



Co-funded by the
Erasmus+ Programme
of the European Union



7th International Workshop on Microsystems
December 14th, 2022

E – DRIVETOUR

*an Interactive Blended Course on Electric Vehicle
Technology*

Theodoros Kosmanis and Dimitrios Tziourtzioumis

Laboratory of Energy Systems

Department of Industrial Engineering and Management

International Hellenic University

E-DRIVETOUR Aims and Objectives

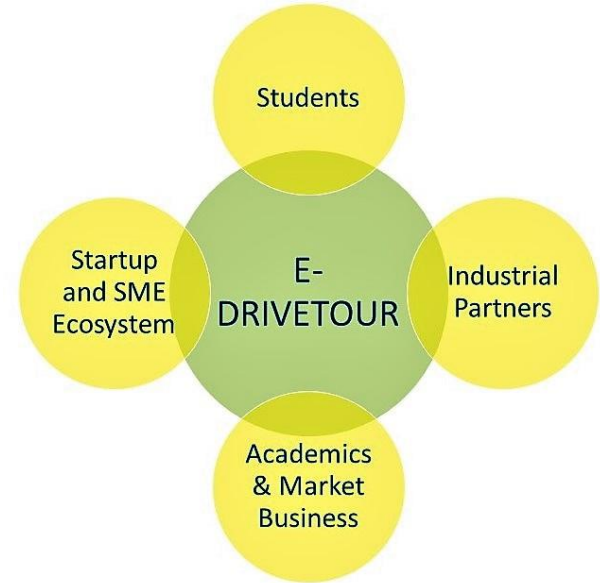


3-year project (2 years preparation, 1 year education)

Development of an **interactive course on electric vehicles** with a comprehensive interdisciplinary curriculum that includes *reconfigurable laboratory apparatus, innovative demonstrator, group assignment & industrial experience.*

Objectives:

- **Develop an innovative course** on Electric Vehicles
- **Recognised by academia & industry** throughout the EU by using the ECTS credit system



E-DRIVETOUR Partnership



3 Universities

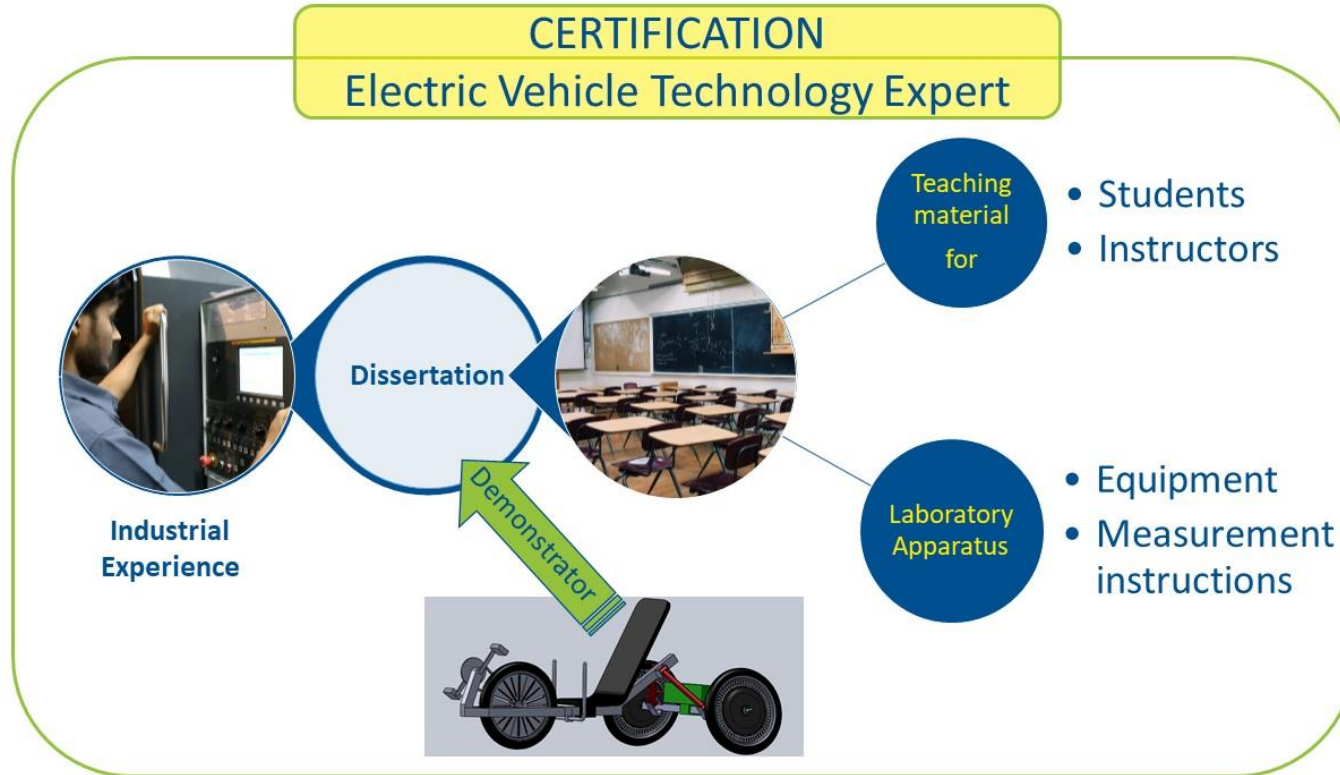
4 SMEs

1 Research Centre

1 Certif. provider



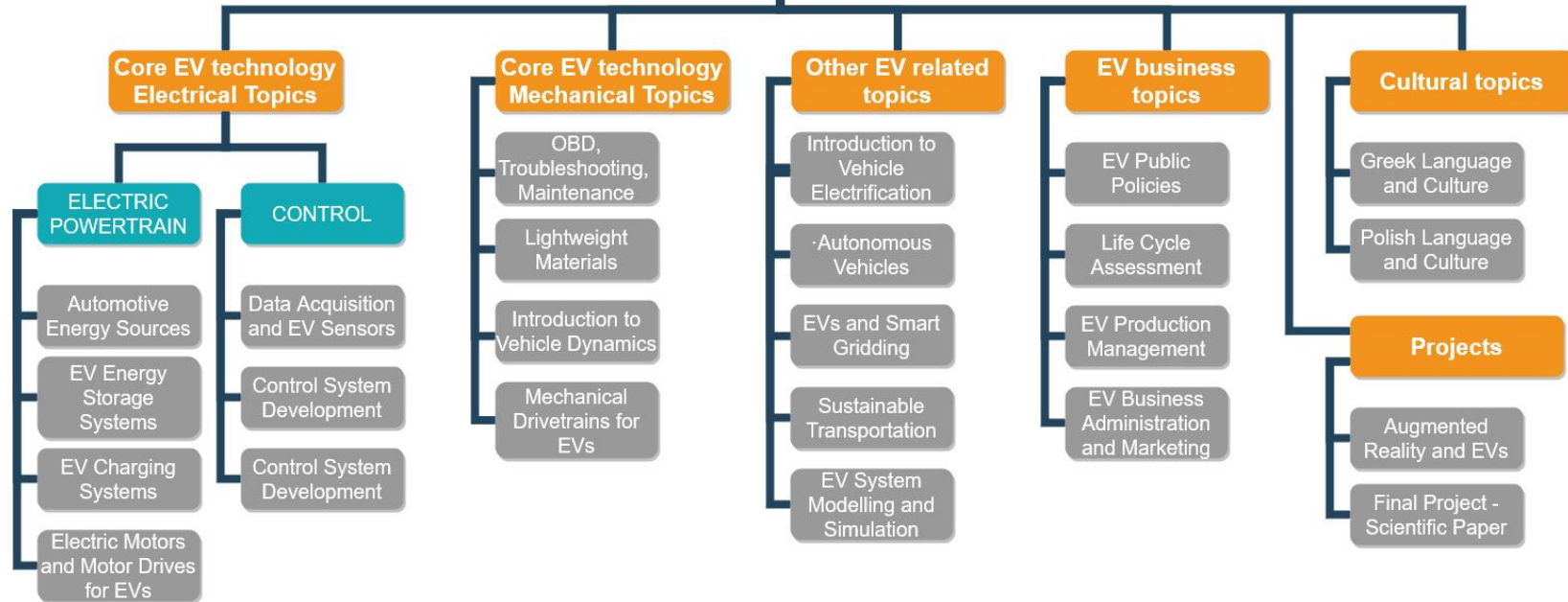
E-DRIVETOUR educational scheme



E-DRIVETOUR teaching topics



E-DRIVETOUR teaching topics



E-DRIVETOUR teaching topics



Code	Course title
TS1.1	Introduction to Vehicle Electrification
TS1.2	NI LabVIEW Training
TS1.3	Automotive Energy Sources
TS1.4	Lightweight Materials
TS1.5	Introduction to Vehicle Dynamics
TS1.6	Data Acquisition and EV Sensors
TS1.7	EV Production Management
TS1.8	Electric Motors & Motor Drives for Evs
TS1.9	Mechanical Drivetrains for EVs
TS1.10	EV Business Administration and Automotive Marketing
TS1.11	Language Lessons
TS1.12	Intermediate Project 1

222 working hours

Code	Course title
TS2.1	EV System Modelling and Simulation
TS2.2	EV Energy Storage Systems
TS2.3	EV Charging Systems
TS2.4	Developing Tool Demonstration
TS2.5	Control System Development
TS2.6	EV Public Policies
TS2.7	EVs and Smart Griding
TS2.8	EV On Board Diagnostics, Troubleshooting & Maintenance
TS2.9	Life Cycle Assessment of EVs
TS2.10	Sustainable Transportation
TS2.11	Language Lessons
TS2.12	Intermediate Project 2

218 working hours

Practical Experience: 14 days – 80 working hours
TOTAL: 520 working hours – 20 ECTS



Participating Students

40 students
initially selected

36 started in
February 2022

35 participated in
the 1st and 2nd
Mobility Period

29 participated in
the 3rd Mobility
Period

28 have reached
Part C of the
certification exams

1 has succeeded in
all topics

27 will be re-
examined next
week

Teaching format

- 3-5 teaching hours daily (afternoon)
- 4 teaching months
- 2 teaching mobility periods
- 1 practical training mobility period
- E-learning platform

Mobility Periods



- **Teaching Mobilities:**
 - **March 2022** (*Thessaloniki, Greece*) – 35 students, 14 educators
 - **May 2022** (*Radom, Poland*) – 35 students, 10 educators
- **Practical Training Mobilities:**
 - **June 2022** (*Thessaloniki, Greece – IHU, CERTH, Inteligg*) – 3 students
 - **June-July 2022** (*Warsaw, Poland – TRIGGO*) – 8 students
 - **September 2022** (*Leuven, Belgium – EZEE*) – 11 students
 - **September 2022** (*Salerno, Italy – eProInn*) – 7 students
 - 6 students have not participated in the training



Mobility Period 1 - IHU

Data Acquisition and EV sensors
NI LabVIEW Training
EV Energy Sources & ESS
Lightweight Materials
Autonomous Vehicles
EV Motors and Motor Drives

Mobility Period 2 - UTHR

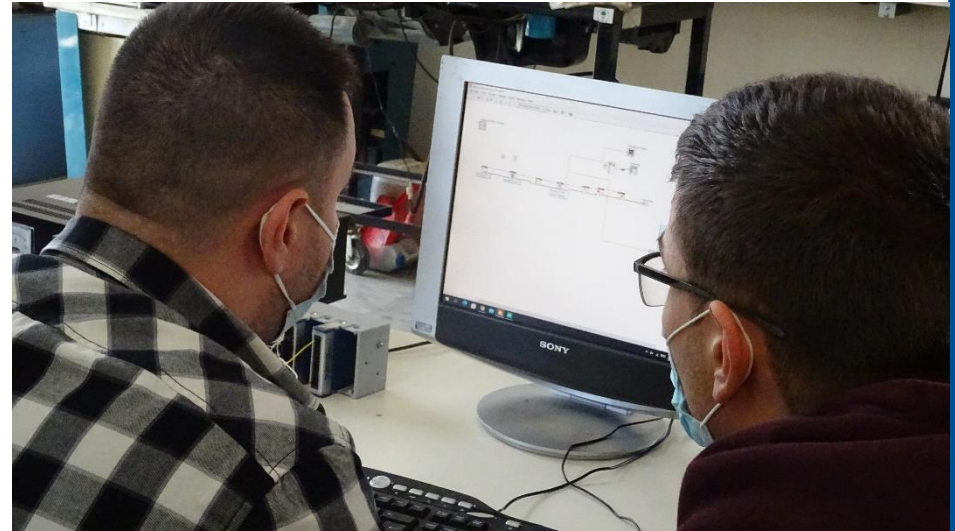
EV Charging Systems
EV OBD, Maintenance & Troubleshooting
EV Mechanical Drivetrains
Vehicle Dynamics

Medium Scale Projects

Small scale EV prototypes and Augmented Reality Software



Data Acquisition and EV sensors



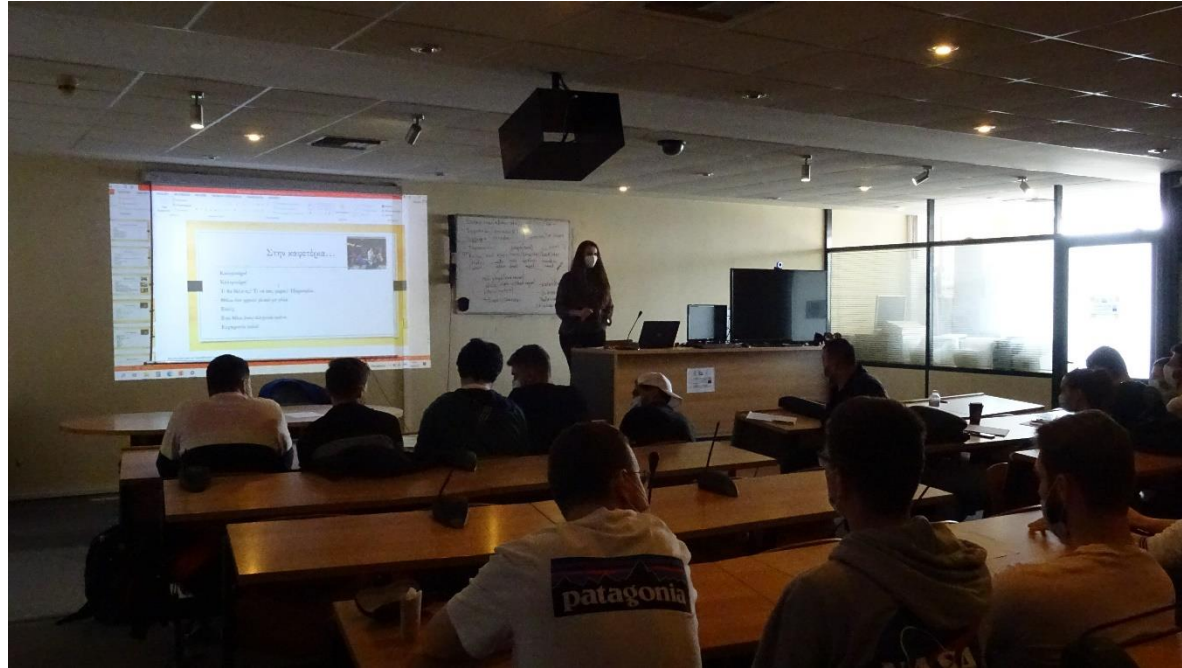
NI LabVIEW Training



Lightweight Material



Autonomous Vehicles



Greek Language and Culture

1st Mobility Period



... and Practice!!!

1st Mobility Period





Augmented Reality



EV prototype



OBD in Real Hybrid EV



Investigating Polish Culture in
Kazimierz Dolny

3rd Mobility Period



Thessaloniki, Greece

Leuven, Belgium



Salerno, Italy



Warsaw, Poland

Certification Exams



			JUN/JUL	OCT	NOV
			23-27	7	15-30
			Exam	Exam	Exam
	C	W	1	2	3
Introduction to Vehicle Electrification	3		TS1.1	1	
NI LabVIEW Training	6		TS1.2		
Automotive Energy Sources	10	2	TS1.3		1
Lightweight Materials	6		TS1.4	1	
Introduction to Vehicle Dynamics	6		TS1.5	1	
Data Acquisition and EV Sensors	6		TS1.6		1
EV Production Management	9		TS1.7	1	
Electric Motors & Motor Drives for Evs	12		TS1.8		1
Autonomous Vehicles	9		TS1.9	1	
EV BA and Automotive Marketing	15		TS1.10	1	
EV System Modelling and Simulation	6		TS2.1	1	
EV Energy Storage Systems	6		TS2.2		1
EV Charging Systems	21	3	TS2.3		1
Mechanical Drivetrains for EVs	2	4	TS2.4	1	
Control System Development	9		TS2.5		1
EV Public Policies	6		TS2.6	1	
EVs and Smart Gridting	6		TS2.7	1	
EV OBD, Troubleshooting & Maintenance	6		TS2.8	1	
Life Cycle Assessment of EVs	3		TS2.9	1	
Sustainable Transportation	3		TS2.10	1	
			6	7	6

In 3 parts

Successful students will receive skills certification



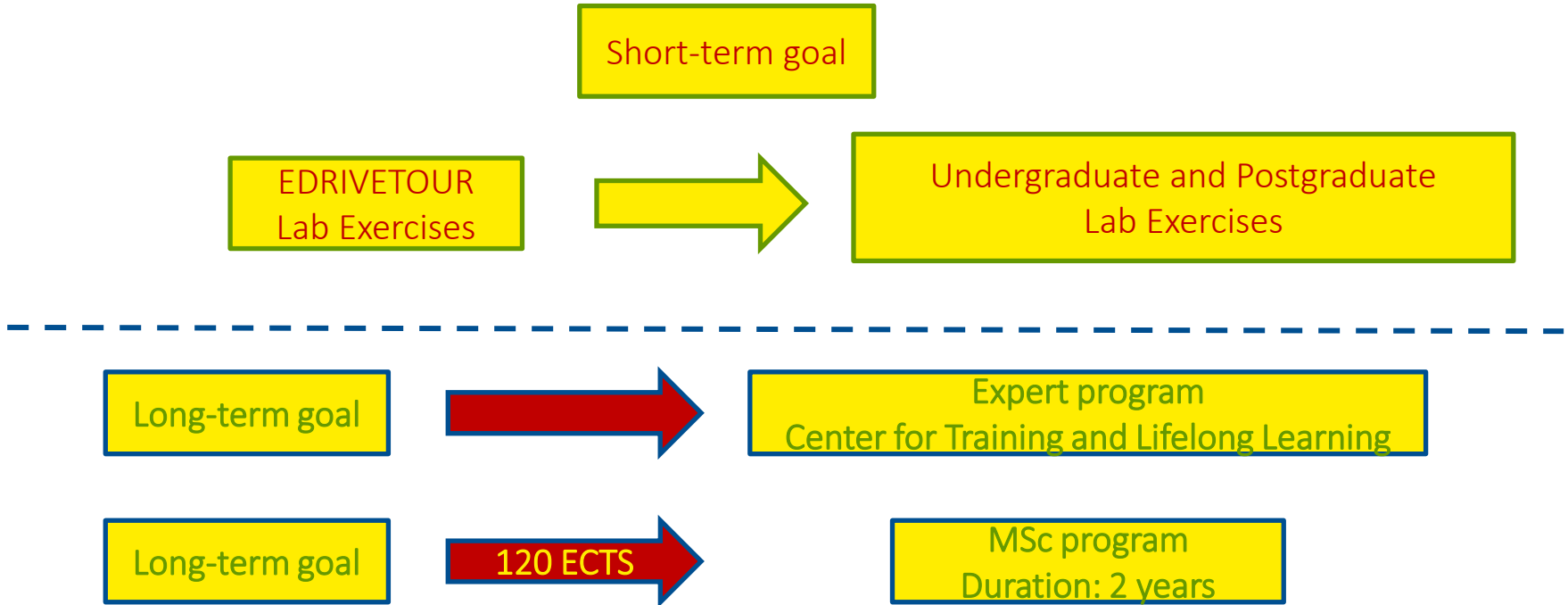


Visibility

- Web Portal & Social Media Presence (*specialized and wider public*)
- e-Learning Platform (*educational material*)
- Technical Publications (*specialized public*)
- Forum & Event participation (*specialized and wider public*)
- Cooperate with related industry initiatives (*specialized public*)
- Workshops (*specialized and wider public*)
- Promotional Content (*wider public*)

Successful Story if

- Set the basis for **a Masters course** on Electric Mobility (first in Europe!)
 - Run on an annual basis – attract graduates outside Europe
- Increase *industrial and HEI participation*
- Foundation of an **accredited vocational training program**





Thank you for your attention

Theodoros Kosmanis

Associate Professor

International Hellenic University

kosmanis@ihu.gr

Dimitrios Tziourtzioumis

Assistant Professor

International Hellenic University

dtziour@ihu.gr

Disclaimer:

The information and views set out in this document are those of the authors and do not necessarily reflect the official opinion of the European Union. Neither the European Union institutions and bodies nor any person acting on their behalf may be held responsible for the use which may be made of the information contained therein.