E-DRIVETOUR
bEyonD the boRder of electrIc VEhicles: an advanced inTeractive cOURse

E-DRIVETOUR Newsletter / No 4 / September 2022

MESSAGE FROM THE PROJECT COORDINATOR

Dear reader,

Welcome to our fourth newsletter of the *bEyonD the boRder of electrIc VEhicles: an advanced inTeractive cOURse* (E-DRIVETOUR) project. The newsletter series provide you with latest information on project progress, achievements and important forthcoming activities related to education on electric mobility.

E-DRIVETOUR is a 36-month project, which started on January 1st, 2020 and is funded by the European Union, under the Erasmus+ Programme Knowledge Alliances (Project Number: 612522-EPP-1-2019-1-EL-EPPKA2-KA).

Its aim is to develop an advanced interactive course related to Sustainable Electric Mobility Engineering that will train individuals with the necessary skills and knowledge to work in the electric automotive industry, including Ultra Lightweight Vehicles (ULV) that comprise e-bikes and e-cargo bikes.

This third year of the project focused on the implementation of the course programme.

More information can be found on our website https://www.edrivetour.eu/ which offers in-depth information about the project, E-DRIVETOUR partners consortium, results, as well as news and events relevant to the project.

Enjoy reading and please do not hesitate to send us your feedback.

Associate Professor Theodoros Kosmanis

Coordinator of the E-DRIVETOUR project

With the support of the Erasmus+ Programme of the European Union

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E-DRIVETOUR'S TEACHING PROCEDURE

STUDENTS AND EDUCATORS

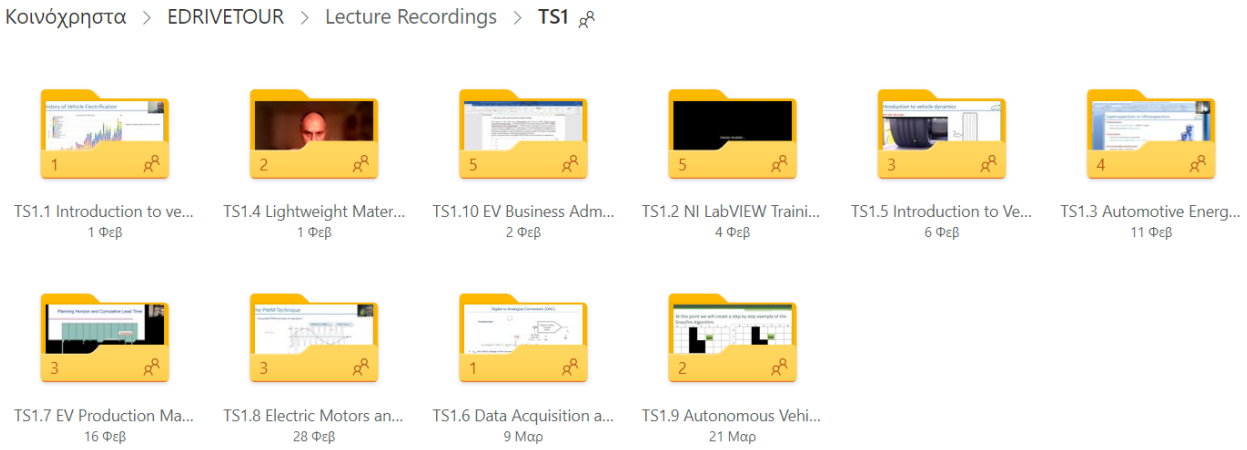
EDRIVETOUR teaching procedure took place from the beginning of February 2022 until the end of May 2022, with the participation of students from 3 universities, specifically 4 students from the University Technology and Humanities in Radom (Poland), 15 students from the University of Craiova (Romania) and 16 students from the International Hellenic University (Greece).

Regarding teaching of theoretical and laboratory courses, 25 educators were overall involved as follows:

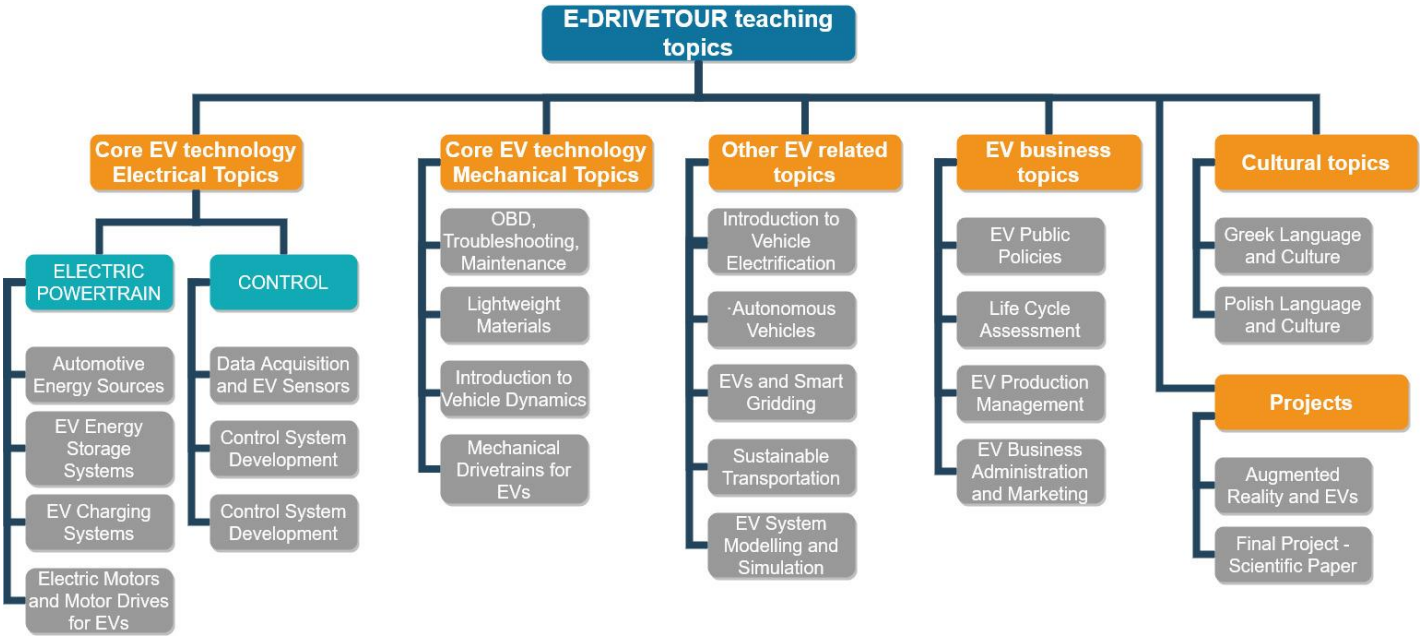
- 11 from the International Hellenic University
- 8 from the University of Technology and Humanities in Radom
- 2 from the University of Craiova
- 1 from the Centre for Research and Technology
- 2 from Inteligg P.C.
- 1 from eProInn s.r.l.

THE COURSES

EDRIVETOUR's theoretical lectures were conducted online through Zoom platform daily in a convenient time schedule, in order not to interrupt each student's normal studies. Additionally, all courses' teaching material was uploaded and organised on an appropriately designed e-learning platform (moodle based). All lectures were recorded and uploaded on the cloud for the students to be able to access them at any time to assist them during studying.



View of the Cloud Folder Hosting Recorded Lectures



Theoretical lectures took place for 4 months. During this period, the students got in touch with a variety of topics, thus horizontally covering all aspects of electric vehicle technology. Specifically, the majority of courses was related to core electric vehicle technology and general vehicle technology mostly from the mechanical point of view.

Lectures were organized in the most possible interactive way, aiming to prepare students for their laboratory courses. They contained discussion on topics, quizzes, projects & exercises.

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
31/1/2022	**1/2/2022**	**2/2/2022**	**3/2/2022**	**4/2/2022**
16:00-19:00 CET	16:00-19:00 CET	16:00-19:00 CET	16:00-19:00 CET	16:00-19:00 CET
TS1.1 INTRODUCTION TO VEHICLE ELECTRIFICATION	TS1.4 LIGHTWEIGHT MATERIAL	TS1.10 EV BUSINESS ADMINISTRATION	TS1.2 NI LABVIEW TRAINING	TS1.5 INTRODUCTION TO VEHICLE DYNAMICS
MONDAY	**TUESDAY**	**WEDNESDAY**	**THURSDAY**	**FRIDAY**
7/2/2022	**8/2/2022**	**9/2/2022**	**10/2/2022**	**11/2/2022**
16:00-19:00 CET	16:00-19:00 CET	16:00-19:00 CET	16:00-19:00 CET	16:00-19:00 CET
TS1.2 NI LABVIEW TRAINING	TS1.4 LIGHTWEIGHT MATERIAL	TS1.10 EV BUSINESS ADMINISTRATION	TS1.3 AUTOMOTIVE ENERGY SOURCES	TS1.5 INTRODUCTION TO VEHICLE DYNAMICS

Indicative schedule of the first two weeks of the online training

E-DRIVETOUR E-LEARNING PLATFORM

E-DRIVETOUR has launched its advanced e-Learning platform providing access to educational material, classroom-to-classroom interconnected projects, remote experimentation on laboratory apparatus and the intermediate projects' demonstrators. The E-DRIVETOUR e-Learning platform is available at: http://edrivetour.ea.consulting/

Teacher: Theodoros Kosmanis

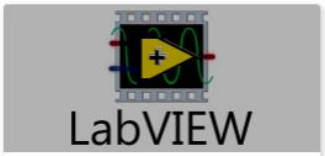
TS1.1 Introduction to Vehicle Electrification

Teaching hours: 3 (Lectures: 3h, Lab: -)

Working effort: 0.2 ECTS

This course is an introduction to Vehicle Electrification, covering general information about architectures of all possible vehicles with electric powertrain such as the Battery Electric Vehicles (BEVs), Hybrid Electric Vehicles (HEVs), Fuel Cell Electric Vehicles (FCEVs), Solar Cell Electric Vehicles etc. The course explains the functionality of EVs, including the basics on energy storage as well as the technologies applied for charging them, the various cases of propulsion system and basic accessories.

Read more



Teacher: George Katranas Teacher: Panagiotis Maroulas Teacher: Dimitrios Tziourtzioumis

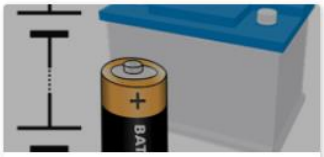
TS1.2 NI LabVIEW Training

Teaching hours: 22 (Lectures: 6h, Lab: 16h)

Working effort: 1.04 ECTS

The LabVIEW Training course is an introduction to National Instruments' LabVIEW graphical programming language for data acquisition and control. Topics covered include creating, editing, and executing programs using the LabVIEW interface. The course will set for the participants the bases for programming and utilizing practical data acquisition structures as well as sensor control circuits. The practical idea of real time processing, essential for

Read more



Teacher: Theodoros Kosmanis Teacher: Dimitris Triantafyllidis

TS1.3 Automotive Energy Sources

Teaching hours: 16 (Lectures: 12h, Lab: 4h)

Working effort: 0.96 ECTS

The fundamentals of energy sources for vehicles in general and electric vehicles specifically are presented. The course covers battery technology as the basic energy source of electric vehicles from its constructional point of view. Battery chemistry fundamentals of most common types of batteries for electric vehicles (Li-Ion, $LiFePO_4$, $LiFeYPO_4$, NiMH, even Lead Acid ones) including their main characteristics are analyzed. Energy sources

Read more

Teacher: Ioannis Bazios Teacher: Panagiotis Maroulas Teacher: Dimitrios Tziourtzioumis

TS1.4 Lightweight Materials

Teaching hours: 10 (Lectures: 6h, Lab: 4h)

Working effort: 0.56 ECTS

The course will touch the industrial trend of using lightweight materials, emphasizing in the weight reduction of vehicle mass. Carbon-fiber reinforced polymers (CFRP) for the electric vehicle frame, panels and pressurized gas tanks are technologies that will be presented in the course. Topics on the specific materials used for vehicle mass reduction, their properties, manufacturing techniques and handling, as well as comparison with corresponding properties

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Teacher: Krzysztof Gorski

TS1.5 Introduction to Vehicle Dynamics

Teaching hours: 6 (Lectures: 6h, Lab: -)

Working effort: 0.4 ECTS

The basics of vehicle dynamics will be taught in the course. In particular below presented topics will be disscussed as an essential knowledge for determining the traction power of a vehicle:

Fundamentals of vehicle movement.

Vehicle resistances including rolling, aerodynamic and grading.

Pneumatic tyre identification.

Dynamics of linear motion. Vehicles performance, maximum speed, gradeability, acceleration and

Read more

Teacher: Michail Kiziroglou Teacher: Theodoros Kosmanis

TS1.6 Data Acquisition and EV Sensors

Teaching hours: 10 (Lectures: 6h, Lab: 4h)

Working effort: 0.56 ECTS

This topic focuses on data acquisition circuits and systems, an essential part of control networks. Electric Vehicle sensors, such as current sensors, encoders and resolvers, and modern sensoring systems are analyzed together with their connectivity with electronic control units (ECUs) that support the control network. An appropriately designed laboratory session by means of NI control systems and NI LabVIEW graphical interface will

Read more

E-DRIVETOUR NEWS

LAUNCH OF E-DRIVETOUR LECTURES

On Monday, January 31st 2022, the actual educational procedures of the E-DRIVETOUR project has initiated. The students were welcome by the project coordinator, Associate Professor **Theodoros Kosmanis** from the International Hellenic University and the leaders of the two partner Universities, Associate Professor **Krzysztof Gorski** from the University of Technology and Humanities in Radom and Professor **Costin Badica** from the University of Craiova.

The first lecture delivered was a short Introduction to Vehicle Electrification by Theodoros Kosmanis.

https://www.linkedin.com/posts/edrive-tour-1a16a71b2_edrivetour-ihu-international-activity-6894004409831882752-dMPJ?utm_source=share&utm_medium=member_desktop

NEXT STEPS

The forthcoming newsletters will provide more insight to the mobility periods during which all students and educators got together in order to experimentally work in laboratories of the Universities and be trained by the industrial partners of the project. Results and testimonials from students will be provided, as the project approaches its completion.

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