental subjects	34%

Please list any further comments in the space below[9]

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

S1M

Programme title[1]	Mechatronics
Department	Faculty of Engineering
University	Darmstadt TU
Country	Germany
URL	www.tu-darmstadt.de
Degree of Study Programme[2]	Academic bachelor degree
ECTS[3]	180
Duration[4]	3
Language[5]	De
Bachelor project[6]	Yes
Teaching methodology[7]	
~~Internship~~	Yes

[1] E.g. Mechatronics.

[2] E.g. Bachelor of Science.

[3] Total number of credits.

[4] In years.

[5] Language used for teaching.

[6] Yes or no.

[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences
The Bachelor program in Mechatronics and even more the Master program have a strong research orientation and are carried by high-research institutions. Teaching methodology include theory, lab sessions, development of projects, connection with industry, seminars. In the "Mechatronics" bachelor's degree course, students receive solid specialist training in the mathematical, theoretical and application-oriented basics of "Mechatronics". In addition, the choice of a specialization in the bachelor's course prepares the in-depth specialization in a sub-discipline of "mechatronics" in a master's course based on this. The Bachelor's degree enables students to participate in the planning and implementation of complex, innovative mechatronic components and systems on a scientific basis. In addition to the technical skills, interdisciplinary or non-technical qualifications are imparted. In particular, professional and research qualifications are imparted in order to be able to use the acquired knowledge responsibly in work, society and science.

The structure of the Programme.

Year 1 – Semester 1*
Module 1
Module 2
…
Year 1 – Semester 1
Module 1
…

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: Distribution of courses by study years: https://www.tu-darmstadt.de/media/daa_responsives_design/02_studium_medien/01_studieninteressierte_medien/02_studienangebot_medien/bachelor_of_science_1/mechatronik_b__sc__1/studienplan_83/bsc_mechatronik_pdf.en.pdf

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	12%
Electrical/Electronic Engineering	28%
Computer Science/ ICT	13%
Mechatronics	16%
Fundamental subjects	31%

Please list any further comments in the space below[9]

Dual studies - internship is integrated in the study process and is not separated.

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

S2M

Programme title[1]	**Mechatronics Engineering**
Department	**Bachelor of Science in Mechatronics Engineering**
University	German International University
Country	Germany
URL	http://www.giu-berlin.de/
Degree of Study Programme[2]	Bachelor
ECTS[3]	180
Duration[4]	3
Language[5]	German
Bachelor project[6]	Yes
Teaching methodology[7]	Classic methodology
~~Internship~~	No

[1] E.g. Mechatronics.
[2] E.g. Bachelor of Science.
[3] Total number of credits.
[4] In years.
[5] Language used for teaching.
[6] Yes or no.
[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences
To Design components and systems in a creative and innovative way that integrate computers, sensors and actuators in mechanical systems to meet desired needs, apply knowledge of math, science, technical knowledge and mechatronics engineering to formulate and solve engineering problems in a creative and innovative way. To integrate theory and practice and solve problems across different subject areas, use a wide range of analytical tools, techniques, equipment and software packages pertaining to the discipline and develop required computer programs, conduct experiments and analyze and interpret the resultant data.

The structure of the Programme.

Year 1 – Semester 1*
Module 1
Module 2
…
Year 1 – Semester 1

Module 1
…

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: http://www.giu-berlin.de/en/academic-programs/engineering/bachelor-of-science-in-mechatronics.aspx

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	12.5%
Electrical/Electronic Engineering	5.8%
Computer Science/ ICT	4.1%
Mechatronics	10.8%
Fundamental subjects	35%

Please list any further comments in the space below[9]

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

S3M

Programme title[1]	Mechatronics
Department	Faculty of Engineering and Robotics
University	AGH University of Science and Technology
Country	Poland
URL	www.agh.edu.pl
Degree of Study Programme[2]	Bachelor Degree
ECTS[3]	210
Duration[4]	3.5
Language[5]	English
Bachelor project[6]	Yes
Teaching methodology[7]	Classic methodology
~~Internship~~	No

[1] E.g. Mechatronics.

[2] E.g. Bachelor of Science.

[3] Total number of credits.

[4] In years.

[5] Language used for teaching.

[6] Yes or no.

[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences
Interdisciplinary studies in the area of engineering and technology. Mechatronics combines such fields as mechanics, electronics, controlling and computer engineering. Graduates in Mechatronics are able to analyse, design and manufacture, operate and service complex interdisciplinary products. Students are able to recognize real engineering problems and be ready to work as part of engineering teams in many different fields of industry, including automation, aviation, house equioment, consumer electronics, defence, software, manufacturing etc. The studies consist of general and technical courses. General courses include mathematics, physics, chemistry, materials science, computer and control science.

The structure of the Programme.

Year 1 – Semester 1*
Module 1
Module 2

Year 1 – Semester 1
Module 1
…

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: http://www.international.agh.edu.pl/eng/regular-studies/education-offer/first-cycle-degree-programmes/mechatronic-engineering/

https://sylabusy.agh.edu.pl/en/1/2/15/1/4/5/55

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	17%
Electrical/Electronic Engineering	12%
Computer Science/ ICT	12%
Mechatronics	17%
Fundamental subjects	23%

Please list any further comments in the space below[9]

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

S4M

Programme title[1]	Mechatronics
Department	Faculty of Mechatronics
University	Warshaw University Of Technology
Country	Poland
URL	https://www.pw.edu.pl/
Degree of Study Programme[2]	Bachelor Degree
ECTS[3]	210
Duration[4]	3
Language[5]	Polish
Bachelor project[6]	Yes
Teaching methodology[7]	Classic methodology
~~Internship~~	No

[1] E.g. Mechatronics.
[2] E.g. Bachelor of Science.
[3] Total number of credits.
[4] In years.
[5] Language used for teaching.
[6] Yes or no.
[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences
Automatics and Robotics, diagnostics of industrial processes, precise and electronic devices, apparatus for precision and biomedical engineering. Visualisation of structures and diagnostics of physiological processes, photonics and microsystems, mechatronic systems, multimedia technologies, metrology and quality engineering, dynamics of machines and machine elements.

The structure of the Programme.

Year 1 – Semester 1*
Module 1
Module 2
…
Year 1 – Semester 1
Module 1
…

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: https://www.pw.edu.pl/engpw/Academics/Faculties/Faculty-of-Mechatronics

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	15%
Electrical/Electronic Engineering	12%
Computer Science/ ICT	12%
Mechatronics	13%
Fundamental subjects	32%

Please list any further comments in the space below[9]

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

P1

Programme title[1]	Mechatronics
Department	Mechatronic Construction
University	Poznan University of Technology
Country	Poland
URL	https://www.put.poznan.pl/
Degree of Study Programme[2]	Master Degree
ECTS[3]	90
Duration[4]	3
Language[5]	En
Bachelor project[6]	Yes
Teaching methodology[7]	Lectures, classes, laboratory classes, projects practice.
~~External intership~~	No

[1] E.g. Mechatronics.
[2] E.g. Bachelor of Science.
[3] Total number of credits.
[4] In years.
[5] Language used for teaching.
[6] Yes or no.
[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences
https://www.put.poznan.pl/sites/default/files/attachments/19_studies_msc_mechatronics_constructions_5_0.pdf

The structure of the Programme.

Year 1 – Semester 1*
Module 1
Module 2
…
Year 1 – Semester 1
Module 1
…

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address:

https://www.put.poznan.pl/sites/default/files/attachments/19_studies_msc_mechatronics_constructions_5_0.pdf

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	7%
Electrical/Electronic Engineering	5%
Computer Science/ ICT	6%
Mechatronics	10%
Fundamental subjects	14%

Please list any further comments in the space below[9]

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

P2

Programme title[1]	Mechatronics
Department	Mechanical Engineering
University	Gdansk University of Technology
Country	Poland
URL	https://pg.edu.pl/
Degree of Study Programme[2]	Bachelor degree
ECTS[3]	175
Duration[4]	3
Language[5]	En
Bachelor project[6]	Yes
Teaching methodology[7]	
~~Intership~~	Yes

[1] E.g. Mechatronics.
[2] E.g. Bachelor of Science.
[3] Total number of credits.
[4] In years.
[5] Language used for teaching.
[6] Yes or no.
[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences
Mechatronics Engineering consistently incorporates scientific valences from the courses in Mechanical, Electrotechnical and Informatics Engineering, in parallel with the respective practical skills of professional relevance, useful for the exercise of new design functions, as well as for the production and maintenance of industrial processes and products. With an employability rate of 100%, this degree seeks to function as a partner of the regional, national and international industry, promptly facilitating the student's involvement in research projects, providing contacts and business internships since the 1st year. It reflects some influence of component companies for the automotive industry, namely, the Évora plant of the multinational Tyco Electronics.

The structure of the Programme.

Year 1 – Semester 1*
Module 1
Module 2

Semester 1: Information Technology, materials science, mathematics, physics. Semester 2: Material removal processes, materials technology, mechanics (metrology and measurement systems), physics. Semester 3: Fundamentals of machine of Machine design, material science, mathematics, Mechanics, Physical education, Thermodynamics. Semester 4: Electrical engineering, electronics, Fluid Mechanics, Welding technology. Semester 5: Automation and Robotics, Fundamentals of Machine design, Hydraulics and Pneumatics, Manufacturing Engineering, Methodology of teamwork, Work Safety and Ergonomics. Semester 6: Environmental management and ecology. Semester 7: Intellectual Property Protection, Professional practice.

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: https://ects.pg.edu.pl/timesheet?courseId=12227

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	25%
Electrical/Electronic Engineering	22%
Computer Science/ ICT	10%
Mechatronics	10%
Fundamental subjects	35%

Please list any further comments in the space below[9]

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

PART B – Work Package 1 – Task 1.2 (refers to EU Partners only)

• Please provide your own studying in the implementation of standards, curriculum and teaching materials in the field of Mechatronics. You can also list URL addresses.
• If you want to list bachelor degrees in Mechatronics offered by your University, fill out the information according to Part A, except if you have already done so in Part A. Similarly, if you want to list Master degrees in Mechatronics or other relevant fields offered by your University, fill out the information according to Part A, except if you have already done so in Part A.

List of good practice examples.

1	
2	
…	…

The template is going to be used by the MechaUZ Partners for filling out information required for the completion of tasks in Work Package 1, more specifically tasks 1.1 and 1.2 of Work Package 1.

Work Package 1 - Task 1.1 description: Analysis and comparison of teaching systems and methods in HEIs of EU and Uzbekistan.

Work Package 1 - Task 1.2 description: Studying experience of the EU partners in the implementation of standards, curriculum and teaching materials in the field of Mechatronics. Compiling a list of good practice examples. **(The Task 1.2 refers to EU Partners only)**

PART A – Work Package 1 – Task 1.1

• *For each identified course relevant to Mechatronics fill out the following information*:*

Programme title[1]	Automotive Engineering
Department	Mechanical Engineering
University	Frederick University
Country	Cyprus
URL	http://www.frederick.ac.cy/bsc-in-automotive-engineering-program-profile
Degree of Study Programme[2]	BSc
ECTS[3]	240
Duration[4]	4 years
Language[5]	English
Bachelor project[6]	Yes (major project)
Teaching methodology[7]	The Program constitutes a balance between the academic and the practical directions.

[1] E.g. Mechatronics.

[2] E.g. Bachelor of Science.

[3] Total number of credits.

[4] In years.

[5] Language used for teaching.

[6] Yes or no.

[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences
Key Learning Outcomes Apply a variety of methods, including mathematical analysis, computational modelling, or practical experiments, to solve automotive engineering related problems. Use appropriate methods to pursue research or other detailed investigation of technical issues related with the discipline of automotive engineering. Design solutions to unfamiliar problems, possibly involving other disciplines and their creativity to develop new and original ideas and methods. Design and conduct analytic, modelling and experimental investigations, to critically evaluate data and draw conclusions Apply their knowledge and understanding for developing practical skills for solving problems, conducting investigations, and designing engineering devices and processes. Recognise the wider, non-technical implications of engineering practice, ethical, environmental, commercial and industrial. Evaluate the capabilities and limitations of existing and emerging technologies in the field of automotive engineering. Demonstrate the ability to integrate knowledge from different branches, and handle complexity, and to understand applicable techniques and methods, their limitations and the non-technical implications of engineering practice. Apply new and emerging technologies related to the field of automotive engineering. Use diverse methods, such as technical reports and technical presentations to communicate effectively with the engineering community and with society at large.

The structure of the Programme.

Year 1 – Semester 1*
Module 1
Module 2
…
Year 1 – Semester 1
Module 1
…

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: http://www.frederick.ac.cy/bsc-in-automotive-engineering-program-structure/bsc-in-automotive-engineering-semester-breakdown--

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	50%

Electrical/Electronic Engineering	9,1%
Computer Science/ ICT	15,9%
Mechatronics	6,8%
Fundamental subjects	18,2%

Please list any further comments in the space below[9]

Internship and major project included in the degree programme.

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

* Repeat the procedure for each identified course.

Programme title[1]	Mechanical and Manufacturing Engineering
Department	Mechanical and Manufacturing Engineering
University	University of Cyprus
Country	Cyprus
URL	http://www.ucy.ac.cy/mme/en/undergraduate/general-information
Degree of Study Programme[2]	BSc
ECTS[3]	240
Duration[4]	4 years
Language[5]	Greek
Bachelor project[6]	Yes
Teaching methodology[7]	The educational system in the Department is designed to not only provide high quality education to the students in their selected areas of study, but to also create entrepreneurial students who will be confident to promote innovative ideas for the purpose of generating a new high-technology based industry in Cyprus.

[1] E.g. Mechatronics.

[2] E.g. Bachelor of Science.
[3] Total number of credits.
[4] In years.
[5] Language used for teaching.
[6] Yes or no.
[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences
The purpose of the Department is to provide high level education and training in Mechanical and Manufacturing Engineering to engineers who will become leaders in their area, to achieve excellence in research and innovation and to advance the well-being of society.

The structure of the Programme.

Year 1 – Semester 1*
Module 1
Module 2
…
Year 1 – Semester 1
Module 1
…

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: http://www.ucy.ac.cy/mme/en/undergraduate/undergraduate-curriculum

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	56.8%
Electrical/Electronic Engineering	2.3%
Computer Science/ ICT	6.8%
Mechatronics	9.1%
Fundamental subjects	25%

Please list any further comments in the space below[9]

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

* Repeat the procedure for each identified course.

PART B – Work Package 1 – Task 1.2 (refers to EU Partners only)

• Please provide your own studying in the implementation of standards, curriculum and teaching materials in the field of Mechatronics. You can also list URL addresses.

• If you want to list bachelor degrees in Mechatronics offered by your University, fill out the information according to Part A, except if you have already done so in Part A. Similarly, if you want to list Master degrees in Mechatronics or other relevant fields offered by your University, fill out the information according to Part A, except if you have already done so in Part A.

List of good practice examples.

1	
2	
…	…

Programme title[1]	Manufacturing and Welding Engineering Design
Department	Mechanical Engineering
University	Frederick University
Country	Cyprus
URL	http://www.frederick.ac.cy/msc-manufacturing-and-welding-engineering-design-program-profile
Degree of Study Programme[2]	MSc
ECTS[3]	90
Duration[4]	1.5 years
Language[5]	English
Bachelor project[6]	

Teaching methodology[7]	

[1] E.g. Mechatronics.
[2] E.g. Bachelor of Science.
[3] Total number of credits.
[4] In years.
[5] Language used for teaching.
[6] Yes or no.
[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences

Key Learning Outcomes

Upon successful completion of this program, the students are expected to:

1. Be provided with broader knowledge of advanced design, manufacturing and welding engineering: the technological evolution and current needs of the industry; the financial evolution of the industry and the financial drivers and needs of the international activities.
2. Become familiar with the content and philosophy of the European and Cypriot legislative framework and to understand the relevant processes and factors.
3. Understand the contemporary global, regional and local issues and develop systemic, critical and creative thinking about their impact on economic activities.
4. Acquire skills and experiences necessary for engineers who will lead the fields of modern design, manufacturing and production engineering activities.
5. Become familiar with the procedures and analysis needed to enforce pertinent legislation, enhance the issuance of international mechanical design and production related certification, and better facilitate the environmental labelling procedure and perform feasibility analysis.
6. Develop a keen understanding of modern design and production enterprises and opportunities.
7. Become familiar with welding fundamentals, processes and equipment, materials and metallurgy and welding safety.
8. Be capable to inspect and evaluate quality of welds and finished weldments
9. Be able to use the basic hand tools and power tools in a variety of conditions
10. Develop a balanced perspective on safety and environmental concerns by offering to the students a broad-based understanding which will help at management level decision.
11. Be equipped with the necessary knowledge and acumen to move into decision-making roles.
12. Understand the organizational, political and entrepreneurial aspects of the industry.
13. Be able to use effectively state-of-the-art software tools for advanced design and production engineering.
14. Be able to gather information about the main local and international funding opportunities for promoting in a sustainable way the activities of modern design and production industry.
15. Obtaining the necessary knowledge background so that they can become chartered in the professional chambers and associations.
16. Be capable of using research results in education, within their professional environments and in society.

17. Provide an advanced understanding and balanced perspective on the financial reporting and contractual activity of the design and production industry.
18. Illustrating leading edge company practice in all areas of financial reporting, from environmental impact to corporate strategy and to emphasise the roles of all players in this.

The structure of the Programme.

Year 1 – Semester 1*
Module 1
Module 2
…
Year 1 – Semester 1
Module 1
…

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: http://www.frederick.ac.cy/msc-manufacturing-and-welding-engineering-design-program-structure-2/msc-manufacturing-and-welding-engineering-design-courses/welding-engineering-design

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	
Electrical/Electronic Engineering	
Computer Science/ ICT	
Mechatronics	
Fundamental subjects	

Please list any further comments in the space below[9]

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

* Repeat the procedure for each identified course.

PART B – Work Package 1 – Task 1.2 (refers to EU Partners only)

• Please provide your own studying in the implementation of standards, curriculum and teaching materials in the field of Mechatronics. You can also list URL addresses.
• If you want to list bachelor degrees in Mechatronics offered by your University, fill out the information according to Part A, except if you have already done so in Part A. Similarly, if you want to list Master degrees in Mechatronics or other relevant fields offered by your University, fill out the information according to Part A, except if you have already done so in Part A.

List of good practice examples.

1	
2	
…	…

Programme title[1]	Mechanical and Manufacturing Engineering
Department	Mechanical and Manufacturing Engineering
University	University of Cyprus
Country	Cyprus
URL	http://www.ucy.ac.cy/mme/en/postgraduate/postgraduate-degrees/master-m-sc-in-mechanical-and-manufacturing-engineering
Degree of Study Programme[2]	MSc
ECTS[3]	120
Duration[4]	1.5 years
Language[5]	Greek
Bachelor project[6]	
Teaching methodology[7]	

[1] E.g. Mechatronics.

[2] E.g. Bachelor of Science.

[3] Total number of credits.

[4] In years.

[5] Language used for teaching.

[6] Yes or no.

[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences

The structure of the Programme.

Year 1 – Semester 1*
Module 1
Module 2
…
Year 1 – Semester 1
Module 1
…

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: http://www.ucy.ac.cy/mme/en/postgraduate/postgraduate-degrees/master-m-sc-in-mechanical-and-manufacturing-engineering

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	
Electrical/Electronic Engineering	
Computer Science/ ICT	
Mechatronics	
Fundamental subjects	

Please list any further comments in the space below[9]

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

* Repeat the procedure for each identified course.

PART B – Work Package 1 – Task 1.2 (refers to EU Partners only)

• Please provide your own studying in the implementation of standards, curriculum and teaching materials in the field of Mechatronics. You can also list URL addresses.
• If you want to list bachelor degrees in Mechatronics offered by your University, fill out the information according to Part A, except if you have already done so in Part A. Similarly, if you want to list Master degrees in Mechatronics or other relevant fields offered by your University, fill out the information according to Part A, except if you have already done so in Part A.

List of good practice examples.

1	
2	
…	…

Programme title[1]	Mechanical Engineering (Manufacturing)
Department	Institute of Engineering and Transport – Mechanical Engineering
University	Malta College of Arts, Science & Technology
Country	Malta
URL	https://www.mcast.edu.mt/courses/me6-02-19/
Degree of Study Programme[2]	BEng(Honours)
ECTS[3]	240
Duration[4]	4 years
Language[5]	Malti

Bachelor project[6]	Yes
Teaching methodology[7]	

[1] E.g. Mechatronics.

[2] E.g. Bachelor of Science.

[3] Total number of credits.

[4] In years.

[5] Language used for teaching.

[6] Yes or no.

[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences
At the end of the programme the learner will be able to: 1. Take decisions based on pertinent information related to the manufacturing processes; 2. Manage the operational function of a manufacturing organisation; 3. Source, validate and apply information to find solutions to engineering related issues; 4. Design products, the manufacturing systems and facilities required for the production of products

The structure of the Programme.

Year 1 – Semester 1*
Module 1
Module 2
…
Year 1 – Semester 1
Module 1
…

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: https://www.mcast.edu.mt/wp-content/uploads/ME6-02-19-Bachelor-of-Engineering-Honours-in-Mechanical-Engineering-M....pdf

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	39.5%
Electrical/Electronic Engineering	4.7%

Computer Science/ ICT	14%
Mechatronics	7%
Fundamental subjects	20.9%

Please list any further comments in the space below[9]

Internship.

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

* Repeat the procedure for each identified course.

PART B – Work Package 1 – Task 1.2 (refers to EU Partners only)

• Please provide your own studying in the implementation of standards, curriculum and teaching materials in the field of Mechatronics. You can also list URL addresses.

• If you want to list bachelor degrees in Mechatronics offered by your University, fill out the information according to Part A, except if you have already done so in Part A. Similarly, if you want to list Master degrees in Mechatronics or other relevant fields offered by your University, fill out the information according to Part A, except if you have already done so in Part A.

List of good practice examples.

1	
2	
…	…

Programme title[1]	Mechatronics

Department	Institute of Engineering and Transport – Mechanical Engineering
University	Malta College of Arts, Science & Technology
Country	Malta
URL	https://www.mcast.edu.mt/courses/uc7-e12-18/
Degree of Study Programme[2]	MSc
ECTS[3]	90
Duration[4]	1.5 years
Language[5]	Malti
Bachelor project[6]	
Teaching methodology[7]	

[1] E.g. Mechatronics.

[2] E.g. Bachelor of Science.

[3] Total number of credits.

[4] In years.

[5] Language used for teaching.

[6] Yes or no.

[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences
At the end of the programme the students are able to; 1. Appraise the purpose, functioning and need for mechatronic systems in modern industry and everyday life as true interdisciplinary systems. 2. Assess various mechanisms, sensors, actuators and controllers as components of a mechatronic system. 3. Model and design mechatronic systems based on customer requirements, specifications, and best practice examples. 4. Develop a stand-alone mechatronic system based on user-case specifications. 5. Integrate a mechatronic system as an intelligent upgrade of an already functioning system in industry. 6. Plan development projects independently and in teams.

The structure of the Programme.

Year 1 – Semester 1*
Module 1
Module 2

…
Year 1 – Semester 1
Module 1
…

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: https://www.mcast.edu.mt/wp-content/uploads/UC7-E12-18-Master-of-Science-in-Mechatronics.pdf

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	
Electrical/Electronic Engineering	
Computer Science/ ICT	
Mechatronics	
Fundamental subjects	

Please list any further comments in the space below[9]

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

* Repeat the procedure for each identified course.

PART B – Work Package 1 – Task 1.2 (refers to EU Partners only)

• *Please provide your own studying in the implementation of standards, curriculum and teaching materials in the field of Mechatronics. You can also list URL addresses.*

• *If you want to list bachelor degrees in Mechatronics offered by your University, fill out the information according to Part A, except if you have already done so in Part A. Similarly, if you want to list Master degrees in Mechatronics or other relevant fields offered by your University, fill out the information according to Part A, except if you have already done so in Part A.*

List of good practice examples.

1	

2	
…	…

Programme title[1]	Mechatronics and Business Management
Department	School of Engineering
University	University of Applied Sciences Upper Austria
Country	Austria
URL	https://www.fh-ooe.at/campus-wels/studiengaenge/bachelor/mechatronikwirtschaft/
Degree of Study Programme[2]	Bachelor of Science in Engineering (BSc)
ECTS[3]	180
Duration[4]	3 years
Language[5]	German
Bachelor project[6]	Yes
Teaching methodology[7]	

[1] E.g. Mechatronics.
[2] E.g. Bachelor of Science.
[3] Total number of credits.
[4] In years.
[5] Language used for teaching.
[6] Yes or no.
[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences

The structure of the Programme.

Year 1 – Semester 1*
Module 1
Module 2
…
Year 1 – Semester 1
Module 1
…

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: https://www.fh-ooe.at/campus-wels/studiengaenge/bachelor/mechatronikwirtschaft/alle-infos-zum-studium/studienaufbau/

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	
Electrical/Electronic Engineering	
Computer Science/ ICT	
Mechatronics	
Fundamental subjects	

Please list any further comments in the space below[9]

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

* Repeat the procedure for each identified course.

PART B – Work Package 1 – Task 1.2 (refers to EU Partners only)

• *Please provide your own studying in the implementation of standards, curriculum and teaching materials in the field of Mechatronics. You can also list URL addresses.*

• *If you want to list bachelor degrees in Mechatronics offered by your University, fill out the information according to Part A, except if you have already done so in Part A. Similarly, if you want to list Master degrees in Mechatronics or other relevant fields offered by your*

University, fill out the information according to Part A, except if you have already done so in Part A.

List of good practice examples.

1	
2	
…	…

Programme title[1]	Mechatronics and Business Management
Department	School of Engineering
University	University of Applied Sciences Upper Austria
Country	Austria
URL	https://www.fh-ooe.at/en/wels-campus/studiengaenge/master/mechatronics-and-business-management/
Degree of Study Programme[2]	Diplom-Ingenieur/Diplom-Ingenieurin für technisch-wissenschaftliche Berufe (DI oder Dipl.-Ing. (Master's degree programme part-time)
ECTS[3]	120
Duration[4]	2 years
Language[5]	German
Bachelor project[6]	
Teaching methodology[7]	

[1] E.g. Mechatronics.

[2] E.g. Bachelor of Science.

[3] Total number of credits.

[4] In years.

[5] Language used for teaching.

[6] Yes or no.

[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences

The structure of the Programme.

Year 1 – Semester 1*
Module 1
Module 2
…
Year 1 – Semester 1
Module 1
…

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: https://www.fh-ooe.at/en/wels-campus/studiengaenge/master/mechatronics-and-business-management/study/focus/

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	
Electrical/Electronic Engineering	
Computer Science/ ICT	
Mechatronics	
Fundamental subjects	

Please list any further comments in the space below[9]

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

* Repeat the procedure for each identified course.

PART B – Work Package 1 – Task 1.2 (refers to EU Partners only)

• Please provide your own studying in the implementation of standards, curriculum and teaching materials in the field of Mechatronics. You can also list URL addresses.
• If you want to list bachelor degrees in Mechatronics offered by your University, fill out the information according to Part A, except if you have already done so in Part A. Similarly, if you want to list Master degrees in Mechatronics or other relevant fields offered by your University, fill out the information according to Part A, except if you have already done so in Part A.

List of good practice examples.

1	
2	
…	…

Programme title[1]	Mechatronics
Department	Mechatronics
University	University of Innsbruck - Joint Study Programme of the University of Innsbruck and the Private University for Health Sciences, Medical Informatics and Technology (UMIT TIROL).
Country	Austria
URL	https://www.uibk.ac.at/studium/angebot/ba-mechatronik.html.en
Degree of Study Programme[2]	B.Sc.
ECTS[3]	180
Duration[4]	3 years
Language[5]	German
Bachelor project[6]	Yes
Teaching methodology[7]	Types of courses and maximum number of students per course (1) Courses without continuous performance assessment: Lectures (VO) are courses held in lecture format. They introduce the research

	areas, methods and schools of thought for a given subject. (2) Courses with continuous performance assessment: 1. Practical courses (UE) focus on the practical treatment of concrete scientific tasks within an area. Maximum number of participants generally 30, for practical training courses, laboratory and machine courses as well as for exercises within the scope of writing the Bachelor's Thesis usually 15. 2. Seminars (SE) provide in-depth treatment of scientific topics through students' presentations and discussion thereof. Maximum number of participants: 30. 3. Lectures with practical elements (VU) focus on the practical treatment of concrete scientific tasks that are discussed during the lecture parts of the course. Maximum number of participants usually 30, for practical training courses, laboratory and machine exercises usually 15. 4. Practical training courses (PR) provide practical experience with concrete scientific tasks, complementing occupational and academic training. Maximum number of participants: usually 15. 5. Project studies (PJ): promote scientific collaboration of two or more fields through the treatment of multidisciplinary topics and the use of various methods and techniques. Maximum number of participants: usually 30. If Bachelor's Thesis are written within the scope of project studies then the maximum number of participants is usually 15.

[1] E.g. Mechatronics.
[2] E.g. Bachelor of Science.
[3] Total number of credits.
[4] In years.
[5] Language used for teaching.
[6] Yes or no.

[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences
Graduates are able to elaborate, evaluate and implement scientific developments in the core fields of mechatronics and to apply them in interdisciplinary contexts. They possess scientifically well-founded theoretical and methodical problem-solving skills in order to apply, after a short introductory period, different fields of mechatronics and mechatronics-related fields of mechanical engineering and electrical engineering in industrial and trade companies.

The structure of the Programme.

Year 1 – Semester 1*
Module 1
Module 2
…
Year 1 – Semester 1
Module 1
…

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: -----https://www.uibk.ac.at/studium/angebot/ba-mechatronik/index.html.en#curriculum

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	29.6%
Electrical/Electronic Engineering	14.8%
Computer Science/ ICT	18.5%
Mechatronics	18.5%
Fundamental subjects	14.8%

Please list any further comments in the space below[9]

The Bachelor's Programme Mechatronics is a joint study programme of the University of Innsbruck and the UMIT TIROL. Mechatronics combines all approaches and techniques to develop systems, procedures, devices and products where the essential characteristics are to be achieved by the integration and interaction of mechanical, electronic and information-processing components. By integrating the methods and techniques from the formerly independent technical disciplines, the development of modern systems with a high degree

of functionality, efficiency and performance is made possible. The synthesis of the engineering disciplines mechanical engineering, electric engineering and computer science, which is also based on the natural science disciplines mathematics, physics, and chemistry, reflects interdisciplinary technological challenge in modern process and equipment technology and is a key motor of present and future product innovation. In order to meet the high requirements of the bachelor's programme, natural scientific as well as engineering competences are developed and promoted with the university training. Moreover, particular importance is attached to the development of social competence due to the interdisciplinarity of the study programme.

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

* Repeat the procedure for each identified course.

PART B – Work Package 1 – Task 1.2 (refers to EU Partners only)

• Please provide your own studying in the implementation of standards, curriculum and teaching materials in the field of Mechatronics. You can also list URL addresses.
• If you want to list bachelor degrees in Mechatronics offered by your University, fill out the information according to Part A, except if you have already done so in Part A. Similarly, if you want to list Master degrees in Mechatronics or other relevant fields offered by your University, fill out the information according to Part A, except if you have already done so in Part A.

List of good practice examples.

1	
2	
…	…

Programme title[1]	Mechatronics
Department	Mechatronics

University	University of Innsbruck - Joint Study Programme of the University of Innsbruck and the Private University for Health Sciences, Medical Informatics and Technology (UMIT TIROL).
Country	Austria
URL	https://www.uibk.ac.at/studium/angebot/ma-mechatronik.html
Degree of Study Programme[2]	Master (Diplom-Ingenieurin/Diplom-Ingenieur (Dipl.-Ing. or DI)
ECTS[3]	120
Duration[4]	2 years
Language[5]	German
Bachelor project[6]	
Teaching methodology[7]	(1) Lectures (VO) 1. Lectures aim at conveying the subject matter with oral presentations, explanations and with examples and demonstrations. Interaction of students and lecturer is aimed at. 2. This type of course encourages e.g. the understanding and integration of knowledge based on the latest developments of the discipline. 3. Lectures are courses without continuous performance assessment. (2) Lecture Tutorials (VU) 1. VU-type courses are a combination of lectures and tutorials, whereby the lecture and tutorial share can be adjusted flexibly depending on the requirements of the subject matter. Should it because of the number of participants be necessary to divide the group for the tutorial part, courses of the VU type have a share of 50% for the lecture part and 50% for the tutorial. 2. This course type similarly encourages the competences and skills listed in para. 1 and 2 no. 2. 3. VU courses are courses with continuous performance assessment. 4. The maximum number of participants for VU courses is usually 30, for practical training, laboratory or machine tutorials usually 15.

	(3) Practical Trainings (PR) 1. Practical trainings serve the acquisition of skills by working independently with laboratory equipment. They aim at encouraging practical use of scientific contents. 2. This course type encourages et al. the ability to work in a team, reliability, communication skills, structured working and professional competence in unfamiliar situations. 3. Practical trainings are courses with continuous performance assessment.

[1] E.g. Mechatronics.
[2] E.g. Bachelor of Science.
[3] Total number of credits.
[4] In years.
[5] Language used for teaching.
[6] Yes or no.
[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences
Graduates have a highly specialised knowledge in the areas of development and implementation of mechatronic components and systems. They are able to demonstrate their competence in the named fields of mechatronics and where they overlap with other disciplines by correctly formulating and supporting scientific arguments and solving problems in an innovative way and by taking on project leadership.

The structure of the Programme.

Year 1 – Semester 1*
Module 1
Module 2
…
Year 1 – Semester 1
Module 1
…

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: https://www.uibk.ac.at/studium/angebot/ma-mechatronik/index.html.en

Profile of the Programme: Distribution of the course subjects.

Subject	Percentage of the total course modules
Mechanical Engineering	
Electrical/Electronic Engineering	
Computer Science/ ICT	
Mechatronics	
Fundamental subjects	

Please list any further comments in the space below[9]

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

* Repeat the procedure for each identified course.

PART B – Work Package 1 – Task 1.2 (refers to EU Partners only)

• *Please provide your own studying in the implementation of standards, curriculum and teaching materials in the field of Mechatronics. You can also list URL addresses.*

• *If you want to list bachelor degrees in Mechatronics offered by your University, fill out the information according to Part A, except if you have already done so in Part A. Similarly, if you want to list Master degrees in Mechatronics or other relevant fields offered by your University, fill out the information according to Part A, except if you have already done so in Part A.*

List of good practice examples.

1	
2	
…	…

Programme title[1]	Production Engineering and Management
Department	Production Engineering and Management
University	Democritus University of Thrace
Country	Greece
URL	https://pme.duth.gr/en/the-department/
Degree of Study Programme[2]	BEng
ECTS[3]	300
Duration[4]	5 years
Language[5]	Greek
Bachelor project[6]	Yes
Teaching methodology[7]	Classic Methodology

[1] E.g. Mechatronics.

[2] E.g. Bachelor of Science.

[3] Total number of credits.

[4] In years.

[5] Language used for teaching.

[6] Yes or no.

[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences
Our department aims at creating tomorrow's leaders in the field of innovation. In this spirit, our students are prepared in multiple fields to be able to follow their careers within a wide dynamic global environment. The title "Production and Management" does not probably fully reflect the range of skills that our graduates acquire. Production and Management Engineers plan, implement and continuously improve systems that include one or more of the following: human resources, materials, information, infrastructure, and energy products. So, they are typically occupied with project management, process optimization, supply chain analysis, process improvement, systems integration and production planning.

The structure of the Programme.

Year 1 – Semester 1*
Module 1
Module 2
…
Year 1 – Semester 1
Module 1
…

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: - https://pme.duth.gr/en/undergraduate-2/courses/ -----------

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	30,2%
Electrical/Electronic Engineering	7,5%
Computer Science/ ICT	9,4%
Mechatronics	1,9%
Fundamental subjects	18,9%

Please list any further comments in the space below[9]

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

* Repeat the procedure for each identified course.

PART B – Work Package 1 – Task 1.2 (refers to EU Partners only)

• *Please provide your own studying in the implementation of standards, curriculum and teaching materials in the field of Mechatronics. You can also list URL addresses.*

• *If you want to list bachelor degrees in Mechatronics offered by your University, fill out the information according to Part A, except if you have already done so in Part A. Similarly, if you want to list Master degrees in Mechatronics or other relevant fields offered by your University, fill out the information according to Part A, except if you have already done so in Part A.*

List of good practice examples.

1	
2	
…	…

Programme title[1]	Industrial Engineering and Management
Department	Industrial Engineering and Management
University	International Hellenic University
Country	Greece
URL	http://www.iem.ihu.gr/
Degree of Study Programme[2]	BEng
ECTS[3]	300
Duration[4]	5 years
Language[5]	Greek
Bachelor project[6]	Yes
Teaching methodology[7]	Classic methodology

[1] E.g. Mechatronics.

[2] E.g. Bachelor of Science.

[3] Total number of credits.

[4] In years.

[5] Language used for teaching.

[6] Yes or no.

[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences

The structure of the Programme.

Year 1 – Semester 1*
Module 1
Module 2
…
Year 1 – Semester 1
Module 1
…

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: http://www.iem.ihu.gr/proptProg.php ------------

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	31,7%
Electrical/Electronic Engineering	23,8%
Computer Science/ ICT	17,5%
Mechatronics	1,6%
Fundamental subjects	15,9%

Please list any further comments in the space below[9]

The Department is a merger of two Departments, namely Automation Engineering and Automotive Engineering.

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

* Repeat the procedure for each identified course.

PART B – Work Package 1 – Task 1.2 (refers to EU Partners only)

• *Please provide your own studying in the implementation of standards, curriculum and teaching materials in the field of Mechatronics. You can also list URL addresses.*

• *If you want to list bachelor degrees in Mechatronics offered by your University, fill out the information according to Part A, except if you have already done so in Part A. Similarly, if you want to list Master degrees in Mechatronics or other relevant fields offered by your*

University, fill out the information according to Part A, except if you have already done so in Part A.

List of good practice examples.

1	
2	
…	…

Programme title[1]	Mechatronics
Department	Department of Electrical and Computer Engineering
University	University of Western Macedonia
Country	Greece
URL	https://mechatronics.uowm.gr/index.php?lang=en
Degree of Study Programme[2]	M.Sc.
ECTS[3]	
Duration[4]	
Language[5]	Greek and English
Bachelor project[6]	
Teaching methodology[7]	

[1] E.g. Mechatronics.

[2] E.g. Bachelor of Science.

[3] Total number of credits.

[4] In years.

[5] Language used for teaching.

[6] Yes or no.

[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences
This program is a 3-semester master program and is addressed to graduates who want to

gain experience in the design and implementation of efficient, economical and reliable systems and products by uniting the principles of mechanics, electronics, and computing. It covers various subjects in the areas of electronics, microprocessor based design, data acquisition, power systems, mechanical systems design, mechanical behavior, and materials.

The structure of the Programme.

Year 1 – Semester 1*
Module 1
Module 2
…
Year 1 – Semester 1
Module 1
…

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: -----https://ects.teiwm.gr/index.php?option=com_content&view=article&id=117&Itemid=287&lang=en-------

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	
Electrical/Electronic Engineering	
Computer Science/ ICT	
Mechatronics	
Fundamental subjects	

Please list any further comments in the space below[9]

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

* Repeat the procedure for each identified course.

PART B – Work Package 1 – Task 1.2 (refers to EU Partners only)

• Please provide your own studying in the implementation of standards, curriculum and teaching materials in the field of Mechatronics. You can also list URL addresses.
• If you want to list bachelor degrees in Mechatronics offered by your University, fill out the information according to Part A, except if you have already done so in Part A. Similarly, if you want to list Master degrees in Mechatronics or other relevant fields offered by your University, fill out the information according to Part A, except if you have already done so in Part A.

List of good practice examples.

1	
2	
…	…

Programme title[1]	Strategic Product Design
Department	Science and Technology
University	International Hellenic University
Country	Greece
URL	https://www.ihu.gr/ucips/postgraduate-programmes/spd
Degree of Study Programme[2]	M.Sc.
ECTS[3]	90 or 120 (for a research-based M.Sc.)
Duration[4]	1 year FT or 2 years PT
Language[5]	English
Bachelor project[6]	
Teaching methodology[7]	

[1] E.g. Mechatronics.
[2] E.g. Bachelor of Science.
[3] Total number of credits.
[4] In years.

[5] Language used for teaching.

[6] Yes or no.

[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences
The MSc in Strategic Product Design Programme is being offered by the School of Science & Technology of the University Center of International Programmes of Studies of the International Hellenic University. The programme aims to provide innovative education at postgraduate level with an interdisciplinary approach as regards the design, development, management and production of products of every scale in the context of modern production and distribution technologies as well as modern forms of administration. The Programme is targeted towards graduates including professionals who wish to broaden their knowledge in the following fields: Product and Services Management, Product Creativity and Design and Industrial Design and Innovation.

The structure of the Programme.

Year 1 – Semester 1*
Module 1
Module 2
…
Year 1 – Semester 1
Module 1
…

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: https://www.ihu.gr/ucips/postgraduate-programmes/spd#tab-281682a65b8367b226b -----------

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	
Electrical/Electronic Engineering	
Computer Science/ ICT	
Mechatronics	
Fundamental subjects	

Please list any further comments in the space below[9]

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

* Repeat the procedure for each identified course.

PART B – Work Package 1 – Task 1.2 (refers to EU Partners only)

• Please provide your own studying in the implementation of standards, curriculum and teaching materials in the field of Mechatronics. You can also list URL addresses.
• If you want to list bachelor degrees in Mechatronics offered by your University, fill out the information according to Part A, except if you have already done so in Part A. Similarly, if you want to list Master degrees in Mechatronics or other relevant fields offered by your University, fill out the information according to Part A, except if you have already done so in Part A.

List of good practice examples.

1	M.Sc, in Strategic Product Design: The newly equipped Digital Manufacturing and Materials Characterization Laboratory (DMMC Lab) is available for students of Strategic Product Design programme to use under the guidance of technically competent personnel. The Laboratory is also used for external collaborations with industry partners, funded research projects and other academic activities. Lab's equipment is summarized as follows: Portable 3D scanner Artec Eva, with white light technology and 0,5mm precision with texture scanning capabilities Desktop 3D scanner NextEngine with Laser technology 0,1mm precision with texture scanning capabilities Portable Kinect sensor 3D printer FormLabs1+ stereolithography technology (SLA) with 25μm precision 3D printer 3DTouch Fused Deposition Modelling (FDM) technology with 125μm precision 3D printer BCN 3D Sigma Fused Deposition Modelling (FDM) technology with 50μm precision 3D printer Markforged MarkTwo Composite Filament Fabrication Technology with 100μm precision 3D printer Sinterit Lisa Selective Laser Sintering with 100μm precision

	4 axis CNC machine Roland MDX40a Coordinate Measurement Machine (CMM) attached to Roland MDX40a. Available information at: https://www.ihu.gr/ucips/digital-manufacturing-and-materials-characterization-laboratory-dmmc-lab.
2	
…	…

Programme title[1]	Automation Systems
Department	Interdepartmental programme, including School of Electrical and Computer Engineering, Mechanical Engineering and Chemical Engineering.
University	National Technical University of Athens
Country	Greece
URL	http://dpms-as.mech.ntua.gr/
Degree of Study Programme[2]	M.Sc.
ECTS[3]	90
Duration[4]	1.5 years
Language[5]	Greek
Bachelor project[6]	
Teaching methodology[7]	Classic Methodology

[1] E.g. Mechatronics.

[2] E.g. Bachelor of Science.

[3] Total number of credits.

[4] In years.

[5] Language used for teaching.

[6] Yes or no.

[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences

The structure of the Programme.

Year 1 – Semester 1*
Module 1
Module 2
…
Year 1 – Semester 1
Module 1
…

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: http://dpms-as.mech.ntua.gr/courses.html ------------

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	
Electrical/Electronic Engineering	
Computer Science/ ICT	
Mechatronics	
Fundamental subjects	

Please list any further comments in the space below[9]

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

* Repeat the procedure for each identified course.

PART B – Work Package 1 – Task 1.2 (refers to EU Partners only)

• Please provide your own studying in the implementation of standards, curriculum and teaching materials in the field of Mechatronics. You can also list URL addresses.

• If you want to list bachelor degrees in Mechatronics offered by your University, fill out the information according to Part A, except if you have already done so in Part A. Similarly, if you want to list Master degrees in Mechatronics or other relevant fields offered by your

University, fill out the information according to Part A, except if you have already done so in Part A.

List of good practice examples.

1	
2	
…	…

Programme title[1]	Industrial Automation
Department	Industrial and product design engineering
University	University of West Attica
Country	Greece
URL	http://mscinautomation.uniwa.gr/
Degree of Study Programme[2]	M.Sc.
ECTS[3]	90
Duration[4]	1.5 years
Language[5]	Greek
Bachelor project[6]	
Teaching methodology[7]	Classic methodology

[1] E.g. Mechatronics.

[2] E.g. Bachelor of Science.

[3] Total number of credits.

[4] In years.

[5] Language used for teaching.

[6] Yes or no.

[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences

The structure of the Programme.

Year 1 – Semester 1*
Module 1
Module 2
…
Year 1 – Semester 1
Module 1
…

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: http://mscinautomation.uniwa.gr/------------

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	
Electrical/Electronic Engineering	
Computer Science/ ICT	
Mechatronics	
Fundamental subjects	

Please list any further comments in the space below[9]

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

* Repeat the procedure for each identified course.

PART B – Work Package 1 – Task 1.2 (refers to EU Partners only)

• *Please provide your own studying in the implementation of standards, curriculum and teaching materials in the field of Mechatronics. You can also list URL addresses.*

• *If you want to list bachelor degrees in Mechatronics offered by your University, fill out the information according to Part A, except if you have already done so in Part A. Similarly, if you* *want to list Master degrees in Mechatronics or other relevant fields offered by your University, fill out the information according to Part A, except if you have already done so in Part A.*

List of good practice examples.

1	
2	
…	…

Programme title[1]	Advanced Manufacturing Systems, Automation and Robotics
Department	Interdepartmental-Mechanical Engineering and Electrical and Computer Engineering
University	Hellenic Mediterranean University
Country	Greece
URL	https://www.hmu.gr/amsar/el?language=el
Degree of Study Programme[2]	M.Sc.
ECTS[3]	90
Duration[4]	1.5 years
Language[5]	Greek
Bachelor project[6]	
Teaching methodology[7]	Classic methodology

[1] E.g. Mechatronics.

[2] E.g. Bachelor of Science.

[3] Total number of credits.

[4] In years.

[5] Language used for teaching.

[6] Yes or no.

[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences

The structure of the Programme.

Year 1 – Semester 1*
Module 1
Module 2
…
Year 1 – Semester 1
Module 1
…

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: --https://www.hmu.gr/amsar/el/%CE%B4%CE%BF%CE%BC%CE%AE/%CF%80%CF%81%CF%8C%CE%B3%CF%81%CE%B1%CE%BC%CE%BC%CE%B1-%CF%83%CF%80%CE%BF%CF%85%CE%B4%CF%8E%CE%BD?language=el----------

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	
Electrical/Electronic Engineering	
Computer Science/ ICT	
Mechatronics	
Fundamental subjects	

Please list any further comments in the space below[9]

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

* Repeat the procedure for each identified course.

PART B – Work Package 1 – Task 1.2 (refers to EU Partners only)

• Please provide your own studying in the implementation of standards, curriculum and teaching materials in the field of Mechatronics. You can also list URL addresses.
• If you want to list bachelor degrees in Mechatronics offered by your University, fill out the information according to Part A, except if you have already done so in Part A. Similarly, if you want to list Master degrees in Mechatronics or other relevant fields offered by your University, fill out the information according to Part A, except if you have already done so in Part A.

List of good practice examples.

1	
2	
…	…

Programme title[1]	
Department	
University	
Country	
URL	
Degree of Study Programme[2]	
ECTS[3]	
Duration[4]	
Language[5]	
Bachelor project[6]	
Teaching methodology[7]	

[1] E.g. Mechatronics.
[2] E.g. Bachelor of Science.
[3] Total number of credits.

[4] In years.
[5] Language used for teaching.
[6] Yes or no.
[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences

The structure of the Programme.

Year 1 – Semester 1*
Module 1
Module 2
…
Year 1 – Semester 1
Module 1
…

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: ------------

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	
Electrical/Electronic Engineering	
Computer Science/ ICT	
Mechatronics	
Fundamental subjects	

Please list any further comments in the space below[9]

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

* Repeat the procedure for each identified course.

PART B – Work Package 1 – Task 1.2 (refers to EU Partners only)

• Please provide your own studying in the implementation of standards, curriculum and teaching materials in the field of Mechatronics. You can also list URL addresses.
• If you want to list bachelor degrees in Mechatronics offered by your University, fill out the information according to Part A, except if you have already done so in Part A. Similarly, if you want to list Master degrees in Mechatronics or other relevant fields offered by your University, fill out the information according to Part A, except if you have already done so in Part A.

List of good practice examples.

1	
2	
…	…

The template is going to be used by the MechaUZ Partners for filling out information required for the completion of tasks in Work Package 1, more specifically tasks 1.1 and 1.2 of Work Package 1.

Work Package 1 - Task 1.1 description: Analysis and comparison of teaching systems and methods in HEIs of EU and Uzbekistan.

Work Package 1 - Task 1.2 description: Studying experience of the EU partners in the implementation of standards, curriculum and teaching materials in the field of Mechatronics. Compiling a list of good practice examples. **(The Task 1.2 refers to EU Partners only)**

PART A – Work Package 1 – Task 1.1

• *For each identified course relevant to Mechatronics fill out the following information*:*

Programme title[1]	Mechatronics
Department	Faculty of Product Design and Environment
University	Transilvania University of Brașov
Country	Romania
URL	https://www.unitbv.ro/en/
Degree of Study Programme[2]	Bachelor of (not specified)
ECTS[3]	240
Duration[4]	4 years
Language[5]	English/Romanian
Bachelor project[6]	yes
Teaching methodology[7]	courses
	seminars
	laboratories
	projects

[1] E.g. Mechatronics.
[2] E.g. Bachelor of Science.
[3] Total number of credits.
[4] In years.
[5] Language used for teaching.
[6] Yes or no.
[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences

The mission of this study programme (Mechanics+ Electronics_ Informatics) is the interdisciplinary education of future engineers, in what concerns the principles and tangible ways for the integration of mechanical engineering, electronics and software. Graduates need to be capable of conceiving, designing accomplishing, exploiting, maintaining and fixing mechatronic products and systems.

The structure of the Programme.

Year 1 – Semester 1*
Module 1
Module 2
…
Year 1 – Semester 1
Module 1
…

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: https://www.unitbv.ro/documente/curriculum-syllabus/Licenta/Syl/DPM_licenta_MT_2018-2019_Syl.pdf

Profile of the Programme: Distribution of the course subjects. https://www.unitbv.ro/documente/curriculum-syllabus/Licenta/Plan%20inv/DPM_licenta_MT_2018-2019.pdf

Subject	**Percentage of the total course modules**
Mechanical Engineering	18%
Electrical/Electronic Engineering	22%
Computer Science/ ICT	28%
Mechatronics	12%
Fundamental subjects	20%

Please list any further comments in the space below[9]

The students have classes on Marketing and Communication, a foreign language, as well as sports. Almost all classes include lab work.

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

* Repeat the procedure for each identified course.

PART B – Work Package 1 – Task 1.2 (refers to EU Partners only)

• *Please provide your own studying in the implementation of standards, curriculum and teaching materials in the field of Mechatronics. You can also list URL addresses.*
• *If you want to list bachelor degrees in Mechatronics offered by your University, fill out the information according to Part A, except if you have already done so in Part A. Similarly, if you want to list Master degrees in Mechatronics or other relevant fields offered by your University, fill out the information according to Part A, except if you have already done so in Part A.*

List of good practice examples. (taken from the Gabrovo Technical University website)

1	specialized laboratories equipped with modern CNC machine tools, industrial robots, 3D printer, computers and multimedia equipment
2	Lower, medium and higher class CAD/CAE/CAM software is used such as AutoCAD Mechanical, INVENTOR, SolidWorks, CATIA, FeatureCAM, SinuTrain, etc . The 3D printer type *uPrint* facilitates students in creating true prototypes of products via Rapid Prototyping
3	25 specialized laboratories equipped with 300 units of metal processing machinery including CNC machines, industrial robots, manufacturing and tooling equipment, computer aided measuring equipment and specialized software

The template is going to be used by the MechaUZ Partners for filling out information required for the completion of tasks in Work Package 1, more specifically tasks 1.1 and 1.2 of Work Package 1.

Work Package 1 - Task 1.1 description: Analysis and comparison of teaching systems and methods in HEIs of EU and Uzbekistan.

Work Package 1 - Task 1.2 description: Studying experience of the EU partners in the implementation of standards, curriculum and teaching materials in the field of Mechatronics. Compiling a list of good practice examples. **(The Task 1.2 refers to EU Partners only)**

PART A – Work Package 1 – Task 1.1

• *For each identified course relevant to Mechatronics fill out the following information*:*

Programme title[1]	Mechatronics
Department	James Watt School of Engineering
University	University of Glasgow
Country	UK
URL	https://www.gla.ac.uk/undergraduate/degrees/mechatronics/#
Degree of Study Programme[2]	Bachelor of Engineering (BEng)
ECTS[3]	460 credits / 480 credits
Duration[4]	4 years / 5 years (with Professional Practice – BOTH BEng & MEng)
Language[5]	English
Bachelor project[6]	Yes
Teaching methodology[7]	Theoretical courses
	Individual and group projects
	Lab work
	Connection with Industry

[1] E.g. Mechatronics.
[2] E.g. Bachelor of Science.
[3] Total number of credits.
[4] In years.
[5] Language used for teaching.
[6] Yes or no.

[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences
Graduates from this degree programme will have the interdisciplinary approach necessary to integrate electronics, control, software and mechanical engineering. In addition, they will acquire skills that are transferable to service industries and other areas of the business community.

The structure of the Programme.

Year 1 – Semester 1*
Module 1
Module 2
…
Year 1 – Semester 1
Module 1
…

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: https://www.gla.ac.uk/undergraduate/degrees/mechatronics/#tab=structure

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	25%
Electrical/Electronic Engineering	27%
Computer Science/ ICT	13%
Mechatronics	15%
Fundamental subjects	20%

Please list any further comments in the space below[9]

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

* Repeat the procedure for each identified course.

PART B – Work Package 1 – Task 1.2 (refers to EU Partners only)

• Please provide your own studying in the implementation of standards, curriculum and teaching materials in the field of Mechatronics. You can also list URL addresses.
• If you want to list bachelor degrees in Mechatronics offered by your University, fill out the information according to Part A, except if you have already done so in Part A. Similarly, if you want to list Master degrees in Mechatronics or other relevant fields offered by your University, fill out the information according to Part A, except if you have already done so in Part A.

List of good practice examples.

1	SPECIAL GLASGOW FEATURE: In fourth year students take part in a multidisciplinary integrated system design project, working in teams alongside students of other engineering disciplines.
2	Electronic design project - Year 2 Mechatronic design project - Year 3 Project M4 - Year 4 (Individual Project – Student chooses a “favorite” field/topic Industrial project M5 - MEng, Year 5
…	…

The template is going to be used by the MechaUZ Partners for filling out information required for the completion of tasks in Work Package 1, more specifically tasks 1.1 and 1.2 of Work Package 1.

Work Package 1 - Task 1.1 description: Analysis and comparison of teaching systems and methods in HEIs of EU and Uzbekistan.

Work Package 1 - Task 1.2 description: Studying experience of the EU partners in the implementation of standards, curriculum and teaching materials in the field of Mechatronics. Compiling a list of good practice examples. **(The Task 1.2 refers to EU Partners only)**

PART A – Work Package 1 – Task 1.1

• *For each identified course relevant to Mechatronics fill out the following information*:*

Programme title[1]	Mechatronic Engineering
Department	Department of Electrical and Electronic Engineering
University	University of Manchester
Country	UK
URL	https://www.manchester.ac.uk/study/undergraduate/courses/2020/03394/beng-mechatronic-engineering/#course-profile
Degree of Study Programme[2]	Bachelor of Engineering
ECTS[3]	330 credits + 90 credits from optional courses
Duration[4]	3 years
Language[5]	English
Bachelor project[6]	Not specified. There is mention of practical application and general project work
Teaching methodology[7]	lecture
	example class
	tutorial
	laboratory class
	independent learning

[1] E.g. Mechatronics.

[2] E.g. Bachelor of Science.

[3] Total number of credits.

[4] In years.

[5] Language used for teaching.

[6] Yes or no.

[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences
Development of microcontroller-based embedded systems. Robotics. Integration of renewable energy sources and the design of the associated power conversion systems. Development of automation and control systems for various industrial processes. Automotive electronics. Design of electrical machines and the development of guidance and control systems for unmanned intelligent underwater. Ground and aerial vehicles. Strong industry links with companies such as Siemens, Rolls-Royce, Centrica, GE, Jaguar Land Rover, BP and Texas Instruments You will also acquire skills such as logical thinking, team working, report writing, analytical and presentation skills and a high level of numeracy

The structure of the Programme.

Year 1 – Semester 1*
Module 1
Module 2
…
Year 1 – Semester 1
Module 1
…

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: https://www.manchester.ac.uk/study/undergraduate/courses/2020/03394/beng-mechatronic-engineering/course-details/

Profile of the Programme: Distribution of the course subjects. (with the electives)

Subject	**Percentage of the total course modules**
Mechanical Engineering	8%
Electrical/Electronic Engineering	45%
Computer Science/ ICT	16%
Mechatronics	15%
Fundamental subjects	16%

Please list any further comments in the space below[9]

There are also subjects concerning managerial skills. A large percentage of the tutoring is achieved via independent learning.

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

* Repeat the procedure for each identified course.

PART B – Work Package 1 – Task 1.2 (refers to EU Partners only)

• Please provide your own studying in the implementation of standards, curriculum and teaching materials in the field of Mechatronics. You can also list URL addresses.
• If you want to list bachelor degrees in Mechatronics offered by your University, fill out the information according to Part A, except if you have already done so in Part A. Similarly, if you want to list Master degrees in Mechatronics or other relevant fields offered by your University, fill out the information according to Part A, except if you have already done so in Part A.

List of good practice examples.

1	Assessment of most course units is by examination combined with an element of course work, such as marked laboratory work or marked examples. Substantial projects are assessed by written reports, presentations and demonstrations.
2	In the first year of study there is approximately a 50:50 split between the contact time and independent study; about the same as expected when studying for A-levels. In subsequent years this split changes to a greater amount of independent learning with the split being approximately 33:67 in the third year.
3	Students meet a personal tutor on a weekly basis to supplement their learning from lectures and laboratory sessions.

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Work Package 1 - Task 1.1 description: Analysis and comparison of teaching systems and methods in HEIs of EU and Uzbekistan.

Work Package 1 - Task 1.2 description: Studying experience of the EU partners in the implementation of standards, curriculum and teaching materials in the field of Mechatronics. Compiling a list of good practice examples. **(The Task 1.2 refers to EU Partners only)**

PART A – Work Package 1 – Task 1.1

• *For each identified course relevant to Mechatronics fill out the following information*:*

Programme title[1]	Mechatronics
Department	Faculty of Mechanical Engineering
University	Technical University of Sofia
Country	Bulgaria
URL	http://www.tu-plovdiv.bg/en/course.php?course=15
Degree of Study Programme[2]	BSc
ECTS[3]	"Code ECTS: MEH"
Duration[4]	4 years
Language[5]	Bulgarian
Bachelor project[6]	not specified
Teaching methodology[7]	not specified

[1] E.g. Mechatronics.
[2] E.g. Bachelor of Science.
[3] Total number of credits.
[4] In years.
[5] Language used for teaching.
[6] Yes or no.
[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences
Mechatronics is an interdisciplinary engineering field comprising various components, such as mechanical systems /units, mechanisms, devices, appliances, machines and different sets of engineering equipment; electronic systems /microelectronics, power electronics, sensors and actuators etc./; information systems /computing devices, software packages, modeling, 3D design, engineering analysis, simulation/.

The structure of the Programme.

Year 1 – Semester 1*
Module 1
Module 2
…
Year 1 – Semester 1
Module 1
…

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: https://tu-sofia.bg/specialties/preview/714

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	subjects not analytically described
Electrical/Electronic Engineering	subjects not analytically described
Computer Science/ ICT	subjects not analytically described
Mechatronics	subjects not analytically described
Fundamental subjects	subjects not analytically described

Please list any further comments in the space below[9]

modules share a common theoretical foundation, including general engineering disciplines and general degree course disciplines, meeting both the general requirements towards mechanical engineers and the specific requirements for mechanical engineers in mechatronics, thus combining the knowledge and skills in mechanical engineering, electronics and computer technology

Robotics:
construction
control and production of industrial robots
mobile and service robots, teleoperators
microrobots
manipulation equipment and robotic systems
actuators for robots
new materials and principles of construction and control of micro and mobile robots in

medicine robotic and computerized technologies modeling and simulation of robotic systems diagnostics operation and maintenance of the objects and robotic systems Precision and Micromechanical Engineering: design manufacture operation diagnostics and maintenance of office and security equipment optical and laser equipment micromechanics medical equipment measuring equipment optical and electronic equipment

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

* Repeat the procedure for each identified course.

PART B – Work Package 1 – Task 1.2 (refers to EU Partners only)

• *Please provide your own studying in the implementation of standards, curriculum and teaching materials in the field of Mechatronics. You can also list URL addresses.*

• *If you want to list bachelor degrees in Mechatronics offered by your University, fill out the information according to Part A, except if you have already done so in Part A. Similarly, if you want to list Master degrees in Mechatronics or other relevant fields offered by your University, fill out the information according to Part A, except if you have already done so in Part A.*

List of good practice examples.

1	
2	

…	…

The template is going to be used by the MechaUZ Partners for filling out information required for the completion of tasks in Work Package 1, more specifically tasks 1.1 and 1.2 of Work Package 1.

Work Package 1 - Task 1.1 description: Analysis and comparison of teaching systems and methods in HEIs of EU and Uzbekistan.

Work Package 1 - Task 1.2 description: Studying experience of the EU partners in the implementation of standards, curriculum and teaching materials in the field of Mechatronics. Compiling a list of good practice examples. **(The Task 1.2 refers to EU Partners only)**

PART A – Work Package 1 – Task 1.1

• *For each identified course relevant to Mechatronics fill out the following information*:*

Programme title[1]	**Integrated Engineering**
Department	**School of Engineering**
University	Tallinn University of Technology
Country	Estonia
URL	https://old.taltech.ee/en?id=162866&op=_print#specialty-4
Degree of Study Programme[2]	Bachelor
ECTS[3]	180
Duration[4]	3 years
Language[5]	English
Bachelor project[6]	Yes
Teaching methodology[7]	TalTech's curriculum of Integrated Engineering unites different engineering subjects to satisfy the increasing need for engineers with versatile skills and knowledge who can solve the complicated problems of today's industry. Therefore, your studies will include programming, Computer Aided Design (CAD), Robotics and Digital Manufacturing.

[1] E.g. Mechatronics.

[2] E.g. Bachelor of Science.

[3] Total number of credits.

[4] In years.

[5] Language used for teaching.

[6] Yes or no.

[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences
In study program are connected different fields, such as IT, business and process management, design and product development, mechatronics and the digitalisation of production. High-quality laboratories for this: laboratories for 3D printing, mechatronics, wood, metal, electronics, logistics, mobile services and media, virtual and augmented reality, etc.

The structure of the Programme.

Curriculum
https://ois.ttu.ee/portal/page?_pageid=37,674560&_dad=portal&_schema=PORTAL&p_action=view&p_fk_str_yksus_id=50007&p_kava_versioon_id=50510&p_net=internet&p_lang=EN&p_rezhiim=0&p_mode=1&p_from=

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: ------------

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	10%
Electrical/Electronic Engineering	17%
Computer Science/ ICT	13%
Mechatronics	23%
Fundamental subjects	33%

Please list any further comments in the space below[9]

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

* Repeat the procedure for each identified course.

PART B – Work Package 1 – Task 1.2 (refers to EU Partners only)

• Please provide your own studying in the implementation of standards, curriculum and teaching materials in the field of Mechatronics. You can also list URL addresses.

• If you want to list bachelor degrees in Mechatronics offered by your University, fill out the information according to Part A, except if you have already done so in Part A. Similarly, if you want to list Master degrees in Mechatronics or other relevant fields offered by your University, fill out the information according to Part A, except if you have already done so in Part A.

List of good practice examples.

1	
2	
…	…

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Work Package 1 - Task 1.1 description: Analysis and comparison of teaching systems and methods in HEIs of EU and Uzbekistan.

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PART A – Work Package 1 – Task 1.1

• *For each identified course relevant to Mechatronics fill out the following information*:*

Programme title[1]	1. **Automotive tehnology** 2. **Electrical Engineering** 3. Mechanical Engineering
Department	**-**
University	Eindhoven University of Technology
Country	Netherlands
URL	https://www.tue.nl/en/ 1. https://www.tue.nl/en/education/bachelor-college/bachelor-automotive-technology/ 2. https://www.tue.nl/en/education/bachelor-college/bachelor-electrical-engineering/ 3. https://www.tue.nl/en/education/bachelor-college/bachelor-mechanical-engineering/
Degree of Study Programme[2]	Bachleor
ECTS[3]	180
Duration[4]	3
Language[5]	English

Bachelor project[6]	Yes (10 ECTS)
Teaching methodology[7]	In each of the three years, electives allow you to shape your program. Gain a broader perspectives by selecting courses and projects from other TU/e bachelor's degree programs or specialize within Mechanical Engineering by choosing courses and projects specific to Mechanical Engineering. The third year is the capstone to your bachelor's degree program and the start of your preparation for a possible subsequent master's degree program.

[1] E.g. Mechatronics.

[2] E.g. Bachelor of Science.

[3] Total number of credits.

[4] In years.

[5] Language used for teaching.

[6] Yes or no.

[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences
1. During the Automotive bachelor's program, you learn the basics of all the relevant parts of the car, so you can understand the car as a system. With this knowledge, you can contribute to innovation on smarter, cleaner and safer cars. The Automotive major is formally part of the Electrical Engineering bachelor's study program. When you have completed this major, you receive the Bachelor of Science in Electrical Engineering degree, specializing in Automotive. 2. Electrical Engineering is working on the future and this is evident in the field's applications. This is why the study is geared to three societal themes that you become familiar with in the first year: • Communication (The Connected World): such as a chip that works using light rather than electric signals, Bluetooth or WiFi • Healthcare (Care and Cure): medical applications such as an MRI scanner or treating cancer cells using electromagnetic waves • Environment (Smart and Sustainable Society): finite resources like oil and gas will eventually become exhausted. Alternatives are sun and wind. But the wind does not blow constantly. How can you store energy? How can you store electricity? 3. Mechanical engineering combines subjects from mathematics, physics and chemistry.

Aspects taught during the program include heat and flow, mechanics and dynamics, the control of machines and systems, and properties of materials. As an aspiring mechanical engineer, you will develop your technical knowledge and your creative and innovative abilities. In addition, the program also helps you develop the social and communication skills you will need in the future, for example, to manage a project team of specialists from different disciplines.

The structure of the Programme.

Curriculums
Mechanic Engineering https://educationguide.tue.nl/programs/bachelor-college/majors/mechanical-engineering/curriculum/ **Electrical engineering** https://assets.studiegids.tue.nl/fileadmin/content/Faculteit_EE/Bachelor_College/Curriculum%20EE%20BACHELOR%202020-2021%20complete.pdf **Automotive Technology** https://studiegids.tue.nl/opleidingen/bachelor-college/majors/automotive-technology/curriculum/?L=0

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: ------------

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	
Electrical/Electronic Engineering	
Computer Science/ ICT	
Mechatronics	
Fundamental subjects	

Please list any further comments in the space below[9]

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

* Repeat the procedure for each identified course.

PART B – Work Package 1 – Task 1.2 (refers to EU Partners only)

• *Please provide your own studying in the implementation of standards, curriculum and teaching materials in the field of Mechatronics. You can also list URL addresses.*

• *If you want to list bachelor degrees in Mechatronics offered by your University, fill out the information according to Part A, except if you have already done so in Part A. Similarly, if you want to list Master degrees in Mechatronics or other relevant fields offered by your University, fill out the information according to Part A, except if you have already done so in Part A.*

List of good practice examples.

1	
2	
…	…

The template is going to be used by the MechaUZ Partners for filling out information required for the completion of tasks in Work Package 1, more specifically tasks 1.1 and 1.2 of Work Package 1.

Work Package 1 - Task 1.1 description: Analysis and comparison of teaching systems and methods in HEIs of EU and Uzbekistan.

Work Package 1 - Task 1.2 description: Studying experience of the EU partners in the implementation of standards, curriculum and teaching materials in the field of Mechatronics. Compiling a list of good practice examples. **(The Task 1.2 refers to EU Partners only)**

Mechatronics courses in Denmark, Norway, Czech Republic and Hungary

PART A – Work Package 1 – Task 1.1

• *For each identified course relevant to Mechatronics fill out the following information*:*

HUNGARY

Programme title[1]	Mechatronics Engineering, BSc Specialization available: Specialization in Mechatronic Systems
Department	Faculty of Engineering
University	University of Debrecen
Country	Hungary
URL	https://www.edu.unideb.hu/page.php?id=65
Degree of Study Programme[2]	Bsc
ECTS[3]	210
Duration[4]	7 Semesters
Language[5]	English
Bachelor project[6]	Project of Mechatronics, Thesis
Teaching methodology[7]	Lecture, seminar: 39%; Practice: 61%

[1] E.g. Mechatronics.
[2] E.g. Bachelor of Science.
[3] Total number of credits.
[4] In years.
[5] Language used for teaching.
[6] Yes or no.
[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences
The objective of the program is to train mechatronics engineers who have the competence to combine engineering with electronics, electrotechnics, and computer control in a synergetic way. Students will able to complete routine design, operation, and maintenance of mechatronic equipment and processes, to introduce and apply mechatronic technologies, to organize energy-efficient and environmental process and production management, and to complete average tasks in engineering development and design considering the needs of the international labour market.

The structure of the Programme.

Year 1 – semester 1	**Credits**		
	Lecture	**Practice**	**Total**

Mathematics I	4	4	8
Engineering Physics	2	2	4
Informatics (Programming in C)		4	4
Electromagnetism	2	2	4
Law and Ethics	2		4
Basics of Mechatronics	2	2	4
Year 1 – semester 2			
Mathematics II	2	4	6
Mathematics Comprehensive Exam			
Computer-Aided Modelling		4	4
Materials Engineering	3	2	6
Economics for Engineering	1	2	4
Informatics (Labview)		4	4
Electrotechnics	2	2	6
Year 2 – semester 3			
Mathematics III	2	2	4
Statics and Strength of Materials	2	2	4
Microeconomics and Economic Processes of Enterprises	1	2	4
Electronics I	2	4	6
Mechanical Machines and Machine Elements	2	2	6
Manufacturing Technologies	2	2	4
Year 2 – semester 4			
Dynamics and Vibration	2	2	4
Mechatronic Devices (Sensors, Actuators, Motors)	2	2	4
Measurement and Data Acquisition	2	2	6
Environment, Health and Safety, Ergonomics (Basics of EHS)	2	2	4
Ergonomics			
Applied Automatization I	2	4	6
Pneumatics and Hydraulics		4	4
Year 3 – semester 5			
Quality and Technical Management	2	2	4
Applied Automatization II		6	6
Electropneumatics and Electrohydraulics		4	6
Modelling and Simulation Prototype Technologies I	2	4	6
Robots and Robotic Technology	2	4	6
Year 3 – semester 6			
Electrical Machines and Drives	2	4	6
Thermodynamic Processes	2	2	4
Mechatronics Comprehensive Exam			

Modelling and Simulation Prototype Technologies II	2	4	6
Caxx Techniques	2	4	6
Cyber-Physical Systems		4	6
Year 4 – semester 7			
Project of Mechatronics		20	15
BSc Thesis		5	15

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: https://eng.unideb.hu/sites/default/files/mechatronics_engineering_bsc_bulletin_2019_0.pdf

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	
Electrical/Electronic Engineering	
Computer Science/ ICT	
Mechatronics	
Fundamental subjects	

Subject	**Credits**	**Percentage of the total course modules**
Natural Sciences	48	23
Economics and Humanities	16	8
Specific Compulsory Subjects	76	36
Differentiated Professional Subjects	45	21
Thesis	15	7
Optional Subjects	15	7
Industrial Training (6 weeks)		

Please list any further comments in the space below[9]

Internship:
Students majoring in the Mechatronics Engineering BSc have to carry out a 6-week internship involved in the model curriculum. The internship course must be signed up for previously via the NEPTUN study registration system in the spring semester (4th semester). Its execution is the criteria requirement of getting the pre-degree certificate (absolutorium).

Thesis:
A Thesis is the creative elaboration of a professional task (scientific, engineering, design, development, research or research development) in written form. By solving the task, the student relies on his/her studies using national and international literature under the guidance of an internal and external supervisor (referee). By solving the task, the

mechatronics engineering student certifies that he/she is capable to apply the acquired knowledge in practice and to summarize the completed work and its results in professional way, to solve the tasks related to his/her topic creatively and to complete individual professional work. By preparing and defending thesis students who complete the Mechanical Engineering undergraduate program prove that they are capable of the practical applications of the acquired skills, summarizing the work done and its results in a professional way, creatively solving the tasks related to the topic and doing individual professional work. The faculty academic calendar (issued by the Vice-Rector for Education) sets the thesis submission deadline. A student in bachelor program has to make a thesis as a prerequisite of the final exam. The requirements of the thesis content, the general aspects of evaluation and the number of credits assigned to the thesis are determined by the requirements of the program. In mechatronics engineering program the credits assigned to the thesis is 15. 33 The latest that thesis topics are announced by the departments for the students is the end of Week 4 of the study period of the last semester. A thesis topic can be suggested by the student as well and the head of department assigned shall decides on its acceptance. . The conditions on the acceptance of thesis as National Conference of Scientific Students' Association (hereinafter NCSSA) topic are specified by the Faculty. The NCSSA work is supposed to meet the requirements in form and content for thesis. Furthermore, it is necessary that the committee of the Pre-NCSSA makes suggestions on the NCSSA work to become a thesis. Making a thesis is controlled by a supervisor had approved by the department who is promoted by a referee also previously had approved by the department. Formal requirements of a thesis are announced in writing by the Department of Electrical Engineering and Mechatronics that are announced with the tasks in written form at the same time. The faculty academic calendar (issued by the Vice-Rector for Education) sets the thesis submission deadline, for want of this the deadline is the 21. day 12 noon before the first day of the final exam. Thesis is evaluated by the referee (internal or external), and it is evaluated and qualified individually by the department. The Head of the Department of Electrical Engineering and Mechatronics makes suggestion on its qualification to the Final Exam Board. If thesis is evaluated with a fail mark by the referee, and the department the student is not allowed to take the final exam and is supposed to prepare a new or modified thesis. The student has to be informed about it. Conditions on resubmitting the thesis are defined by the program coordinator.

Final exam (Final Exam):

Students having obtained the pre-degree certificate will finish their studies by taking the final exam. Final exam can be taken in active student status in the forthcoming exam period after gaining the pre-degree certificate then after termination of student status in any exam period within two years according to the valid education requirements. After the fifth year of the termination of student status the candidate is not allowed to take the final exam. Only students who do not have outstanding charges are allowed to take the final exam. Students who obtained a pre-degree certificate until 1 September 2016 can take the final exam until 1 September 2018. A student having obtained the pre-degree certificate (absolutorium) will finish his/her studies in Mechatronics Engineering BSc training by taking the final exam. A final exam is the evaluation and control of the knowledge and skills acquired in tertiary education during which the candidate has to certify that he/she is able to apply the obtained knowledge in practice. A final exam can be taken in the forthcoming exam period after obtaining the pre-degree certificate. The Department announces two final exam dates in a year, one at the 34 beginning of January and one at the end of June. A final exam has to be taken in front of the Committee on the fixed date. If a candidate does not pass his/her final exam by the termination of his/her student status, he/she can take his/her final exam after the termination of the student status on any of the final exam days of the relevant academic year according to existing requirements on the rules of the final exam. The Final exam consists of two parts according to the curriculum.

1) Written and oral exam on the topics of Building Automation.

2) Thesis Defence (a presentation of the thesis, answering questions, comments then answering questions based on the knowledge related to the thesis topic).

A final exam can be started if the candidate can be submitted to the final exam on the basis of definite opinion of the referees. The two parts must be hold on the same day. The parts of the final exam are evaluated on a five-point scale by members with voting rights in the Final Exam Board. The final grade for the final exam will be decided on by voting in a closed sitting after the final exam, then. In case of equal votes, the committee chair will make the decision. Final exam results will be announced by the committee chair. Results of the final exam and thesis defence will be announced at the end of the given exam day (when all candidates finished final exam and thesis defence on the given day). A note of the final exam will be taken.

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

HUNGARY

Programme title[1]	Mechatronics Engineering, BSc
Department	Bánki Donát Faculty of Mechanical and Safety Engineering
University	Óbuda University
Country	Hungary
URL	http://international.uni-obuda.hu/mechatronics-engineering
Degree of Study Programme[2]	Bachelor in Mechatronic Engineering
ECTS[3]	210
Duration[4]	7 Semesters
Language[5]	English
Bachelor project[6]	Project of Mechatronics, Thesis
Teaching methodology[7]	Lecture, seminar: 39%; Practice: 61%
~~Specialized Integrated Practice~~	yes

[1] E.g. Mechatronics.

[2] E.g. Bachelor of Science.

[3] Total number of credits.

[4] In years.

[5] Language used for teaching.

[6] Yes or no.

[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences
The aim is to train mechatronic engineers capable to integrate mechanical engineering with electronics, electrotechnics and computer control synergically; to complete routine design tasks related to mechatronic equipment and processes and smart machines, as well as to operate and maintain them; to introduce and apply mechatronic technologies; to organize process and production control in an energy efficient and environmentally sound manner; and to perform general complexity tasks of technical development and design, also taking labour market demands into consideration. They are prepared to continue their studies at a Masters course.

The structure of the Programme.

Year 1 – Semester 1	**Credits**
Mathematics I	6
Engineering Physics	4
Introduction to Mechatronics	3
Mechanics I.	4
Engineering materials	6

Informatics I.	3
Machine Elements, Machine Structures I	4
Year 1 – Semester 2	
Mathematics II	6
Mechanics II.	4
Electrotechnics	4
Informatics II	3
Laboratory of Informatics	2
Machine Elements, Machine Structures II	4
Materials Technology I	4
Manufacturing Technology I	3
Year 2 – semester 3	
Mechanics III.	6
Machine Elements, Machine Structures III	5
Machine Design Systems	4
Materials Technology II	3
Pneumatics, hydraulics	5
Manufacturing Technology II	5
Electronics	4
Year 2 – semester 4	
Measurements of Engineering Physics	2
Environmental Protection	2
Control Engineering	4
Analog and Digital Circuits I	4
Micro- and nanotechnology I	6
Industrial robot systems I	5
Year 3 – semester 5	
Economics I	2
Basics of Logistics	3
Quality Assurance	2
Analog and Digital Circuits II	4
Heat and Flow Machines	4
Mechanics	3
Micro- and nanotechnology II	6
Industrial robot systems II	7
Mechatronic of Motor Car	4
Year 3 – semester 6	
Economics II	2
Interfaces	3
Self-organizing Low-dimensional Systems	6
Programmable Circuits and Controls	5
Mechatronics of Manufacturing Systems	5
IT Networks	4
Year 4 – semester 7	

Knowledges of Legal	2
Ethics of Engineering	3
Knowledges of EU	3
Computer Aided Design	3
Thesis	15
Ergonomics of Security Technologies	3
Specialized Integrated Practice	4

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: http://www.bgk.uni-obuda.hu/sites/default/files/tanulmanyi-osztaly/csatolmany/oe_bgk_mechatronikai_mernok_kreditekvivalencia.pdf

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	
Electrical/Electronic Engineering	
Computer Science/ ICT	
Mechatronics	
Fundamental subjects	

Subject	**Credits**	**Percentage of the total course modules**
Basics of science	49	23
Economics and Humanities	23	11
Programme core courses	76	36
Differential engineering knowledge	37	18
Optional courses	10	5
Thesis work	15	7
All:	210	100

Please list any further comments in the space below[9]

Professional traineeship:
Professional traineeship of at least six weeks, organized at a location of professional practice. Professional traineeship is included in the criteria prescribed.

Knowledge verification:
a) during the study period, by written or verbal reports, written (classroom) tests, by the evaluation of home assignments (designs, measurement records, etc.), mid-semester grading or signature,
b) by preliminary examination passed in the study period,
c) by examination or comprehensive examination passed in the examination period, and

d) by final examination.

Criteria for admission to a final examination:
a) Final completion certificate (absolutorium) granted,
b) Degree project /thesis accepted by supervisor.
Admission to a final examination is subject to a final completion certificate being granted. A final completion certificate is issued by a higher education institution to a student who has complied with the study and examination requirements prescribed in the curriculum and completed the professional traineeship required – except for meeting the foreign language requirement and completion of the degree project / thesis –, and has acquired the credits prescribed.

Parts of the final examination:
The final examination consists of defending the degree project / thesis and oral examinations taken on the subjects prescribed in the curriculum (time allowed for preparation: at least 30 minutes per subject), to be passed by the student consecutively within the same day. Subjects (subject groups) comprising, in the aggregate, a body of knowledge corresponding to at least 20 and up to 30 credit points may be designated for the final examination.
The list of questions of the oral examination is made available to candidates 30 days before the date of the final examination.
Candidates may start the examination if their degree project / thesis has been accepted by the final examination board with at least sufficient (2) qualification. Criteria for correcting a failed degree project / thesis are defined by the competent institute.

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

CZECH REPUBLIC

Programme title[1]	Mechatronics (3906R001/0 - 1)
Department	
University	University of South Bohemia in České Budějovice
Country	Czech Republic
URL	www.jcu.cz
Degree of Study Programme[2]	Bsc
ECTS[3]	240
Duration[4]	8 Semesters
Language[5]	CZech
Bachelor project[6]	Project of Mechatronics, Thesis
Teaching methodology[7]	Lecture, seminar: 39%; Practice: 61%

[1] E.g. Mechatronics.

[2] E.g. Bachelor of Science.

[3] Total number of credits.

[4] In years.

[5] Language used for teaching.

[6] Yes or no.

[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences

The structure of the Programme.

Year 1 – Semester 1*	**Credits**
FBI/003 Basic Rules of Study at the University of South Bohemia	0
KFY/TDOD Technical documentation	3
UFY/ZFMK Physics Laboratory Work - Introduction for Combined Studies	2
UMB/010K Mathematics for Combined Studies	6
FBI/007 Guidelines for Information Resources	0
UFY/FYZ1K Physics I for Combined Studies	6

UMB/550K Pre-calculus for Combined Studies	2
UFY/ZPCK Introduction to Programming in C for Combined Studies	6
UFY/SW1K SolidWorks 1 for Combined Studies	5
UFY/VTFK Computer Technique for Physicists for Combined Studies	1
Year 1 – Semester 2	
UFY/SW2K SolidWorks 2 for Combined Studies	6
UFY/FPR1K Physics Laboratory Work I for Combined Studies	3
OJZ/900 Progress Examination in English	0
KFY/TMED Technical mechanics	3
UFY/FYZ2K Physics II for Combined Studies	5
UFY/NOMK Material Science for Combined Studies	5
UMB/565K Calculus II for Combined Studies	8
Year 2 – Semester 3	
UFY/EKA1K Electronics I for Combined Studies	5
UFY/ESPK Electrical Machines and Drives for Combined Studies	4
UFY/MTEK Fluid Dynamics for Combined Studies	6
UFY/TM2K Engineering Mechanics 2 for Combined Studies	6
UMB/566K Calculus III for Combined Studies	8
UFY/FPR2K Physics Laboratory Work II for Combined Studies	3
UFY/SVEK Statistical Evaluation of Experimental Data for Combined Studies	5
Year 2 – Semester 4	
UFY/BPRK Safety Standards for Combined Studies	4
UFY/TE1K Technology 1 for Combined Studies	6
UFY/TM3K Engineering Mechanics 3 for Combined Studies	6
UFY/TERK Thermomechanics for Combined Studies	4
UMB/572 Mathematical analysis IV	5
Year 3 – Semester 5	
UFY/SDC1K Gauges, detectors, sensors 1 -	5

principles - combined studies	
KFY/AUTD1 Automatization and Control I	4
UFY/PP1K Strength of Materials 1 for Combined Studies	8
UFY/TE2K Technology 2 and Quality Control for Combined Studies	6
UFY/MECHK Mechatronics Combined Studies	6
UFY/PREK Electronics Practices for Combined Studies	3
Year 3 – Semester 6	
UFY/POLK Polymeric and Nonferrous Materials for Combined Studies	5
KFY/AUTD2 Automatization and Control II	5
KŘE/KSV Lean Production	5
UFY/SDC2K Gauges, detectors, sensors 2 - application examples	5
UFY/PP2K Strength of Materials 2 for Combined Studies	7
UAI/657K Robotics I. for Combined Studies	5
UAI/658K Practical Course in Automation for Combined Studies	3
Year 4 – Semester 7	
KŘE/KRKV Quality Management	6
OJZ/960 Final Examination in Foreign Language for Combined Study	5
UAI/621K Microcomputer System Design for Combined Studies	5
UFY/890 Bachelor Thesis, Practical Part	
UFY/HPSK The Hydraulic and Pneumatic Machines for Combined Studies	4
UFY/SV2K Lean Manufacturing 2 - praxis - for Combined Studies	3
Year 4 – Semester 8	
UFY/891 Bachelor Thesis, Practical Part	8
UFY/PRAK Practice for the Study Field Mechatronics, combined studies	16

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: https://wstag.jcu.cz/ects/plan/15391?lang=en

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	
Electrical/Electronic Engineering	
Computer Science/ ICT	

Mechatronics	
Fundamental subjects	

Please list any further comments in the space below[9]

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

NORWAY

Programme title[1]	Informatics: Robotics and Intelligent Systems
Department	Department of Informatics The Faculty of Mathematics and Natural Sciences
University	Oslo University
Country	Norway
URL	https://www.uio.no/
Degree of Study Programme[2]	Bachelor's degree
ECTS[3]	180
Duration[4]	3 year
Language[5]	Norway
Bachelor project[6]	No, only exams
Teaching methodology[7]	Lecture, seminar, lab works
~~Practice~~	Development semester

[1] E.g. Mechatronics.
[2] E.g. Bachelor of Science.
[3] Total number of credits.
[4] In years.
[5] Language used for teaching.
[6] Yes or no.
[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences
Briefly on the study program Informatics: Robotics and intelligent systems are about machines that can choose to act on their own, based on what they perceive about their surroundings. The study will teach how machines can perceive and operate, and how to create systems that solve tasks. Through this study, you will learn to analyze and model electronic systems and the programs that control them. You will learn how to test and troubleshoot at different levels, and to program to control robotics systems yourself. You also work in the lab to build electronics and microelectronics. The program has much in common with the other studies in computer science, and begins with a basic course in programming and computer technology. Then you immerse yourself in mechanics, algorithms, and robotics.

The structure of the Programme.

Year 1 – Semester 1	**Credits**
IN1000 – Introduction to object-oriented	10

programming and HSE topics	
IN1020 – Introduction to Computer Technology	10
MAT1100 – Mathematics	10
Year 1 – Semester 2	
IN1010 – Object-oriented programming	10
IN1080 – Mechatronics	10
MAT1110 – Mathematics and linear algebra	10
Year 2 – semester 3	
IN2010 – Algorithm and data engineer	10
IN2060 – Digital technology and computer architecture	10
MAT1120 – Linear Algebra/STK1000 – Introduction to applied statistics	10
Year 2 – semester 4	
IN3140 – Introduction to robotics	10
IN1030 – Systems, requirements and consequences	10
INF2310 – Digital image processing/FYS-MEK1110 – Mechanics/IN2140 – Introduction to operating systems and data communication	10
Year 3 – semester 5	
Development Semester	30
Year 3 – semester 6	
IN3050 - Introduction to artificial intelligence and machine learning	10
IN3160 - Digital system design	10
EXPHIL03 - Examen philosophicum	10

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: https://www.uio.no/studier/program/informatikk-robotikk/oppbygging/

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	
Electrical/Electronic Engineering	
Computer Science/ ICT	
Mechatronics	
Fundamental subjects	

Please list any further comments in the space below[9]

The program has the following structure:

- Compulsory common subjects, 130 ECTS
- Compulsory specialization courses, 20 credits
- Development semester, 30 credits

Development Semester

Development semester is a semester you can build yourself. You can choose to take free courses, or travel on an exchange abroad. The 5th semester is specially adapted as a development semester.

Free courses can be chosen from all the bachelor courses offered at the University of Oslo, as long as the course has available capacity and you meet the prerequisites and admission requirements as stated on the course page. You can also get bachelor's courses from other educational institutions. If you are not allowed to register for a subject you want to have as free in your education plan.

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

NORWAY

Programme title[1]	Informatics: Robotics and Intelligent Systems
Department	Department of Informatics The Faculty of Mathematics and Natural Sciences
University	Oslo University
Country	Norway
URL	https://www.uio.no/english/
Degree of Study Programme[2]	Master's Degree
ECTS[3]	120
Duration[4]	2 years (4 semesters)
Language[5]	English
Bachelor project[6]	Master's thesis: Long thesis with 60 ECTS credits Short thesis with 30 ECTS credits
Teaching methodology[7]	The programme has the following structure: ✓ Courses, 30 or 60 ECTS credits ✓ Master's thesis, 30 or 60 ECTS credits

[1] E.g. Mechatronics.
[2] E.g. Bachelor of Science.
[3] Total number of credits.
[4] In years.
[5] Language used for teaching.
[6] Yes or no.
[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences
The programme has 2 programme options: • Robotics and intelligent systems • Cybernetics and autonomous systems **Courses and Master's thesis** Selection of courses and topic for the Master's thesis is done in consultation with your supervisor during the first semester. Depending on programme option, you can have a supervisor at the Department of Informatics or at the Department of Technology Systems. All courses should normally be completed and passed before the last semester. Please see each programme option for information about mandatory and recommended courses. The Master's thesis is an independent research work carried out under supervision. You can choose either a long thesis of 60 ECTS credits, in addition to 60 ECTS credits with courses, or a short thesis of 30 ECTS credits in addition to 90 ECTS credits with courses. At least 30

credits must be from the program structure. If you choose a long thesis, the work is distributed over several semesters. The submission of the thesis is done on a fixed date in the last semester. If you choose a short thesis, the subject of the thesis is presented on a given date at the beginning of the semester and the deadline for submission is 17 weeks after this date. A short thesis must be written entirely in the last semester. The Master's thesis must be presented public at the end of the semester. Following the presentation, an oral examination with the sensors and supervisor follows the assignment. If you are taking the programme option Robotics and intelligent systems, your main supervisor will be from the research group Robotics and intelligent systems at the Department of Informatics. If you are taking the programme option cybernetics and autonomous systems, your main supervisor will be from the Section for Autonomous Systems and Sensor Technologies at the Department of Technology Systems. Students may also be supervised by the research group for Nanoelectronics at the Department of Informatics, if their thesis is relevant to the programme option and academic requirements are met.

The structure of the Programme.

Year 1 – Semester 1*
Module 1
Module 2
…
Year 1 – Semester 1
Module 1
…

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: https://www.uio.no/english/studies/programmes/informatics-robotics-master/structure/

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	
Electrical/Electronic Engineering	
Computer Science/ ICT	
Mechatronics	
Fundamental subjects	

Please list any further comments in the space below[9]

Programme structure The programme option Robotics and intelligent systems gives you the opportunity to choose a specialization in one, or more, of the topics: robotics systems, artificial intelligence or digital embedded systems. Theme for the Master's thesis is associated with advanced issues

within the topics. You choose courses in consultation with your supervisor and these will give you a solid theoretical basis for the completion of the Master's thesis. At least 30 credits must be from the program structure.

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

NORWAY

Programme title[1]	Mechatronics
Department	Faculty of Engineering and Science
University	University of Agder
Country	Norway
URL	https://www.uia.no/en
Degree of Study Programme[2]	Master's degree
ECTS[3]	120 ECTS credits
Duration[4]	2 years (4 semesters)
Language[5]	English
Bachelor project[6]	Master's Thesis in Mechatronics
Teaching methodology[7]	Information on teaching and working methods are given in the course descriptions for each course. A range of different teaching and working methods will be used, including lectures, individual and group exercises, laboratory work and project work. Besides facilitating the students' academic development, teaching methods are selected with a view to developing the students' ability to solve practical problems and work in teams. Project work, both individually and in groups, will train the students in the application of theoretical knowledge and tools to identify and analyse specific problems and develop new systems and products. It will also develop the students' ability to cooperate and communicate effectively. Regarding master's thesis: For every student/group there will be 5 compulsory guidance meetings.

[1] E.g. Mechatronics.

[2] E.g. Bachelor of Science.

[3] Total number of credits.

[4] In years.

[5] Language used for teaching.

[6] Yes or no.

[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences
The programme aims to educate candidates to high levels of competence in mechatronics. Mechatronics integrates machine technique, analogue and digital electronics and cybernetics in the design and manufacturing of products and processes. The programme aims to expand and strengthen the expertise of engineers in this field, with a particular emphasis on mechanical systems involving large forces. The programme emphasises applications of theoretical knowledge in relevant areas of usage and in product development, with a detailed treatment of all aspects of product development.

The structure of the Programme.

Year 1 – Semester 1*
Elective Courses: • Analog and Digital Electro Technologies (7.5 sp) • Machine Elements and Hydraulics (7.5 sp)
MAS416-G Modelling and Simulation of Mechatronic Systems
MAS410-G Hydraulic Components and Systems
MA-431-GMathematics for mechatronics
ORG001-G Health, Safety and Environment
Year 1 – Semester 2
MAS413-G Mechanical Systems 1
MAS409-G Electric Motor Drives
MAS414-G Mechanical Systems 2
MAS411-G Industrial IT
Year 2 – semester 3
Specialization Course: Specialization Welfare technology Specialization Applied machine learning and robotics Specialization Industrial mechatronic systems
Year 2 – semester 4
MAS500-G Master's Thesis in Mechatronics

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: https://www.uia.no/en/studieplaner/programme/MASTMEK

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	
Electrical/Electronic Engineering	
Computer Science/ ICT	

Mechatronics	
Fundamental subjects	

Please list any further comments in the space below[9]

Assessment methods Most courses conclude with an individual written examination, which provides the basis for assessment. Project reports and midterm examinations, where used, may also count towards the final grade. In all courses where written examinations are used, students must complete all coursework requirements, e.g. compulsory assignments or project work, before taking the examination.

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

DENMARK

Programme title[1]	**Mechatronics (Engineering) BEng**
Department	
University	University of Southern Denmark (SDU)
Country	Denmark
URL	https://www.sdu.dk/en
Degree of Study Programme[2]	Bachelor of Mechatronics (Engineering)
ECTS[3]	210
Duration[4]	3,5 years
Language[5]	Danish, English
Bachelor project[6]	Yes, Final Project 30 ECTS
Teaching methodology[7]	
~~Internship~~	Industrial Engineering Training

[1] E.g. Mechatronics.

[2] E.g. Bachelor of Science.

[3] Total number of credits.

[4] In years.

[5] Language used for teaching.

[6] Yes or no.

[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences
The Bachelor of Engineering programme aims to qualify the student to perform vocational activities in both national and international settings, where he or she is required to: • Translate technical research results and scientific and technical knowledge into practical application in development assignments and in the resolution of technical problems. • Critically acquire new knowledge within relevant areas of engineering. • Independently accomplish general engineering assignments. • Plan, realise and manage technical and technological plants and systems, and in doing so be able to consider societal, financial, environmental and workplace safety and health implications in the resolution of technical problems. • Take part in co-operative and managerial functions and contexts at a qualified level together with people with different educational, linguistic and cultural backgrounds. • Furthermore, the programme aims to qualify the students to participate in further education. The Bachelor of Engineering programme is planned to comprise 3½ years of full-time equivalent work. A year of full-time equivalent work denotes a full-time student's work in the course of a year, corresponding to 60 ECTS points. Thus, the duration of the complete programme corresponds to 210 ECTS points. In addition, the student is required to

participate in practical workshop training. The Bachelor of Engineering programme includes • mandatory technical courses • elective courses • practical workshop training • engineering internship • bachelor project (in the following referred to as final project). With this profile - without a predetermined specialisation - you will choose which subjects you would like to have instead of the fixed profile subjects. You can choose from the subjects offered which typically belong to the specialisations and compose your own profile or perhaps suggest other subjects which we will send to the Academic Study Board for approval. The project element of this profile will focus on the development of a mechatronic product with focus on control systems. Potential projects could be, for example, 'Build a 3D printer with optimal temperature control and flow of plastic' or 'construct a self-propelled car (model) using distance assessment radar technology'. If you choose this profile it is important that you are interested in general product development and technology in mechatronics and that you put together the subjects which are most relevant to your interests. You will gain skills in general mechatronic product development and in your chosen subject. You will be able to apply for jobs in many types of companies/branches that are engaged in product development in mechanics, electronics, software and mechatronics.

The structure of the Programme.

Year 1 – Semester 1*
Module 1
Module 2
…
Year 1 – Semester 1
Module 1
…

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: https://www.sdu.dk/en/om_sdu/fakulteterne/teknik/ledelse_administration/administration/studieordninger_a/mekatronik_dipling/moduler_e20

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	
Electrical/Electronic Engineering	
Computer Science/ ICT	
Mechatronics	
Fundamental subjects	

Please list any further comments in the space below[9]

The Curricula for Bachelor of Engineering in Mechatronics: https://odin.sdu.dk/sitecore/index.php?a=sto&id=27061&lang=en

Curriculum for the Bachelor of Engineering programmes at the University of Southern Denmark: https://www.sdu.dk/-/media/files/om_sdu/fakulteterne/teknik/studieordninger/kap_1til8_dipling/uk-dipling-studieordning_180621.pdf

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

DENMARK

Programme title[1]	**Mechatronics BSc**
Department	
University	University of Southern Denmark (SDU)
Country	Denmark
URL	https://www.sdu.dk/en
Degree of Study Programme[2]	Bachelor of Science in Engineering
ECTS[3]	180 ECTS
Duration[4]	3 years
Language[5]	English
Bachelor project[6]	Bachelor Project
Teaching methodology[7]	

[1] E.g. Mechatronics.
[2] E.g. Bachelor of Science.
[3] Total number of credits.
[4] In years.
[5] Language used for teaching.
[6] Yes or no.
[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences
First semester In the first semester you will gain insight into what mechatronics is and what it takes to develop mechatronic products. You will work with subjects such as mechatronic design, materials and processes, embedded systems and maths and physics. With your project group you will design a small mechatronic product taking you through the entire development process. **Second semester** This is where you will gain an understanding of the system in general as well as knowledge about system components and their interactions. You will learn to design electronic and mechanic elements and produce and incorporate them into mechatronic produts. As part of the semester project you will work with theory in practice when you develop a mechatronic product that can move. **Third semester** In this semester you will build on the knowledge you have gained about mechatronics and the development of mechatronic products. You will learn about subjects such as analogue

electronics, actuators and sensors as well as dynamic systems.
The semester project will focus on the development of a complete mechatronic system involving the use of actuators and sensors, design of electronics and specification and production of mechatronics.
You will also choose which of the profiles you will specialise in.

Fourth semester
In the fourth semester you will immerse yourself in your chosen subject profile. You can choose a profile in mechanics, electronics, embedded systems, or you can choose a multidisciplinary profile where you choose between subjects from the other profiles. As well as two profile subjects/electives you will have a semester project focusing on the chosen profile and obligatory subjects Control Engineering and Computer Aided Engineering.

Fifth semester
This semester is about innovation, multidisciplinary skills and entrepreneurship (Experts in Teams). You and your project group will organise yourselves into a virtual company where you will go through all development phases from idea to creation of a fully functioning prototype - taking into consideration economy, external suppliers, etc.
As well as this you will continue with your chosen profile.
You can also choose to study abroad for a semester.

Sixth semester
Here you will write your bachelor project in which you bring together all your knowledge and skills from the preceding semesters.
Example of bachelor projects:
- HMI-concept for an Infotainment System in a car
- Interactive interface for children
- Motivating children to save energy

The structure of the Programme.

Year 1 – Semester 1*
Module 1
Module 2
…
Year 1 – Semester 1
Module 1
…

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: https://www.sdu.dk/-/media/images/om_sdu/fakulteterne/teknik/skemaer/bachelor/bachelor_mekatronikmechatronicsengineering2020.jpg

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**

Mechanical Engineering	
Electrical/Electronic Engineering	
Computer Science/ ICT	
Mechatronics	
Fundamental subjects	

Please list any further comments in the space below[9]

Curriculum For Bachelor of Science in Engineering programmes at the University of Southern Denmark: https://www.sdu.dk/-/media/files/om_sdu/fakulteterne/teknik/studieordninger/kap_1til8_civbach/uk-bachelor-studieordning_190823.pdf **The Curricula for Bachelor of Science in Engineering (Mechatronics)** https://odin.sdu.dk/sitecore/index.php?a=sto&id=27042&lang=en

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

* Repeat the procedure for each identified course.

LITHUANIA

Programme title[1]	**MECHATRONICS SYSTEMS**
Department	Department of Mechatronics, Robotics and Digital Manufacturing
University	Vilnius Gediminas Technical University, VGTU
Country	Lithuania
URL	https://www.vgtu.lt/#Home
Degree of Study Programme[2]	Master's in Mechatronics
ECTS[3]	120 ECTS
Duration[4]	2 years
Language[5]	Lithuanian, English
Bachelor project[6]	Master‘s Thesis
Teaching methodology[7]	

[1] E.g. Mechatronics.
[2] E.g. Bachelor of Science.
[3] Total number of credits.
[4] In years.
[5] Language used for teaching.
[6] Yes or no.
[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences
The aim of the study program is to provide the up-to-date knowledge of mechatronic engineering usable as a basis for research works, to develop an original individual thinking in the professional and scholastic aspects, a critical understanding of mechatronic science and its interrelation with knowledge of other areas.

The structure of the Programme.

Year 1 – Semester 1*	**Credits**
Mechanics of Mechatronic and Robotic Systems (with course project)	9
Experimental Research of Mechatronic Systems	9
Master Graduation Thesis 1	3
The Use of the Finite Elements Method in Continuum Mechanics	6
Fundamentals of Research and Innovation	3
Year 1 – Semester 2	
Control of Mechatronic Systems	6

Sensors in Mechatronics	6
Diagnostics in Mechatronics	6
Master Graduation Thesis 2	3
Modelling of Mechatronic Systems	**9**
Year 2 – Semester 3	
Microprocessor Control	6
Electrics Drives of Mechatronic Systems	9
Master Graduation Thesis 3	3
Pneumatic and Hydraulic Systems (with course project)	9
Free choice obligatory course	3
Year 2- semester 4	
Master Graduation Thesis 4	30

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: https://www.vgtu.lt/studies/study-programmes/master-study-programmes/317411?element_id=317413&sp_id=21&f_id=9&qualification=a%3A1%3A%7Bi%3A0%3Bs%3A1%3A%22M%22%3B%7D#Modules

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	
Electrical/Electronic Engineering	
Computer Science/ ICT	
Mechatronics	
Fundamental subjects	

Please list any further comments in the space below[9]

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

* Repeat the procedure for each identified course.

LITHUANIA

Programme title[1]	**Dual Degree Program "Mechatronics"**
Department	Department of Mechatronics, Robotics and Digital Manufacturing
University	Vilnius Gediminas Technical University, VGTU
Country	Lithuania
URL	https://www.vgtu.lt/#Home
Degree of Study Programme[2]	Master's in Mechatronics
ECTS[3]	120 ECTS
Duration[4]	2 years
Language[5]	English
Bachelor project[6]	Master's Thesis
Teaching methodology[7]	Double degree study programme: first study year in VGTU and second study year in Braunschweig Technical University (Germany)

[1] E.g. Mechatronics.
[2] E.g. Bachelor of Science.
[3] Total number of credits.
[4] In years.
[5] Language used for teaching.
[6] Yes or no.
[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences
The aim of the Mechatronics programme is to prepare high qualification mechatronics specialists that are able to carry out independently research, lead projects of mechatronics development, maintenance and process improvement, apply their knowledge in different areas of application, make decisions on the basis of limited information and provide logical, unambiguous and clear arguments both for specialists and non-specialists. The Mechatronics programme objectives are as follows: 1. Deliver the most advanced knowledge of mechatronics and related sciences, which are necessary for specialists creating mechatronic systems; develop ability to evaluate and apply this knowledge. 2. Teach skills to apply obtained knowledge and understanding as well as modern research methods in practical activities requiring integration of analytical abilities, innovation, and know-how, including scientific research. 3. Instil the need to apply obtained knowledge, understanding, and abilities to solution of problems in new, unknown, or constantly changing international environment and within

context of different areas of study. 4. Instil the need and ability to learn and critically assess theoretical and practical novelties by means of continuous independent learning throughout one's life, apply innovations and implement high-tech mechatronic systems and facilities in the field of production and operation. 5. Teach skills to justify conclusions and to adjust them for concerned persons of different education, creatively solve technical, administrative, and legal problems related to professional activities, comprehend ethical and social consequences of one's knowledge and the decisions made based on it as well as responsibility for said consequences. Expected learning outcomes of the Mechatronics programme were formulated on the basis of the requirements raised for the second cycle university study programmes in the description of study cycles (qualification level VII). Learning outcomes were divided into five groups: • knowledge and its application; • ability to conduct research; • special competencies; • social competencies; • personal competencies. The symbiosis of expected learning outcomes of the Mechatronics programme produces creative and critically thinking mechatronics specialists with broad engineering and scientific erudition and second cycle university education, capable of undertaking scientific and technological development efforts in the field, creating innovative technologies and products, and teaching at educational institutions. The objectives and the expected learning outcomes of studies are relevant, they comply and meet all the professional requirements for graduates of the programme, and ensure that students acquire the knowledge, abilities and competences required for their professional activities.

The structure of the Programme.

Year 1 – Semester 1*	**Credits**
Experimental Practice	6
Experimental Research of Mechatronic Systems	6
Mechanics of Mechatronic and Robotic Systems	6
Fundamentals of Research and Innovation	6
Free choice obligatory course	6
Year 1 – Semester 2	
Control of Mechatronic Systems	6
Sensors in Mechatronics	6
Diagnostics in Mechatronics	6
Academic Writing	6
Modelling of Mechatronic Systems	6
Year 2 – Semester 3 (Braunschweig TU)	
Soft Skills Training (free choice e.g. language	4

course)	
Application of Commercial FE Software	5
Vibration Measurement Technology	5
Adaptronics	5
Technologies of Microsystems with Laboratory Works	11
Year 2- semester 4	
Master Graduation Thesis 4	30

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address https://www.vgtu.lt/studies/study-programmes/master-study-programmes/317411?element_id=317413&sp_id=77&f_id=9&qualification=a%3A1%3A%7Bi%3A0%3Bs%3A1%3A%22M%22%3B%7D#Modules

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	
Electrical/Electronic Engineering	
Computer Science/ ICT	
Mechatronics	
Fundamental subjects	

Please list any further comments in the space below[9]

Each tutor explains to the postgraduate students the structure of the evaluation grade during the first class on a given subject. Study outcome evaluation grade may consist of the accumulated grade for the tasks performed during the semester as provided for in the study subject module, grade for interim reporting on theoretical problems, and the exam evaluation obtained during the examination session. Students who have not performed and reported on tasks prescribed in the study subject module card are not allowed to start the examination.

Upon announcement of examination results postgraduate students shall be allowed to inspect their achieved results and written work in presence of the tutor. Work submitted for evaluation and checked by the tutor is not corrected during the inspection. A student who doesn't agree with the examiners clarifications and arguments can file a written motivated appeal with the head of the Mechatronics and Robotics Department regarding violation of knowledge assessment and/or knowledge evaluation procedures, if the exam is done at VTGU or with the Academic Dean being the head of the examination board for mechanical engineering *("Prüfungsausschuss Maschinenbau*") at TUB:

Process at VTGU: Upon receiving an appeal regarding insufficient knowledge evaluation grade, the head of the department calls an appeal committee of three department tutors. If the appeal is filed because of knowledge evaluation procedure violation a fourth member is introduced to the committee, a representative appointed by the student union of the university. The appeal has to be considered no earlier than three days from the day of filing of the appeal but no later than within five work days of the filing. Having listened to the

opinions of the student and tutor, the committee makes a decision by voting. The head of the department shall submit a copy of the report on the meeting of the appeal committee to the dean of the faculty of the appealing student. Process at TUBS: Upon receiving an appeal regarding insufficient knowledge evaluation grade, the head of the examination board for mechanical engineering (academic dean) requests a written justification from the tutor. Having listened to the opinions of the student and tutor, the examination board makes a decision by voting. The head of the examination board shall submit a copy of the decision to the appealing student.

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

* Repeat the procedure for each identified course.

Lithuania

Programme title[1]	**Mechatronics and Robotics**
Department	Department of Mechatronics, Robotics and Digital Manufacturing
University	Vilnius Gediminas Technical University, VGTU
Country	Lithuania
URL	https://www.vgtu.lt/#Home
Degree of Study Programme[2]	Bachelor's in Mechatronics
ECTS[3]	240 ECTS
Duration[4]	4 years
Language[5]	Lithuanian, English
Bachelor project[6]	Bachelor's Thesis
Teaching methodology[7]	

[1] E.g. Mechatronics.

[2] E.g. Bachelor of Science.

[3] Total number of credits.

[4] In years.

[5] Language used for teaching.

[6] Yes or no.

[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences

Goals
1. The aim of the study program is to train future bachelors in Mechatronics and Robotics by providing them with the knowledge of mathematics and natural sciences and making them capable to design, produce and apply mechatronic and robotic systems.

Results
Knowledge
- The knowledge of mathematics, natural sciences, technological sciences, social sciences and the humanities: concepts, laws, theories; the knowledge of mathematics; fundamental knowledge of nature and its phenomena as well as their quantitative and qualitative expressions; the basics of the technological science of the study field; the knowledge of structure, control and design & production of mechatronic and robotic systems as well as ensuring their quality control and maintenance; the knowledge
- The knowledge of structure, control and design & production of mechatronic and robotic systems as well as ensuring their quality control and maintenance.
- The knowledge of materials usable in industrial engineering, their properties, connections and methods of their formation and surface processing technologies and engineering structures; quality control and certification.

Research skills
- The skills of mechatronic and robotic systems' control, skills of information and data assessment, computing and processing; in addition, the capability to interpret the data in respect of their importance while carrying out the works related to mechatronic and robotic systems' designing, control, production, maintenance and quality assurance
- The capability to apply achievements and methods of mathematics and natural sciences for solving the manufacturing enineering problems and to understand theoretically the latest manufacturing engineering technologies, to recognize and analyze the opportunities of their implementation.
- The skills of understanding the technological advantages and imperfections of the chosen materials, processes and technologies, applying numerical and experimental methods for such assessments, understanding and interpreting the obtained information and data on laboratory observance and measurements, assessing their importance in the context of the applicabe theory upon applying the skills of information and data assessing, computing and processing.

Engineering analysis
- The capability to combine theoretical and practical elements, to carry out laboratory operations and experimental works required for engineering activities; to analyze problematic situations and search for alternative ways of their regulation upon assessing the possible social and environmental consequences of the activities for the enviroment and social welfare.
- The capability to carry out an analysis of various existing and newly created engineering structures and their combinations as well as to analyze various ways of combination of structures as well as usable and planned to use structural materials.
- The capability to carry out an analysis of single, complex and buil-in mechatronic systems and an assessment of their parameters as well as to analyze, diagnose and forecast

remote, complex and built-in robotic systems.

Engineering design

- The graduates will know and be capable to design engineering objects according to the provided parameters in the area of their specialization, to assess projects developed by other persons and self-dependently design new systems and modernize or renovate the existing ones.
- The capability to identify rapidly the properties of the provided mechatronic system and to develop projects on its improvement and updating the workcell media and the equipment required for it; to develop projects on updating the existing workcells; to design operation of single and linked robots.
- The skills in designing engineering structures with planning their manufacturing technologies and the materials usable, to assess and develop projects of new structural connections, including complex environmental impact.

Personal and social abilities

- The capability to communicate, to present the results of their activities in a correct state language or at least one foreign language in writing or orally to different auditoriums of listeners; to work self-dependently and creatively being well-motivated and responsible, to plan thoroughly the works and the time; to assume a responsibility for the quality of the own activities and those of their subordinated employees as well as assessment of such activities following the standards of the profe
- The graduates will acquire the learning skills required for purposeful self-dependent continuing the studies and lifelong learning, they will perceive a moral responsibility for the influence of the own activities and their results on the society, its economic and cultural development as well as the welfare of the country and the environmental impact.

Engineering practice ability

- The capability to assess the status of a mechatronic system on diagnostics and troubleshooting, to control existing robotic systems, to choose appropriate components for them, to prepare them for manufacturing process by programming them and adjusting mutual interaction of equipment units.
- The capability to combine theoretical and practical elements in solving various engineering tasks, to assess the situation and to pass appropriate engineering solutions.
- The capability to assess and correctly select the materials required for the equipment and products, to plan and prepare for implementation different methods of connection of materials and to assess the existing solutions.

The structure of the Programme.

Year 1 – Semester 1*	**Credits**
Law	3
Chemistry	6
Physics 1	6
Programming C	3
Human's Safety and Environmental	3

Protection	
Introduction to Mechatronics and Robotics	3
Mathematics 1	6
Year 1 – Semester 2	
Physics 2	3
Mathematics 2	6
Materials Science 1	3
General and Applied Engineering Graphics	6
Electrical Engineering	3
Engineering Mechanics	6
Cognitive Practice	3
Year 2 – Semester 3	
Materials Science 2	3
Theory of Mechanisms and Machines (with course project)	9
Mathematics 3	6
Fluid Mechanics and Thermodynamics	3
Technical Drawing	3
English/Frennch/German language	3
Ethics or Formal Writing	3
Year 2- semester 4	
CAD/CAM/CAE	6
Mechanics of Materials	6
C++ Programming Language	6
Machine Elements (with course project)	6
Free choice obligatory course	3
Speciality English/French/German Language	3
Year 3 – semester 5	
Robotics	6
Mechatronic Systems 1	3
Electric Drives	3
Theory and Practice of Measurements (with course project)	6
Economic Rationale of Engineering Decisions (with Course Work)	6
Electronics	3
one of the following: Politics and Technology *or* Philosophy of Technology	3
Year 3 – semester 6	
Automatic Control Systems (with course project)	6
Specific Purpose Language Culture	3
Elements of Mechatronics	3

Robotical Technology	6
Materials in Mechatronics	3
Mechatronic Systems 2	6
Free choice obligatory course	3
Year 4 – semester 7	
Design of Mechatronic and Digital Production Systems. Complex Project	6
Digital Automatics (with course project)	6
Management	3
Bachelor Graduation Thesis 1	3
Career Intenship	12
Year 4 – semester 8	
Bachelor Graduation Thesis 2	6
Design of Mechatronic and Robotic Systems (with course project)	6
Industrial Logical Controllers	3
Bachelor Graduation Thesis 3	9
Quality and Certification in the Automated Industry	6

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address https://www.vgtu.lt/studies/study-programmes/master-study-programmes/317411?element_id=317413&sp_id=77&f_id=9&qualification=a%3A1%3A%7Bi%3A0%3Bs%3A1%3A%22M%22%3B%7D#Modules

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	
Electrical/Electronic Engineering	
Computer Science/ ICT	
Mechatronics	
Fundamental subjects	

Please list any further comments in the space below[9]

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

VGTU *Bachelor of Mechatronics and Robotics* study programme has been awarded the **Investor's Spotlight** mark of quality, certifying that the study programme meets the needs of foreign investors and is a leader in fostering the competences essential for modern business.

investors' spotlight

* Repeat the procedure for each identified course.

Lithuania

Programme title[1]	**Mechatronics**
Department	Department of Mechanical Engineering
University	Kaunas Technology University
Country	Lithuania
URL	https://en.ktu.edu/
Degree of Study Programme[2]	Bachelor of Engineering Sciences
ECTS[3]	240 ECTS
Duration[4]	4 years
Language[5]	Lithuanian, English
Bachelor project[6]	Final Degree Project
Teaching methodology[7]	

[1] E.g. Mechatronics.
[2] E.g. Bachelor of Science.
[3] Total number of credits.
[4] In years.
[5] Language used for teaching.
[6] Yes or no.
[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences
Objective(s) of a Study Programme: To provide theoretical knowledge of production and manufacturing engineering through understanding of fundamentals, theories and principles of the mechatronic science, develop practical abilities and skills of design of technological processes and mechatronic systems, selection and application of technological equipment. Access to Professional Activity: The graduate is able to perform organisational, technological and design work, carry out operation and maintenance of mechatronic systems and perform other engineering, expert-consulting work at the companies and enterprises where advanced engineering knowledge is required. **Course (module) Learning Outcomes** **Learning Outcomes** 1 is able to apply the theoretical principles of dramink in practice; 2 is able to make detail drawings according valid ISO standarts; 3 is able to make detail sketches also to make asssembly drawings and technical

documentation adapted to them according valid ISO standarts; 4 is able to create detail drawings inside AutoCAD software. 5 is able know 3D modeling principles and create necessary views in a paper space inside Inventor software; **Teaching / Learning Methods:** Laboratory classes, Lecture, Reflective learning, Modeling **Assessment Methods:** Control work, Individual work, Report; Laboratory examination, Mid-term examination, Computer-based exams

The structure of the Programme.

Year 1 – Semester 1*
Module 1
Module 2
…
Year 1 – Semester 1
Module 1
…

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address https://admissions.ktu.edu/?study-program=b-mechatronics#P175B166

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	
Electrical/Electronic Engineering	
Computer Science/ ICT	
Mechatronics	
Fundamental subjects	

Please list any further comments in the space below[9]

Main competences – Adapt systems for machinery control in various companies operating in the fields from production to designing; – To control production processes and understand needs and possibilities for their robotisation; – To analyse problematic areas of facilities management and adapt modern robotic systems for increase of efficiency; – To design and realise modern robotic systems according to the market needs. **Interdisciplinarity of this study programme provides wide range of career possibilities for work in various industries, public sector, space or military industry. Students learn at the most modern laboratories of the Baltic Region and after graduation they are able to:** – Design, install and provide maintenance to stationary and mobile robots and their systems;

– Realise modern algorithms for control of machinery and the ones based on artificial intellect;
– To combine classic mechatronics solutions, classical control algorithms, possibilities of artificial intellect and information technologies.

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

* Repeat the procedure for each identified course.

PART B – Work Package 1 – Task 1.2 (refers to EU Partners only)

• Please provide your own studying in the implementation of standards, curriculum and teaching materials in the field of Mechatronics. You can also list URL addresses.

• If you want to list bachelor degrees in Mechatronics offered by your University, fill out the information according to Part A, except if you have already done so in Part A. Similarly, if you want to list Master degrees in Mechatronics or other relevant fields offered by your University, fill out the information according to Part A, except if you have already done so in Part A.

List of good practice examples.

1	
2	
…	…

The template is going to be used by the MechaUZ Partners for filling out information required for the completion of tasks in Work Package 1, more specifically tasks 1.1 and 1.2 of Work Package 1.

Work Package 1 - Task 1.1 description: Analysis and comparison of teaching systems and methods in HEIs of EU and Uzbekistan.

Work Package 1 - Task 1.2 description: Studying experience of the EU partners in the implementation of standards, curriculum and teaching materials in the field of Mechatronics. Compiling a list of good practice examples. **(The Task 1.2 refers to EU Partners only)**

PART A – Work Package 1 – Task 1.1

• *For each identified course relevant to Mechatronics fill out the following information*:*

Programme title[1]	Mechatronics
Department	**Faculty of Science and Engineering**
University	Vidzeme University of Applied Sciences
Country	Latvia
URL	liepu.lv
Degree of Study Programme[2]	Professional bachelor degree
ECTS[3]	240
Duration[4]	4
Language[5]	LV
Bachelor project[6]	Yes
Teaching methodology[7]	Dual studies - study time in lectures is combined with work in a branch company. Studies at the University include the acquisition of theory, laboratory work, seminars, project work. Students do internships in a company.To prepare qualified specialists whose theoretical and practical

[1] E.g. Mechatronics.

[2] E.g. Bachelor of Science.

[3] Total number of credits.

[4] In years.

[5] Language used for teaching.

[6] Yes or no.

[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences
The goals of the professional higher education study program "Mechatronics" are: • to promote the growth of specialists in the sectors of the national economy in which modern electromechanical equipment is managed with integrated application of electronics and computer equipment • to promote the development of computer control in the region and the country; • to provide conditions for obtaining high-quality and competitive higher professional education in computer control by preparing specialists who are able to carry out academic and applied research in computer control science (branch of science - 2.2. Electrical engineering, electronics, information and communication technologies); • to provide an opportunity for bachelors of the study program “Mechatronics”, continuing their education, to obtain a master's degree in engineering, mechatronics, adaptronics, transport, etc. areas, as well as the relevant professional competencies; • to promote the development of a creative, responsible and motivated personality for lifelong learning.Knowledge: 1) is familiar with the stages of development of constructor documentation; 2) is able to perform assembly and component work drawings; 3) is able to perform the main accuracy and optimization calculations of mechanical, electronic and computer equipment; 4) know the causes of the most common failures of mechanics, electrical equipment, electronics and computer equipment and the principles of their prevention. Skills: 1) is able to develop mechatronic equipment; 2) is able to lead a joint working group of mechanics, electricians, electronics and computer specialists for the design of mechatronics systems; 3) is able to monitor the operation of mechatronic equipment; 4) is able to perform mechatronics equipment assembly tasks. 5) is able to demonstrate the basic and specialized knowledge characteristic of the field of engineering and mechatronics and a critical understanding of this knowledge, including the submission of part of the knowledge to the highest achievements in the field of engineering and mechatronics; 6) is able to perform professional, innovative or research activities using the acquired theoretical foundations and skills of mechatronics; 7) is able to make decisions and solve problems in the field of engineering and mechatronics; 8) is able to independently structure his / her learning, direct his / her and his / her subordinates' further education and professional development; 9) is able to take responsibility and initiative, performing work individually, in a team or leading the work of other people, make decisions and

find creative solutions in changing or uncertain circumstances. Competence: 1) understands the interaction of mechanics, electromechanics, electronics and computer equipment; 2) is able to forecast the non-repudiation of mechanical, electrical, electronic and computer equipment; 3) is able to find the causes of damage to mechanical equipment and eliminate them; 4) is able to work with ready-made programs intended for the control of mechatronics equipment 5) is able to organize both group work and work in a group; 6) is able to co-operate with representatives of other professional specializations; 7) is able to apply work safety, fire safety and environmental protection regulations; 8) understands ISO, EC and other national standards in the field of mechatronics.

The structure of the Programme.

Curriculum
Year I:Introduction to studies, research and technology Industry legislation Office software Technical English Environmental and civil protection Mathematics Programming Electronics basics Metrology and measurement techniques Electricity and magnetism Mechanics and flows Electronics engineering project Introduction to mechanics Databases Internet of Things Year II: Business Management Project management Human Resource Management Metrology and measurement techniques Algorithms and data structures Technical graphics Electronics engineering project Electronics Construction Materials, structures Production technologies Study work I Sensors Robot control I Internships Year III: Business communication Comprehensive quality management Thermodynamics Operating systems and computer architecture Technical graphics Study work II Electrical engineering and electric drive Internet of Things Robot control Artificial Intelligence Simulation and mathematical modeling Software engineering Innovation management Internships Year IV: Production organization and management Cyber security Internships Smart technology project Cloud computing project Study work III Bachelor Thesis

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: ------------

Profile of the Programme: Distribution of the course subjects.

Subject	
Mechanical Engineering	10
Electrical/Electronic Engineering	15
Computer Science/ ICT	15
Mechatronics	20

Fundamental subjects	24
Internships	16

Please list any further comments in the space below[9]

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

* Repeat the procedure for each identified course.

PART A – Work Package 1 – Task 1.1

• *For each identified course relevant to Mechatronics fill out the following information*:*

Programme title[1]	Mechatronics
Department	**Faculty of Engineering**
University	Vidzeme University of Applied Sciences
Country	Latvia
URL	www.va.lv
Degree of Study Programme[2]	Professional bachelor degree
ECTS[3]	240
Duration[4]	4
Language[5]	LV
Bachelor project[6]	Yes
Teaching methodology[7]	

[1] E.g. Mechatronics.

[2] E.g. Bachelor of Science.

[3] Total number of credits.

[4] In years.

[5] Language used for teaching.

[6] Yes or no.

[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences
To prepare qualified specialists - mechatronics engineers for professional work in companies of various economic sectors, where mechatronic systems development, design and automation of technological processes are performed, as well as in companies where management of electrical equipment with integrated electronics and computer equipment is performed. To prepare qualified specialists whose theoretical and practical knowledge, as well as skills, abilities and attitudes would meet the requirements of the modern labor market.

The structure of the Programme.

Curriculum
Year 1. Mathematics, English, Economics, Russian, Basics of computer systems administration, Physics, Mechanical engineering drawing, Basics of programming, Introduction to the specialty, English, Labor, environmental and civil protection, Physics, Mathematics in engineering calculations, Materials learning, Computer architecture, Probability theory and mathematical statistics, Technical mechanics and material resistance, Electropneumatic automation. Year 2. Introduction to communication and practical personnel management, Probability theory and mathematical statistics, Adjustments, tolerances and technical measurements, Electrical engineering, Theory of machines and mechanisms, Development of electrical documentation, Automation elements, their structure, operation, application, Electropneumatic automation, Coursework, Basics of electric machines, Computer programs in engineering mechanics, Electronics, Electrical measurements, Power supply and electrical apparatus, Design basics, Sensors and their application, Practice. Year 3. Project management in engineering, Electric drive, Production and service organization, Automated design, Internet of things and sensor networks, PLC application and programming, Industrial automated process visualization, PLC programming, Elective courses, Study work, Practice. Year 4. Robots and robot control systems, Automatic control system design, PLC programming, Industrial automated process visualization, Elective courses, Study work, Practice, Bachelor's thesis

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: ------------

Profile of the Programme: Distribution of the course subjects.

Subject	
Mechanical Engineering	6
Electrical/Electronic Engineering	32
Computer Science/ ICT	6
Mechatronics	32
Fundamental subjects	13.50
Internships	12.50

Please list any further comments in the space below[9]

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

* Repeat the procedure for each identified course.

PART B – Work Package 1 – Task 1.2 (refers to EU Partners only)

• *Please provide your own studying in the implementation of standards, curriculum and teaching materials in the field of Mechatronics. You can also list URL addresses.*

• *If you want to list bachelor degrees in Mechatronics offered by your University, fill out the information according to Part A, except if you have already done so in Part A. Similarly, if you want to list Master degrees in Mechatronics or other relevant fields offered by your University, fill out the information according to Part A, except if you have already done so in Part A.*

List of good practice examples.

1	
2	
…	…

The template is going to be used by the MechaUZ Partners for filling out information required for the completion of tasks in Work Package 1, more specifically tasks 1.1 and 1.2 of Work Package 1.

Work Package 1 - Task 1.1 description: Analysis and comparison of teaching systems and methods in HEIs of EU and Uzbekistan.

Work Package 1 - Task 1.2 description: Studying experience of the EU partners in the implementation of standards, curriculum and teaching materials in the field of Mechatronics. Compiling a list of good practice examples. **(The Task 1.2 refers to EU Partners only)**

PART A – Work Package 1 – Task 1.1

• *For each identified course relevant to Mechatronics fill out the following information*:*

1)

Programme title[1]	Automation and Control Engineering
Department	School of Industrial and Information Engineering
University	Politecnico di Milano
Country	Italy
URL	www.polimi.it
Degree of Study Programme[2]	Bachelor of Science
ECTS[3]	185
Duration[4]	3 years
Language[5]	Italian
Bachelor project[6]	No
Teaching methodology[7]	Theory, tutorials, labs

[1] E.g. Mechatronics.

[2] E.g. Bachelor of Science.

[3] Total number of credits.

[4] In years.

[5] Language used for teaching.

[6] Yes or no.

[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences

The structure of the Programme.

Year 1 – Semester 1*
Mathematical analysis 1
Fundamentals of Computer Science
Geometry and linear algebra
Year 1 – Semester 2
Physics
Business economics and organization
Basic circuit theory
Year 2 – Semester 1*
Mathematical analysis 2
Thermodyanmics and heat transfer
Information systems
Telecommunication networks
Year 2 – Semester 2
Basic Control Engineering
Mechanical system modelling
Introduction to electronics
Year 3 – Semester 1
Electrical machines and drives
Instrumentation and measurements
Discrete event systems
Year 3 – Semester 2
Process control

Industrial plants and project management
Robotics
Databases 1
General chemistry
Electromagnetics and transmission media
Elements of functional and integral transofrms

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: https://www4.ceda.polimi.it/manifesti/manifesti/controller/ManifestoPublic.do?check_params=1&aa=2019&k_corso_la=355&lang=EN&polij_device_category=DESKTOP&__pj0=0&__pj1=2e242eefdca0f9832da162800cc42ed8

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	21.3
Electrical/Electronic Engineering	19.7
Computer Science/ ICT	12.5
Control Engineering	12.5
Fundamental subjects	34
Mechatronics	0

Please list any further comments in the space below[9]

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

* Repeat the procedure for each identified course.

2)

Programme title[1]	Mechatronic Engineering
Department	Department of Management and Engineering
University	Universita degli Studi di Padova
Country	Italy

URL	www.unipd.it
Degree of Study Programme[2]	Bachelor of Science
ECTS[3]	186
Duration[4]	3 years
Language[5]	Italian
Bachelor project[6]	No
Teaching methodology[7]	Theory, tutorials, labs

Year 1 – Semester 1*
Mathematical analysis 1
Introductory Computer Science
Geometry and linear algebra
Year 1 – Semester 2
Physics
Fundamentals of metallurgy
Mathematical analysis 2
Chemical technologies for Engineering
Year 2 – Semester 1*
Electrical Engineering
Applied Thermodyanmics and heat transfer
Machine Design
Signals and systems
Year 2 – Semester 2
Analog electronics
Automatic control
Mechanics applied to machines
Year 3 – Semester 1
Microcontrollers and DSP
Digital circuit theory
Mechanical systems
Industrial computer laboratory

Electrical machines and drives
Year 3 – Semester 2
Automation measurements
Business economics and organization
Electronics laboratory
Electric safety in Mechatronic systems

Subject	**Percentage of the total course modules**
Mechanical Engineering	29.8
Electrical/Electronic Engineering	16.8
Computer Science/ ICT	5
Control Engineering	11.2
Fundamental subjects	34
Mechatronics	3.2

3)

Programme title[1]	Automation Engineering
Department	Department of Electrical Energy and Information Engineering "Guiglielmo Marconi"
University	University of Bologna
Country	Italy
URL	www.unibo.it
Degree of Study Programme[2]	Bachelor of Science
ECTS[3]	183
Duration[4]	3 years
Language[5]	Italian
Bachelor project[6]	No
Teaching methodology[7]	Theory, tutorials, labs, internship

https://corsi.unibo.it/laurea/IngegneriaMeccatronica/insegnamenti/piano?code=9250&year=2019&manifest=it_2019_9250_000_000_2019

Subject	**Percentage of the total course modules**
Mechanical Engineering	29.8
Electrical/Electronic Engineering	20
Computer Science/ ICT	5
Control Engineering	11.3
Fundamental subjects	33.9
Mechatronics	0

4)

Programme title[1]	Mechatronic Engineering
Department	Department of Electrical Energy and Information Engineering "Guiglielmo Marconi"
University	University of Bologna
Country	Italy
URL	www.unibo.it
Degree of Study Programme[2]	Bachelor of Science
ECTS[3]	180
Duration[4]	3 years
Language[5]	Italian
Bachelor project[6]	No
Teaching methodology[7]	Theory, tutorials, labs,internship

Year 1 – Semester 1*
Calculus P
Fundamentals of Computer programming
English language
General Physics
Year 1 – Semester 2
Fundamentals of computer programming 2

Fundamentals of Mechanics P
Industrial Electrical Engineering
Measurement Instrumentation
Year 2 – Semester 1*
Automatic Control P
Electric Actuators
Industrial Electronics
Methods and technologies for automation
Industrial informatics
Year 2 – Semester 2
Laboratory of industrial informatics
Methods and technologies for automation
Mechanical actuators
Communication technologies
Year 3 – Semester 1
Mechanical drive complememts
Communication technology lab
Electric drives
Construction for machine elements
Electronic microcontroller systems
Year 3 – Semester 2
Mechanics of fluids
Applied thermodynamics
Enabling industrial technologies for the WEB and HMI
Computer architectures
Energy systems
Electronics of digital systems
Machines
Internship

Subject	**Percentage of the total course modules**
Mechanical Engineering	30.3
Electrical/Electronic Engineering	20.5
Computer Science/ ICT	14.8

Control Engineering	13.1
Fundamental subjects	21.3
Mechatronics	0

5)

Programme title[1]	Automation Engineering
Department	
University	University of Gävle
Country	Sweden
URL	www.hig.se
Degree of Study Programme[2]	Bachelor of Science
ECTS[3]	180
Duration[4]	3 years
Language[5]	Swedish
Bachelor project[6]	Yes
Teaching methodology[7]	Theory, tutorials, labs

Year 1 – Semester 1*
Algebra and Geometry
Digital control theory
Linear Algebra
Introduction to Automation
Year 1 – Semester 2
Calculus in one variable
Electric circuits
Electric Power Engineering
Maintenance technology
Year 2 – Semester 1*
Applied differential equations
Electronics and Measurement systems
Linear Analysis
Programming Methodology

Year 2 – Semester 2
Control theory
Embedded systems
Introduction to Data communication
Thermodynamics and fluid dynamics
Year 3 – Semester 1
Applied Electronics
Automation systems
Elementary Mechanical Engineering
Hydraulics and pneumatics
Year 3 – Semester 2
Robotics
Scientific methods and Writing for automation
Thesis work in Automation Engineering

https://www.hig.se/Ext/En/University-of-Gavle/Education/Programmes/Programsidor/Grundniva/Study-Programme-in-Automation-Engineering-180-cr/Courses-within-the-program.html

Subject	**Percentage of the total course modules**
Mechanical Engineering	18.75
Electrical/Electronic Engineering	18.75
Computer Science/ ICT	12.5
Control Engineering	16.66
Fundamental subjects	25
Mechatronics	0
Thesis	8.33

6)

Programme title[1]	Mechatronics
Department	Faculty of Electrical Engineering and Information Technology
University	Slovak Technical University (Slovakia)
Country	Slovakia
URL	www.stuba.sk
Degree of Study Programme[2]	Bachelor
ECTS[3]	192
Duration[4]	3 years
Language[5]	English, Slovak
Bachelor project[6]	Yes
Teaching methodology[7]	Lectures, tutorials, labs,internship

Year 1 – Semester 1*
Additional Exercises in Mathematics I
Engineering Chemistry
Fundamentals of Mechanical Engineering
Mathematics I
Physics Seminar I
Programming
Foreign Languages for Technical Communication (De)
Year 1 – Semester 2
Additional Exercises in Mathematics II
Applied Physics I
Engineering Mechanics I
Material Science
Mathematics II
Physics Seminar II
Foreign Languages for Technical Communication (De)
Physical Education and Sport
Computer Aided Design
Year 2 – Semester 1*
Applied Physics II
Elasticity and Strength
Fluid Mechanics
Law for Engineers

Production Processes I
Foreign Languages for Technical Communication (De)
Physical Education and Sport
Engineering Mechanics II
Interesting Mathematics and Physics
Year 2 – Semester 2
Basics of Management
Machine Parts I
Practice in Industry
Production Processes II
Thermodynamics
Foreign Languages for Technical Communication (De)
Basics of Statistic Analysis
Physical Education and Sport
Mathematics III
Year 3 – Semester 1
Fundamentals of Finite Elements Method
Integrated Management Systems
Mechatronics
Structure Strength Optimation
Theory of multibody systems
Foreign Languages for Technical Communication (De)
Electrics and Electronics
Linear Algebra
Year 3 – Semester 2
Bachelor Work
Parts of Machine Dynamics
Simulation of Mechatronic Systems
Numerical Mathematics in Matlab

Subject	**Percentage of the total course modules**

Mechanical Engineering	41.15
Electrical/Electronic Engineering	2.7
Computer Science/ ICT	2.7
Mechatronics	5.7
Fundamental subjects	23.96
Others (Internship, thesis, humanitarian subjects)	23.79

https://www.stuba.sk/english-1/stu/ects-label/ects-information-package/information-on-degree-programmes/all-programmes.html?page_id=5552&f=0&le=0&l=all&c=0&pg=1&ad=true

7)

Programme title[1]	Automotive Mechatronics
Department	Faculty of Electrical Engineering and Information Technology
University	Slovak Technical University (Slovakia)
Country	Slovakia
URL	www.stuba.sk
Degree of Study Programme[2]	Bachelor
ECTS[3]	197
Duration[4]	3 years
Language[5]	English, Slovak
Bachelor project[6]	Yes
Teaching methodology[7]	Lectures, tutorials, labs,internship

Year 1 – Semester 1*
English Language 1
Introduction into Engineering
Introduction to computers
Mathematics 1
Physical Exercises 1
Safety in Electrical Engineering
Communication management
Introduction to Physics
Year 1 – Semester 2
Algorithms and Programming
Electrical Engineering 1

English Language 2
Mathematics 2
Physical Exercises 2
Physics 1
Seminar in Physics 1
Year 2 – Semester 1*
Automatic Control Systems 1
Electric Circuits
Mathematics 3
Mechanics
Physical Exercises 3
Physics 2
Seminar in Physics 2
Year 2 – Semester 2
Automatic Control Systems 2
Dynamics of Mechatronic Systems
Microcomputer Systems
Physical Exercises 4
Modeling and Simulation Using Matlab
Finance Basics
Year 3 – Semester 1
Bachelor Project 1
Components and Systems in Mechatronics
Design of Automobiles and Electromobiles
Electric drives and servosystems
Physical Exercises 5
PLC Systems in Mechatronics

Year 3 – Semester 2
Bachelor Project 2
Bachelor Thesis
Physical Exercises 6
Sensor Systems and Actuators
Dynamics of Vehicles
Communication Systems and Networks
Design of Electronic Systems

https://www.stuba.sk/english-1/stu/ects-label/ects-information-package/information-on-degree-programmes/all-programmes.html?page_id=5552&f=0&le=1&l=all&c=0&pg=1&ad=true

Subject	**Percentage of the total course modules**
Mechanical Engineering	11.67
Electrical/Electronic Engineering	20.81
Control systems	6.1
Computer Science/ ICT	9.14
Mechatronics	9.14
Fundamental subjects	22.84
Others(projects,languages,thesis,humanitarian subjects)	20.3

8)

Programme title[1]	Robotics and Intelligent devices
Department	
University	National University of Ireland Maynooth
Country	Ireland
URL	www.maynoothuniversity.ie
Degree of Study Programme[2]	Bachelor

ECTS[3]	240
Duration[4]	4 years
Language[5]	English
Bachelor project[6]	Yes
Teaching methodology[7]	Lectures,Tutorials,Labs, internship, thesis

http://apps.maynoothuniversity.ie/courses/?TARGET=QUALIFICATION&MODE=VIEW&SUBJECT_CODE=&OFFERING_CODE=U_HONS_DEGREES&QUALIFICATION_CODE=ROBT

Subject	**Percentage of the total course modules**
Mechanical Engineering	0
Electrical/Electronic Engineering	9.4
Computer Science/ ICT	42.75
Control Engineering	6.25
Mechatronics & Robotics	9.37
Fundamental subjects	11.5
Thesis,industrial work experience	20.8

9)

Programme title[1]	Mechatronic Engineering (Control Technologies for Industries 4.0)
Department	Department of Electronics and Telecommunication
University	Politecnico di Torino
Country	Italy
URL	www.polito.it
Degree of Study Programme[2]	Master’s degree
ECTS[3]	120
Duration[4]	Two years
Language[5]	English
Master project[6]	Yes
Teaching methodology[7]	Lectures, tutorials, labs (internship optional)

https://didattica.polito.it/pls/portal30/sviluppo.offerta_formativa_2019.vis?p_coorte=2020&p_sdu=37&p_cds=55

Subject	Percentage of the total course modules	
	BSc in IT	**BSc in ME**
Mechanical Engineering	16,67	10
Electrical/Electronic Engineering	8,33	8.33
Computer Science/ ICT	10	10
Control Engineering	25	31.67
Mechatronics & Robotics	15	15
Fundamental subjects	0	0
Thesis	25	25

10)

Programme title[1]	Automation and Control Engineering
Department	School of Industrial and Information Engineering
University	Politecnico di Milano
Country	Italy
URL	www.polimi.it
Degree of Study Programme[2]	Master's degree
ECTS[3]	120
Duration[4]	Two years
Language[5]	English
Master project[6]	Yes
Teaching methodology[7]	Lectures, tutorials, labs (internship optional)

Year 1 – Semester 1*
COMPUTER AIDED MANUFACTURING
DYNAMICS OF MECHANICAL SYSTEMS
MODEL IDENTIFICATION AND DATA ANALYSIS
Year 1 – Semester 2
ADVANCED AND MULTIVARIABLE CONTROL
DYNAMICS OF ELECTRICAL MACHINES AND DRIVES
ADVANCED MEASUREMENT SYSTEMS FOR CONTROL APPLICATIONS

MACHINE DESIGN
Year 2
SOFTWARE ENGINEERING (FOR AUTOMATION)
CONTROL OF INDUSTRIAL ROBOTS
ADVANCED PROCESS CONTROL
ADDITIVE MANUFACTURING
FORMAL METHODS FOR CONCURRENT AND REAL-TIME SYSTEMS (UIC 545)
AUTOMATION AND CONTROL LABORATORY
THESIS AND FINAL EXAM

https://www4.ceda.polimi.it/manifesti/manifesti/controller/ManifestoPublic.do?check_params=1&aa=2019&k_corso_la=473&lang=EN&polij_device_category=DESKTOP&__pj0=0&__pj1=ae2df38c00bb31965ea8e9f1b1f3990a

Subject	Percentage of the total course modules
Mechanical Engineering	25
Electrical/Electronic Engineering	8.33
Computer Science/ ICT	16.67
Control Engineering	29.17
Mechatronics &Robotics	4.17
Fundamental subjects	0
Thesis	16.67

PART B – Work Package 1 – Task 1.2 (refers to EU Partners only)

• *Please provide your own studying in the implementation of standards, curriculum and teaching materials in the field of Mechatronics. You can also list URL addresses.*

• *If you want to list bachelor degrees in Mechatronics offered by your University, fill out the information according to Part A, except if you have already done so in Part A. Similarly, if you want to list Master degrees in Mechatronics or other relevant fields offered by your*

University, fill out the information according to Part A, except if you have already done so in Part A.

List of good practice examples.

1	
2	
…	…

PART A – Work Package 1 – Task 1.1

• *For each identified course relevant to Mechatronics fill out the following information*:*

Programme title[1]	Mechatronic Engineering
Department	Department of Mechanical and Aerospace Engineering, Department of Computer and Control Engineering
University	Turin Polytechnic University in Tashkent
Country	Uzbekistan
URL	www.polito.uz
Degree of Study Programme[2]	PhD
ECTS[3]	-
Duration[4]	3 years
Language[5]	English
Bachelor project[6]	No
Teaching methodology[7]	Development of projects, lab sessions, seminars

[1] E.g. Mechatronics.
[2] E.g. Bachelor of Science.
[3] Total number of credits.
[4] In years.
[5] Language used for teaching.
[6] Yes or no.
[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course name	Hours
3D motion tracking in body mechanics	15
Automotive transmissions (manual, non-manual and hybrid)	20
Basic of experimental mechanics in dynamics	15
Basic of experimental mechanics in statics	16
Flow control	15

Gearbox failure analysis and monitoring	25
Legged robots: from bio-inspiration to novel legged machines	12
Servosystems: Characteristics, analytical tools and application to a use case: aircraft flight controls	24
Controll and characterization of the fretting damage	15
Human-machine interaction	20
Parallel and distributed computing	25
Hybrid propulsion systems	15
Advanced scientific programming in matlab	28
Control and data acquisition automation in scientific experiments	10
Object detection for automotive and aerospace applications: reliability challenges and solution	15
Optimization methods for engineering problems	30
Total	**300**

Subject	**Percentage of the total course modules**
Mechanical Engineering	35.33
Electrical/Electronic Engineering	27.33
Computer Science/ ICT	33.33
Mechatronics and Robotics	4
Fundamental subjects	0

The template is going to be used by the MechaUZ Partners for filling out information required for the completion of tasks in Work Package 1, more specifically tasks 1.1 and 1.2 of Work Package 1.

Work Package 1 - Task 1.1 description: Analysis and comparison of teaching systems and methods in HEIs of EU and Uzbekistan.

Work Package 1 - Task 1.2 description: Studying experience of the EU partners in the implementation of standards, curriculum and teaching materials in the field of Mechatronics. Compiling a list of good practice examples.**(The Task 1.2 refers to EU Partners only)**

PART A – Work Package 1 – Task 1.1

• *For each identified course relevant to Mechatronics fill out the following information*:*

Programme title[1]	Mechatronics and Robotics
Department	Mechatronics and Robotics
University	Tashkent State Technical university
Country	Uzbekistan
URL	http://tdtu.uz/en/faculty-of-electronics-and-automation/department-of-mechatronics-and-robotics/
Degree of Study Programme[2]	Bachelor
ECTS[3]	-
Duration[4]	4 year
Language[5]	Uzbek and Russian
Bachelor project[6]	yes
Teaching methodology[7]	Theory, lab sessions, development of projects, connection with industry, seminars, other

[1] E.g. Mechatronics.

[2] E.g. Bachelor of Science.

[3] Total number of credits.

[4] In years.

[5] Language used for teaching.

[6] Yes or no.

[7]Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences
The acquired competencies qualify the graduate as a versatile personality and allow him to be competitive in the field of professional activity. The objects of professional activity of a graduate who has mastered the academic undergraduate program in the direction of preparation 5312600 - "Mechatronics and Robotics" are robots and robotic systems, including information-sensory, executive and control modules, their mathematical, algorithmic and software, methods and means of their design, modeling, experimental research, debugging and operation, scientific research and production testing of robotic systems various applications. The competitive advantages include the maximum consideration of the requirements of employers in the formation of the curriculum, which in its content allows to ensure the competence of the graduate, the involvement of experienced faculty, as well as leading practitioners.

The structure of the Programme.

Year 1– Semester 1*	**1-semester**
Module 1	Uzbek (Russian)
Module 2	Foreign language
…	Information technology in technical systems
Year 1– Semester 1	Higher Mathematics
Module 1	Physics
…	*Introduction to the study*
Year 1– Semester 1*	*Fundamentals of Mechatronics*
	2- **semester**
	Humanities (History of Uzbekistan, Philosophy, Religious Studies)
	Foreign language
	Higher Mathematics
	Physics
	Drawing geometry and engineering graphics
	Electrical Engineering and Electronics
	Power electronics
	3- **semester**
	Electrical Engineering and Electronics
	Mechanics of Solids

	Automated electromechanical systems
	Robots and robotic systems
	Schematic and microprocessor systems
	Mobile robots, flexible and intelligent robotic systems
	Mechatron modules and robot modeling
	4- **semester**
	Metrology and standardization
	Robots and robotic systems
	Schematic and microprocessor systems
	Mobile robots, flexible and intelligent robotic systems
	Mechatron modules and robots drive
	Modeling systems
	5- **semester**
	Professional psychology
	The theory of control
	Mechatron modules and their design
	Mechatron modules and robots drive
	Microcontrollers and their programming bases
	Elective subject
	6- **semester**
	Ecology
	Industry Economics and Management
	The theory of control
	Mechatron modules and their design
	Microcontrollers and their programming bases
	Elective subject
	7- **semester**
	Safety of life activity
	Mechatron modules and automated design systems of robots
	Information devices of mechatron modules and robots
	Design of microcontroller control systems
	Design of mechatron modules and robots
	Fundamentals of programming robotic systems
	Fundamentals of artificial intelligence
	8- **semester**
	Mechatron modules and automated design systems of robots
	Information devices of mechatron modules and robots
	Design of microcontroller control systems
	Design of mechatron modules and robots
	Fundamentals of programming robotic systems
	Fundamentals of artificial intelligence

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: ------------

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	16%
Electrical/Electronic Engineering	16%
Computer Science/ ICT	18%
Mechatronics	33%
Fundamental subjects	17%

Please list any further comments in the space below[9]

Qualification practices are provided after each course: after the 1st year, 2 weeks, after the 2nd year, 5 weeks, after the 3rd year, 6 weeks, and in the 8th semester, 2 weeks of undergraduate practice. All practices are conducted at industrial enterprises of the corresponding profile. At 3-4 courses, one day in a week, classes are held at the branches of the department located at the enterprise. Laboratory classes are provided for 14 subjects, which is 39%

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

* Repeat the procedure for each identified course.

PART B – Work Package 1 – Task 1.2(refers to EU Partners only)

• *Please provide your own studying in the implementation of standards, curriculum and teaching materials in the field of Mechatronics. You can also list URL addresses.*

• *If you want to list bachelor degrees in Mechatronics offered by your University, fill out the information according to Part A, except if you have already done so in Part A. Similarly, if you want to list Master degrees in Mechatronics or other relevant fields offered by your University, fill out the information according to Part A, except if you have already done so in Part A.*

List of good practice examples.

1	
2	

…	…

The template is going to be used by the MechaUZ Partners for filling out information required for the completion of tasks in Work Package 1, more specifically tasks 1.1 and 1.2 of Work Package 1.

Work Package 1 - Task 1.1 description: Analysis and comparison of teaching systems and methods in HEIs of EU and Uzbekistan.

Work Package 1 - Task 1.2 description: Studying experience of the EU partners in the implementation of standards, curriculum and teaching materials in the field of Mechatronics. Compiling a list of good practice examples. **(The Task 1.2 refers to EU Partners only)**

PART A – Work Package 1 – Task 1.1

• *For each identified course relevant to Mechatronics fill out the following information*:*

Programme title[1]	Computer engineering
Department	Computer Systems
University	Tashkent university of information technologies
Country	Uzbekistan
URL	https://tuit.uz
Degree of Study Programme[2]	Bachelor of Science
ECTS[3]	240
Duration[4]	Four year
Language[5]	Uzbek and Russian
Bachelor project[6]	Yes
Teaching methodology[7]	Theory, lab sessions, practice, projects, seminars, industry internship

[1] E.g. Mechatronics.
[2] E.g. Bachelor of Science.
[3] Total number of credits.
[4] In years.
[5] Language used for teaching.
[6] Yes or no.
[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences

Most of major courses consists of 3 parts: • Lecture • Lab class • Practice class

The structure of the Programme

Year 1 – Semester 1 (15 week)	**Year 1 – Semester 2 (15 week)**
Humanities Elective I – 4	Humanities Elective II – 4
Academic writing I – 2	Academic writing II – 2
Foreign language I – 4	Foreign language II – 4
Calculus – 8	Differential equations – 4
Physics I – 6	Linear Algebra – 4
Programming I – 6	Physics II – 6
Sport – 0	Programming II – 6
	Sport – 0
Total 30 credit	***Total 30 credit***
Year 2 – Semester 3 (15 week)	**Year 2 – Semester 4 (15 week)**
Database – 6	Computer organization – 6
Cyber security – 6	Web programming – 6
Data structure and algorithms – 6	Algorithm design – 6
Electronics and circuits I – 6	Electronics and circuits II – 6
discrete structures – 6	Probability – 6
Total 30 credit	***Total 30 credit***
	Academic Internship – 0
Year 3 – Semester 5 (15 week)	**Year 3 – Semester 6 (15 week)**
Computer networks – 6	Operating systems – 6
Systems and Signals – 6	Embedded systems – 6
Computer architecture – 6	Machine learning – 6
Digital device design – 6	Network security – 6
Open Elective course I – 4	Open Elective course II – 4
Project I – 2	Project II – 2
Total 30 credit	***Total 30 credit***
	Industry Internship – 0
Year 4 – Semester 7 (15 week)	**Year 4 – Semester 8 (10 week)**
Mobile Application – 6	IT/Major Elective – 6
IT/Major Elective – 6	IT/Major Elective – 6
IT/Major Elective – 6	IT/Major Elective – 6

IT/Major Elective – 6	
Total 24 credit	***Total 18 credit***
	Graduation Internship – 0
	Graduation Project – **18**
Total 240 credit	

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: ------------

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	0
Electrical/Electronic Engineering	7
Computer Science/ ICT	57
Mechatronics	9
Fundamental subjects	27

Please list any further comments in the space below[9]

Additionally to BSc program (required):

- Graduation State Exam: Foreign language
- Graduation Project: Defense of Graduation Project

Collaboration with industry (required):

- University-Industry Internship: Practice
- University-Industry Internship: Graduation Project

Assessment methods:

- 50 - Midterm exam
- 50 - Final exam
- 100 - Total

Grades:

- A+=4.50 - 5.00 (90 - 100);
- A= 4.26 - 4.50 (86 - 90);
- B+=4.00 - 4.25 (80 - 85);
- B= 3.55 - 3.95 (71 - 80);

- C+=3.25 - 3.50 (65 - 70).
- C= 3.00 - 3.25 (60 - 65);

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

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Mechatronics courses in **Finland and Belgium**

Contents

Finland: During the research we could not find the courses related to Mechatronics, so we did it in the field of Mechanical Engineeting: 1 bachelor course

Belgium: 1 bachelor course

FINLAND

PART A – Work Package 1 – Task 1.1

• *For each identified course relevant to Mechatronics fill out the following information*:*

Programme title[1]	Mechanical Engineering
Department	LUT School of Engineering Scienceri
University	LUT University, Finland
Country	Finland
URL	http://www.lut.fi
Degree of Study Programme[2] Bachelor's 3+2	Bachelor degree or Graduate degree (EQF Level 6)
ECTS[3]	180
Duration[4]	3 years
Language[5]	Finnish
Bachelor project[6]	Yes (10 ECTS)
Teaching methodology[7]	The Bachelor's Programme in Mechanical Engineering is a three-year double degree programme. The programme is developed in cooperation with Hebei University of Technology (HEBUT) in China. The programme leads to the degree of Bachelor of Science in Technology, M.Sc. (Tech.), which is 180 ECTS credits. The programme includes general, intermediate specialisation, minor, language and elective studies as well as a Bachelor's thesis at the end of the studies. You will complete the entire degree in Lappeenranta, Finland. General studies (88 ECTS credits) include studies in mathematics, physics, engineering design, mechanics, materials, control systems and programming. Intermediate specialisation studies (40 ECTS credits) focus on the topics in mechatronics, robotics, production engineering, FE analysis, machine design

	and manufacturing. Options for minor studies (20 ECTS credits) include energy economics, sustainability science, Chinese business, culture and technology. Language studies (19 ECTS credits) include Chinese, Finnish and English and are featured with the aim to increase intercultural communication abilities as well as employability in Finland, China and around the world. In elective studies (3 ECTS credits), you can select any course at LUT. Bachelor's thesis, 10 ECTS credits. After completing a bachelor's degree in mechanical engineering, you can continue your studies directly in the Master's programmes at LUT in the field of mechanical engineering, Industrial Design Engineering or Mechanical Engineering.
~~Laboratories~~	The mechanical platform provides students with high-performance industrial equipment (design and simulation software, machine tools, manufacturing and machining robots, electronic card making machines, 3D printer, etc.). Students also use other school resources such as the electrical engineering platform, the materials science resource center.
External internship	NO

[1] E.g. Mechatronics.
[2] E.g. Bachelor of Science.
[3] Total number of credits.
[4] In years.
[5] Language used for teaching.
[6] Yes or no.
[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences

The main themes of your studies are production technology, the design of demanding metal structures and robotic welding or the design of mechatronic equipment.

The structure of the Programme.

Year 1 – Semester 1*
Module 1
Module 2
…
Year 1 – Semester 1
Module 1
…

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: http://www.insa-strasbourg.fr/fr/programme-des-etudes/

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	19%
Electrical/Electronic Engineering	15%
Computer Science/ ICT	0%
Mechatronics	22%
Fundamental subjects	45%

Please list any further comments in the space below[9]

Mechanical engineering degree opens the door to a wide range of tasks: you can work in the metal or automotive industries, for example, but also in industries related to food, healthcare, energy production, transport or climate change mitigation.

You can work in management and expert positions, as a design or production engineer, or in the development of consumer goods, machinery, equipment and their parts. With a Master's degree in mechanical engineering one can also research and develop manufacturing methods and apply them to production.

Work may also involve training, research and marketing tasks, for example in industrial projects or in one's own company. Master's graduates in mechanical engineering have gone on to become:

heads of virtual design firms
design managers of international energy companies
production managers of pulp and paper plants

mechanical engineers quality control managers in the metal industry

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.

BELGIUM

Programme title[1]	Bachelor of Engineering Technology (Leuven)
Department	
University	KU Leuven
Country	Belgium
URL	https://onderwijsaanbod.kuleuven.be/opleidingen/e/CQ_51601481.htm#activetab=diploma_omschrijving
Degree of Study Programme[2]	Bachelor of Science
ECTS[3]	180
Duration[4]	3
Language[5]	English
Bachelor project[6]	Yes.
Teaching methodology[7]	Learning by training
~~Intership~~	Yes

[1] E.g. Mechatronics.
[2] E.g. Bachelor of Science.
[3] Total number of credits.
[4] In years.
[5] Language used for teaching.
[6] Yes or no.
[7] Theory, lab sessions, development of projects, connection with industry, seminars, other.

Course-specific learning aims/outcomes/competences
The bachelor's programme is based on four pillars, which run like a thread throughout the entire programme: Engineers and Science – For engineers, technology and science are inseparable. Gaining scientific knowledge and skills is not a goal in itself, but it is a means when bringing technology into practice. Engineers and Technology – Your technological training starts from day one. You will get to know different technological domains from a versatile, multi-disciplinary point of view. This enables you to make a well-considered choice for a specialisation in the 2nd bachelor. Engineers and the World – Engineers do not only work with science and technology, they also work with people. It is important to develop into an engineer who

functions smoothly in a diverse and complex society. Engineering Experiences – An engineering experience challenges you to act and think like a real engineer, by working as a team and bringing together all your knowledge, skills and points of view.

The structure of the Programme.

Year 1 – Semester 1*
Module 1
Module 2
…
Year 1 – Semester 1
Module 1
…

You can also list URL address instead of filling out the Table above. In this case, please provide the URL address: https://www.kuleuven.be/english/application (online request).

Profile of the Programme: Distribution of the course subjects.

Subject	**Percentage of the total course modules**
Mechanical Engineering	10%
Electrical/Electronic Engineering	10%
Computer Science/ ICT	20%
Mechatronics	9%
Fundamental subjects	51%

Please list any further comments in the space below[9]

The programme-specific learning outcomes are: Knowledge and comprehension (K) K1L Basic scientific-disciplinary knowledge and comprehension in the field of Engineering Technology K2L Basic scientific-disciplinary knowledge and comprehension in one of the disciplines of the chosen specialisation K3L Basic scientific-disciplinary knowledge and comprehension in one or more of the following professional competencies, to function as a graduate in Engineering Technology in a broad social context 1. ethical aspects and scientific practice 2. business aspects and entrepreneurship

3. communication
4. cooperation
5. professionalism

[9] Information may include reference to textbooks, assessment methods, collaboration with industry, industrial experience (any practical trainings), Innovative practices, percentage of modules which include laboratory, etc.