

ERASMUS+ PROGRAMME
Project Number: 618509-EPP-1-2020-1-JO-EPPKA2-CBHE-JP

ECO-CAR:
Vocational Training Diploma on Electrical and Hybrid Vehicles

11th Online Management Meeting

Agenda

The University of Jordan

Thursday, May 12th, 2022

15:00 – 17:00

(Amman time)





Thursday, May 12th, 2022

15:00 – 17:00

14:45 - 15:00

Registration

15:00 - 15:05

Welcoming Speech, by:

Prof. Ahmed Al-Salaymeh, General Project Coordinator at the University of Jordan.

Work Packages and Clusters Discussion

Moderator of the sessions Eng. Rasha Albaik & Eng. Sara Tweissi

15:05 - 15:15

Cluster 1: Hybrid and Electric Vehicle Basics

Presented by: Prof. Rebhi Damseh, Dr. Ma'moun Al-Smadi, and Dr. Clio Vossou

- ✓ Courses outlines
- ✓ Courses content
- ✓ Upcoming tasks and challenges
- ✓ Timeline to submit the cluster material

Cluster 1: Hybrid and Electric Vehicle Basics	
Focus Group 1 (Professional Diploma)	Introduction to Automotive Engineering (Introduction to Hybrid and Electric Vehicles)
Focus Group 2 (Community College Diploma)	Hybrid and Electric Vehicle Technology
Focus Group 3 (Vocational Diploma)	Hybrid and Electric Vehicles Systems

University	Role	Name of Responsible Members
BAU	Leader	Prof. Rebhi Damseh and Dr. Ma'moun Al-Smadi
NTUA	Co-Leader	Dr. Clio Vossou
Aachen	Partner	Mr. Stephan Bihn
MU	Partner	Dr. Hussien Al-Majali
UJ	Partner	Dr. Bashar Qawasmeh

15:15– 15:25 Cluster 2: Battery Storage Technology, Charging systems, and Recharging Infrastructure.

Presented by: Eng. Florian Ringbeck and Prof. Salman Ajib

- ✓ Courses outlines
- ✓ Courses content
- ✓ Upcoming tasks and challenges
- ✓ Timeline to submit the cluster material

Cluster 2: Battery Storage Technology, Charging systems, and Recharging Infrastructure	
Focus Group 1 (Professional Diploma)	1- Energy Storage and Energy Management 2- Power Electronics and Charging Systems
Focus Group 2 (Community College Diploma)	N.A
Focus Group 3 (Vocational Diploma)	Braking and Charging System

University	Role	Name of Responsible Member
Aachen	Leader	Eng. Florian Ringbeck
TH-OWL	Co-Leader	Prof. Salman Ajib & Dr. Sabine Brunklaus
UJ	Partner	Dr. Bashar Qawasmeh & Dr. Hussam Khasawneh
ZUJ	Partner	Dr. Nabeel Abu Shaban
JUST	Partner	Eng. Salaheldeen Abu Yahya

15:25 – 15:30 Cluster 3: Electric and Hybrid Vehicles Diagnosis for Maintenance and Repair

Presented by: Dr. Wael Adaileh

- ✓ Courses outlines
- ✓ Courses content
- ✓ Upcoming tasks and challenges
- ✓ Timeline to submit the cluster material

Cluster 3: Electric and Hybrid Vehicles Diagnosis for Maintenance and Repair	
Focus Group 1 (Professional Diploma)	N.A
Focus Group 2 (Community College Diploma)	Malfunction Diagnostics and Repair in Hybrid and Electric Vehicles
Focus Group 3 (Vocational Diploma)	N.A

University	Role	Name of Responsible Member
TTU	Leader	Dr. Wael Adaileh and Dr. Ali Alahmer
HTU	Co-Leader	Eng. Alaa Aldaamseh
BAU	Partner	Dr. Mamoun Al-Smadi
Aachen	Partner	Eng. Florian Ringbeck

15:30–15:40 Cluster 4: Internal Combustion Engines in Hybrid Vehicles

Presented by: Eng. Adam Nyerges and Dr. Mohammed Almajali

- ✓ Courses outlines
- ✓ Courses content
- ✓ Upcoming tasks and challenges
- ✓ Timeline to submit the cluster material

Cluster 4: Internal Combustion Engines in Hybrid Vehicles	
Focus Group 1 (Professional Diploma)	Internal Combustion Engine
Focus Group 2 (Community College Diploma)	Internal Combustion Engine
Focus Group 3 (Vocational Diploma)	1- Internal Combustion Engine 2- Cooling & Lubrication Systems

University	Role	Name of Responsible Member
BME	Leader	Eng. Adam Nyerges
MU	Co-Leader	Dr. Mohammed Almajali
JUST	Partner	Prof. Suhail Kiwan
HTU	Partner	Engr. Waleed Sunjuq
UNIVAQ	Partner	Prof. Michele Anatone
UJ	Partner	Prof. Mohammad Hamdan and Dr. Mohammed Alrbai

15:40– 15:50 Cluster 5: Automotive Electricity, Electronics, Sensors, and Actuators

Presented by: Prof. Tarek A. Tutunji and Eng. Eman Abdelhafez

- ✓ Courses outlines
- ✓ Courses content
- ✓ Upcoming tasks and challenges
- ✓ Timeline to submit the cluster material

Cluster 5: Automotive Electricity, Electronics, Sensors, and Actuators	
Focus Group 1 (Professional Diploma)	Automotive Electronic, Electrical, and Sensing Systems
Focus Group 2 (Community College Diploma)	1- Electrical and Electronics Circuits 2- Electrical and Electronic Systems in Vehicles
Focus Group 3 (Vocational Diploma)	1- Sensors 2- Basic Electricity and Electronics

University	Role	Name of Responsible Member
HTU	Leader	Prof. Tarek A. Tutunji
ZUJ	Co-Leader	Eng. Eman Abdelhafez
TTU	Partner	Dr. Wael Adaileh + Dr. Ahmad Mostafa

BME	Partner	Dr. Máté Zöldy
UJ	Partner	Eng. Mohamad Masad

15:50 – 16:10

Cluster 6: Vehicle Dynamics

Presented by: Dr. Jon Garcia Barruetabeña

- ✓ Courses outlines
- ✓ Courses content
- ✓ Upcoming tasks and challenges
- ✓ Timeline to submit the cluster material

Cluster 6: Vehicle Dynamics	
Focus Group 1 (Professional Diploma)	1- Automotive Powertrains 2- Vehicle Dynamics
Focus Group 2 (Community College Diploma)	Vehicle Engineering
Focus Group 3 (Vocational Diploma)	1- Powertrain Systems 2- Steering & Suspension Systems 3- Braking and Charging System

University	Role	Name of Responsible Member
UD	Leader	Jon García-Barruetabeña
ASU	Co-Leader	Dr. Mohammad Bani Khaled
UNIVAQ	Partner	Dr. Carlo Villante
NTUA	Partner	Dr. Clio Vossou
JUST	Partner	Eng. Qatada Damra
TTU	Partner	Dr. Wael Adaileh + Dr. Ahmad Mostafa
UJ	Partner	Dr. Hussam Khasawneh & Dr. Hashem Alkhaldi

16:10-16:15

Cluster 7: Health and Safety

Presented by: Dr. Mohammad Almajali

- ✓ Courses outlines
- ✓ Courses content
- ✓ Upcoming tasks and challenges
- ✓ Timeline to submit the cluster material

Cluster 7: Health and Safety	
Focus Group 1 (Professional Diploma)	N.A
Focus Group 2 (Community College Diploma)	N.A
Focus Group 3 (Vocational Diploma)	Safety in Hybrid and Electric Vehicles



University	Role	Name of Responsible Member
MU	Leader	Dr. Mohammad Almajali
UNIVAQ	Co-Leader	Dr. Carlo Villante
BAU	Partner	Dr. Ma'moun Al-Smadi
ZUJ	Partner	Dr. Loai Dabbour
BME	Partner	Dr. Árpád TÖRÖK
UJ	Partner	Eng. Otba Al-Oran

16:15 – 16:25 Cluster 8: Electrical Machines and Drives

Presented by: Prof. Salman Ajib and Mr. Timo Broecker

- ✓ Courses outlines
- ✓ Courses content
- ✓ Upcoming tasks and challenges
- ✓ Timeline to submit the cluster material

Cluster 8: Electrical Machines and Drives	
Focus Group 1 (Professional Diploma)	1- Electrical Machines and Drives 2- Power Electronics and Charging Systems
Focus Group 2 (Community College Diploma)	Electrical Machines and Drives
Focus Group 3 (Vocational Diploma)	Control Systems

University	Role	Name of Responsible Member
TH-OWL	Leader	Prof. Salman Ajib
ASU	Co-Leader	Prof. Ayman Abu Baker
HTU	Partner	Dr. Muhannad Al-Tarifi
BAU	Partner	Dr. Ma'moun Al-Smadi
UJ	Partner	Prof. Dia Abu Alnadi

16:25 – 16:35 Cluster 9: Labs & Workshops

Presented by: Prof. Rebhi Damseh, Dr. Ma'moun Al-Smadi, and Dr. Wail Adaileh

- ✓ Courses outlines
- ✓ Courses content
- ✓ Upcoming tasks and challenges
- ✓ Timeline to submit the cluster material

Cluster 9: Labs & Workshops	
Focus Group 1 (Professional Diploma)	1- Introduction to Automotive Engineering (Introduction to Hybrid and Electric Vehicles) Workshop



	<ul style="list-style-type: none"> 2- Internal Combustion Engine Workshop 3- Electrical Machines and Drives Workshop 4- Powertrain Integration in HEVs Workshop 5- Power Electronics and Charging Systems Lab 6- Energy Storage and Energy Management Lab 7- Automotive Electronic, Electrical, and Sensing Systems Lab 8- Vehicle Dynamics Lab 	
<p style="text-align: center;">Focus Group 2 (Community College Diploma)</p>	<ul style="list-style-type: none"> 1- Hybrid and Electric Vehicle Workshop 2- Workshop of Electrical and Electronic Systems in Vehicles 3- Malfunction Diagnostics and Repair in Hybrid and Electric Vehicles Workshop 4- Vehicle Engineering workshop 5- Internal Combustion Engine Lab 6- Electrical Machines and Drives Lab 7- Electrical and Electronics Circuits Lab 	
<p style="text-align: center;">Focus Group 3 (Vocational Diploma)</p>	<ul style="list-style-type: none"> 1- Hybrid and Electric Vehicles Systems Workshop 2- Sensors Lab 3- Braking and Charging System Workshop 4- Powertrain Workshop 5- Internal Combustion Engine Workshop 6- Steering & Suspension Systems Workshop 7- Cooling & Lubrication Systems Workshop 8- Basic Electricity and Electronics Lab 9- Braking and Charging System Workshop 	

10- Safety in Hybrid and Electric Vehicles
Workshop

11- Control Systems Lab

University	Role	Name of Responsible Member
BAU	Leader	Prof. Rebhi Damseh + Dr. Ma'moun Al-Smadi
TTU	Co-Leader	Dr. Wail Adaileh + Dr. Ali Alahmer
JUST	Co-Leader 2	Eng. Salheddin Abu Yahya
UD	Partner	Jon García-Barruetaña
UNIVAQ	Partner	Prof. Michele Anatone
HTU	Partner	Engr. Yousef Okour
ASU	Partner	Prof. Ayman AbuBaker

16:35-17:00 Work packages Summary and Upcoming Tasks

WP	Task / Update	Notes
WP1	<ul style="list-style-type: none"> - Task: UNIVAQ and BME have to provide at least 2 members for ECO-CAR Network. Also, RWTH-Aachen, TH-OWL still have to provide at least 1 more members. - Task: Sign collaboration agreements with enterprises and training centres to let the students make their internships. 	
WP2	Task: ASU should start preparing a new paper based on the survey results	Set together the first draft date
WP3	<ul style="list-style-type: none"> - Update: UD training workshop date has been shifted - Tasks: MU and BAU have to select the topic and date of their online workshops 	(see Annex 1)
WP4	<ul style="list-style-type: none"> -Task: ECO-CAR centre lab template is still needed from MU -Task: provide the status of the experiments manual 	
WP5	<ul style="list-style-type: none"> -Update: The courses content has to be delivered no later than 31st of May - Urgent Task: Accreditation of the diploma/courses has to be done to avoid the delays and risks 	
WP6	- Task: Submit Monitoring Report that evaluating the 1st year of ECO-CAR	
WP7	- Task: preparing for marketing plan in cooperation with other co-leaders	Set together the first draft date
WP8	- Update: Next STC meeting will be in TH-OWL on 30 th of June till 1 st of July.	Prof. Salman will update us for the meeting preparations

17:00 Wrap up & End of the meeting

Annex 1

Table 1: Physical Training Workshops

Universities	Lessons & Laboratory	DATES
BME	<p>Each day will have a focal topic:</p> <ul style="list-style-type: none"> • Trends in automotive sector • Vehicle Dynamics • Drivetrain elements • NVH in e mobility • Infrastructural questions <p>Possible visits to enterprises & manufacturers during workshops One of the days can be substituted with visit at ZalaZONE brand new proving ground and another day could be in Bosch Research Center Budapest.</p>	30 th May – 4 th June 2022
UD	<p>Lessons</p> <ul style="list-style-type: none"> • Hybrid & Electric Vehicle Basics • Dynamics of Vehicles • Teaching methodology <p>MORE: Vibroacoustic Comfort in Road Vehicles; Vehicle Dynamics; Simulation Techniques</p> <p>Laboratory</p> <ul style="list-style-type: none"> • Vehicle modelling using Matlab Simulink Vehicle modelling using Carmaker • Vehicle components modelling using ANSYS Vehicle dynamics characterization by means of experimental measurements <p>MORE: Vibration measurement</p> <p>Visits: the Automotive Intelligence Center</p>	<p>4 – 8th July 2022 (Old date)</p> <p><u>new date: January, 2023</u></p>
TH-OWL	<ul style="list-style-type: none"> • Hybrid and Electric Vehicle Basics • Battery Technology, Charging safety and Recharge infrastructure • Automotive electricity, Electronics, Sensors and Actuators • Teaching methodology <p>Visits: To local manufacturer</p>	<p>22-26th of August 2022 Or 29th of Aug – 2nd of September, 2022</p>
UNIVAQ	<ul style="list-style-type: none"> • Hybrid and Electric Vehicle Basics • Internal combustion engines in hybrid vehicles • Well to wheel LCA Calculations 	5 – 9th September 2022
NTUA	<p>Lessons</p> <ul style="list-style-type: none"> • Hybrid and Electric Heavy Vehicle Basics • EV & HEV Technology and hazardous material • Dynamics of vehicle, active and passive safety <p>Laboratory</p> <ul style="list-style-type: none"> • Vehicle dynamic measurements • Vehicle modeling using Matlab • Vehicle modeling using TruckSim <p>Visits Local Manufacturer of heavy vehicle's superstructures</p>	26 – 30th September 2022
RWTH - Aachen	<p>Lessons</p> <ul style="list-style-type: none"> • Short lecture on the Fundamentals of Electromobility 	7 – 11th November 2022



	<ul style="list-style-type: none"> • Extensive lecture on the fundamentals of Batteries and their Application in Electromobility (Principles, aging, battery packs, battery management systems, etc.). • Digitalization of teaching. <p>Laboratory A laboratory training on battery fundamentals can be provided. Visits Under investigation (Ford production plant / Etron production of Audi in Brussels)</p>	
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Table 2: Jordanian Online Workshops

Universities	Subject	DATES
UJ	High Voltage System	JUNE 2022
JUST	EV Charging Systems and Charging Infrastructure	
MU		
TTU	Lithium Sulfur Batteries in Automobiles	Wednesday, July 27th, 2022 at 3:00 pm (Amman Time)
HTU	Estimating the Impact of Topography and Traffic on Vehicle's Energy Consumption	April 2022
BAU		
ASU	The importance of using modern technology such as Scan Tools and smart electronic equipment in the diagnosing and maintenance of Electrified Vehicles and the percentage of its prevalence in vehicles workshops and maintenance centres in Jordan.	14/3/2022
ZUJ	Design of Hybrid and Electric Vehicles: Design principles	8/6/2022, 2:00 PM