

ERASMUS+ PROGRAMME

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

ECO-CAR:

Vocational Training Diploma on Electrical and Hybrid Vehicles

Workshop

Report

Budapest University of Technology and Economics (BME)

May 30th – 3rd June 2022

Monday – Friday

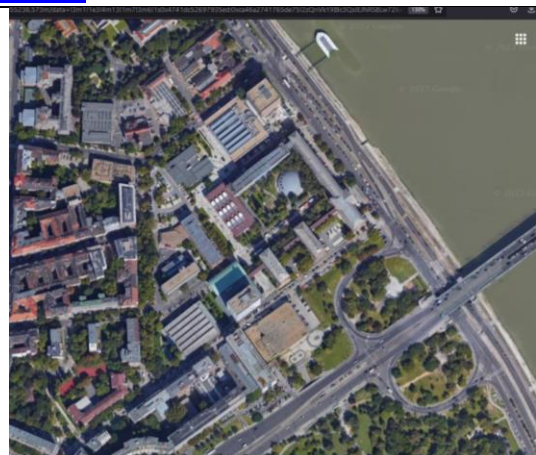
Location:

BME St building

3rd floor 319,320,321 rooms

47.47846391231239, 19.056695097109554

[Google maps link](#)



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

This Project has been funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.



Contents



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

This Project has been funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Overview about the participants

In Table 1 the participants of all different Jordanian Partner Universities are listed.

Table 1: Participants from Jordanian Partner Universities

Partner	University Partner	Person Name (English as written in Passport)	Position	Passport Number	Passport Issue Date	Passport Expire Date
P1	The University of Jordan (UJ)	Prof. Ahmed S. A. Al-Salaymeh	Project Coordinator	P160586	11.08.2018	10.08.2023
		Prof. Mohammad Ahmad Saleh Hamdan	Professor	0963209	11.03.2018	10.03.2023
		Dr. Hussam Jihad Said Khasawneh	Associate Professor	Q728859	08.09.2021	07.09.2026
		Eng. Mohamad Abdelhafed Mohamad Al Masad	Engineer	P117500	12.08.2018	11.08.2023
P2	Jordan University of Science and Technology (JUST)	Rana Boulos George Ma'ayah	Engineer	0788194	12.03.2018	11.02.2023
		Mohammad Khlaif Nasir Aldaoud	Engineer	P191120	17.10.2018	16.10.2023
P3	Mutah University	Dr. Falah Mustafa Suliman Alsarairah	Associate Professor	Q564698	31.03.2022	30.03.2027
		Prof. Husein Diab Salameh Almajali	Professor	0928693	26.03.2018	25.03.2023
		Ali Salem Ali Dmour	Professor	0928883	05.04.2018	04.04.2023
		Dr. Mohammad R. O. Al Majali (alternative)	Assistant Professor	Q614473	15 AUG/ 2021	14 AUG/ 2026
P4	Tafila Technical University (TTU)	Dr. Ahmad Omar Mohammad Mostafa	Assistant Professor	0931775	30/4/2018	29/4/2023
		Dr. Wail Murtada Faraj Adaileh	Associate Professor	P022412	03/05/2018	02/05/2023
		Eyad Kh. Sh. Almaita (alternative)	Assistant Professor	Q703618	05/09/2021	04/09/2026



		Hesham Ibrahim Ahmed Al Salem (alternative)	Assistant Professor	0444809	28/09/2017	27/09/2022
P5	Al-Balqa Applied University (BAU)	Prof. Rebhi Ahmad Khalil Damseh (alternative)	Professor	P406142	22-Jan-2019	21-Jan-2024
		Dr. Ma'moun Abdullah Ali Al- Smadi	Lecturer	P391609	31-Dec-2018	30-Dec-2023
		Dr. Ma'en Menayzel Zahi Al-Rashdan	Associate Prof.	Q866798	30-3-2022	29-3-2027
		Dr. Ala'eddin Abdel- Karim Mohammad Masadeh (alternative)	Assistant Prof.	P374920	3-12-2018	2-12-2023
P6	Al-Hussein bin Abdullah II Technical University (HTU)	Dr. Muhannad Adnan Ahmed Al- Tarifi	Assistant Professor	P946687	Sep 24 2019	Sep 23 2024
		Eng. Waleed Khaled Waleed Sunjuq	Teaching Assistant	0684939	1/8/2017	31/7/2022
		Eng. Yousef Jamal Yousef Okour (alternative)	Director of Engineering workshops	P256272	07.08.2018	06.08.2023
		Tarek Aquil Jamil Tutunji (alternative)	Professor	Professor	Q900754	09.01.2022
P7	Applied Science University (ASU)	Prof. Ayman A. A. Abubaker	Professor	Q594121	18 JUL 2021	17 JUL 2026
		Dr. Mohammad A. Bani-Khaled	Assistant Professor	P113082	26/ JUN/2018	25/JUN/2023
P8	Al-Zaytoonah University of Jordan (ZUJ)	Dr. Loai Dabbour	Chairman of Architecture Department	Q170733	9/2/2020	8/2/2025
		Dr. Nabeel Abu Shaban	Vice Dean of Engineering Faculty	P110842	21/6/2018	20/6/2023
		Dr. Safwan Al Qawabah (alternative)	Dean of Engineering Faculty	P088501	21/6/2018	20/6/2023
		Eng. Eman Abdelhafez	Lecturer	P104560	24/5/2018	23/5/2023

Summary of the Workshop days

The ECO Car Workshop was held according to the plans between 30.05.2022-03.06.2022. The attendance list was given to the project leaders. The presentations were shared in the common project folder. The Agenda of the workshop was the following:

ECOCAR BUDAPEST WS AGENDA					
	30.05.2022	31.05.2022	01.06.2022	02.06.2022	03.06.2022
8:30-9:15	Introduction	eGearbox layout	ZalaZONE trip	MIEV test at High Speed handling (ZalaZONE)	Introduction to
9:15-10:00	Drivers of automotive industry at 21th century	eDrivetrain simulation			NVH tools
10:15-11:00	Drivetrain comparison	Range and dynamic properties of Evs	lunch (ZalaZONE)	Inverters (ZalaZONE)	NVH of electric
11:00-11:45	Advanced drivetrains	Elements of electric powertrain - overview		Control of ePowertains (ZalaZONE)	NVH in practice
12:45-13:30	On board energy storage	Rotating electric machines I	Site visit	lunch (ZalaZONE)	EU effect of elec
13:30-14:15	Energy management	Simulation of rotating electric machines		ZalaZONE trip back	Health and Safe
14:30-15:15	Vehicle dynamics basics	Dual e-Hybrid drive layout	Autonomous vehicles (ZalaZONE)		
15:15-16:00	Simulation of vehicle dynamics	Test & evaluation	Autonomous vehicles (ZalaZONE)		

Pictures from the event



Lecture from Eng. Marton Virt



Lecture from Eng. Marton Virt



Lecture from Eng. Nyerges



Lecture from Eng. Hang



Lecture from Eng. Tollner



Workshop



Lecture at ZalaZONE



Monday 30th of May 2022

On Monday, 30th of May, 2022 the Budapest Workshop started at Technical University of Budapest at 9.00 am. Prof. Máté Zöldy addressed all the participants and participants introduced themselves.

Workshop was started with an introduction of drivers of automotive industry at 21st century. Basics of drivetrains and advanced drivetrains, on board energy storage, energy management and vehicle dynamics basics were presented.

It was a very interactive and informative session for most of the participants.

Tuesday 31th of May 2022

On Tuesday 31th of May the program was started at 9:00 at TU Budapest. Main topics of the day were presented by Eng. Ádám Nyerges and Dr. Peter Harth. The day was focusing on eGearbox modelling and simulation. After presenting the developed models and the simulation results the day was continued at the Workshop of the department. Brand newly development Green hybrid drivetrain is presented.

Wednesday-Thursday, 1st-2nd June 2022

On this two days the workshop was moved to ZalaZONE the new proving ground for vehicle development. In the program there were site visit, technical presentations and activities at the workshop. An outlook was provided on autonomous vehicles by Prof Szalay, R&I manager of ZalaZONE.

Friday, 3rd June 2022

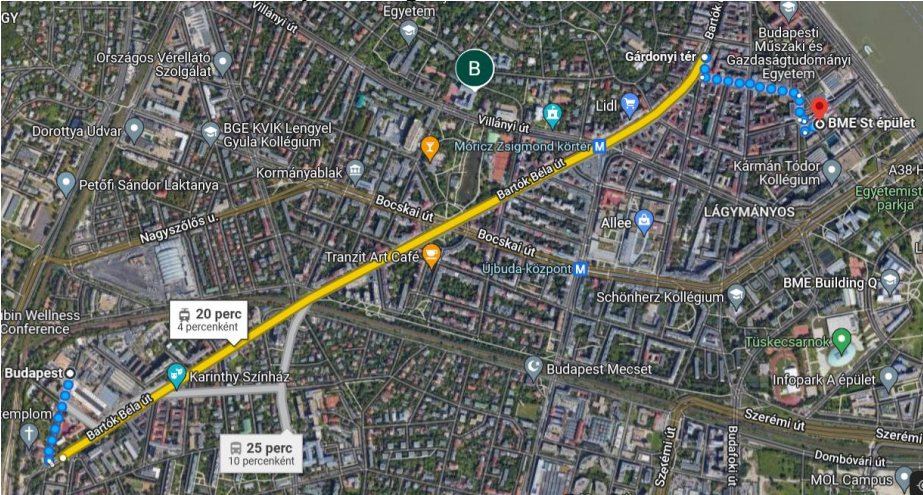
At the closing day the focal topic was NVH role and importance at electric drivetrains. Dr. Dömötör and Mr. Pathy-Nagy presented and it was extended by a workshop practice. Closing topics were safety and security questions by Dr. Török and economical and environmental aspects of e-mobility by Prof. Török.

At the end of the training Prof. Zöldy distributed certificates to the participants.

Training material

All presentations delivered and discussed during the workshop week have been collected and shared with all participants via Drive folder.

Important information

proposed Hotel for night 30.05, 31.05 and 02.06:	Anna Hotel (https://annahotel-budapest.hu/en)
Workshop location:	BME ST Building (1111 Budapest, Stoczek utca 6)
Travel from Anna Hotel to Workshop location	<p>Tram 19 or 49 direction city center 19 (Bem rakpart Bécsi út / Vörösvári út irány), 49 (Deák Ferenc tér) to 5th station Gárdonyi tér megálló and take a walk 7 min.</p>  <p>The map shows a route starting from the Anna Hotel (marked with a red pin) in the city center of Budapest. A yellow line indicates the tram route (19 or 49) heading towards the city center. The route ends at the Gárdonyi tér megálló station. From there, a blue line indicates a 7-minute walk to the BME ST Building (marked with a red pin). The map also shows various landmarks and streets in the area, including Vörösvári út, Bécsi út, and Stoczek utca.</p>
Proposed hotel for zalaZONE night 01.06	Hotel Aranybárány http://aranybarany.hu/en/
Travel from Budapest to ZalaZONE and back	managed by BME, bus will leave from Anna hotel

QUALITY AND MONITORING SHORT REPORT

SURVEY	ECO-CAR Budapest Training
MEASUREMENT DATE	JUNE 2022

1. PARTICIPATION TABLE

Budapest Training		
Number of participants	Collected Data	Percentage of Participation (%)
22	22	100%

2. QUALITY LEVEL

The meeting/event is considered approved if the average percentage of weighted answers is more than 70%. Scores less than this will require corrective actions by the partnership, led by the Project Coordinator.

3. TABLES AND GRAPHS OF RESULTS

3.1 Number of surveys submitted

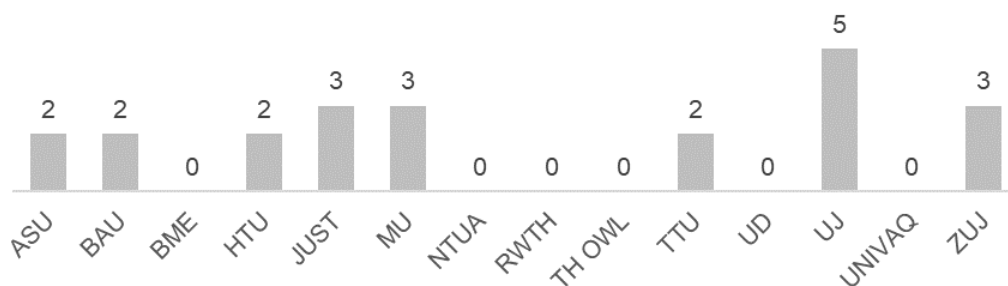


Figure 1. Number of surveys submitted (N=22).

3.2 Analysis of scaled questions

Budapest Training									
		1 Fully Disagree	2 Disagree	3 Neutral	4 Agree	5 Fully Agree	Weighted Average	Combined %	Total
1- Overall Training Experience									
1	The meeting was well planned and organised.	2	0	1	7	12	85%	91%	22
		9%	0%	5%	32%	55%			100%
2	The training facilities were adequate and comfortable.	1	2	3	8	8	78%	86%	22
		5%	9%	14%	36%	36%			100%
3	The technical resources used were satisfactory.	1	2	3	4	12	82%	86%	22
		5%	9%	14%	18%	55%			100%
4	The materials provided were helpful.	1	2	2	9	8	79%	86%	22
		5%	9%	9%	41%	36%			100%
5	The objectives of the training were clearly defined and met.	1	1	3	9	8	80%	91%	22
		5%	5%	14%	41%	36%			100%
6	The study tours were useful and had an added value in the whole training.	2	3	2	4	11	77%	77%	22
		9%	14%	9%	18%	50%			100%
7	The training content was well organised.	2	0	2	9	9	81%	91%	22
		9%	0%	9%	41%	41%			100%
8	The topics of the training were clear and easy to follow.	0	3	3	7	9	80%	86%	22
		0%	14%	14%	32%	41%			100%
9	The length of training was sufficient.	2	1	2	8	9	79%	86%	22
		9%	5%	9%	36%	41%			100%
10	The training enhanced my understanding on the subject.	2	1	1	11	7	78%	86%	22
		9%	5%	5%	50%	32%			100%
11	The training was relevant to my needs.	1	3	1	6	11	81%	82%	22
		5%	14%	5%	27%	50%			100%
12	The training will be useful to me and my professional growth.	2	1	1	8	10	81%	86%	22
		9%	5%	5%	36%	45%			100%
13	The training met my expectations.	2	1	2	8	9	79%	86%	22
		9%	5%	9%	36%	41%			100%

Table 1. Analysis of responses on 1-5 scale for the Budapest Training.

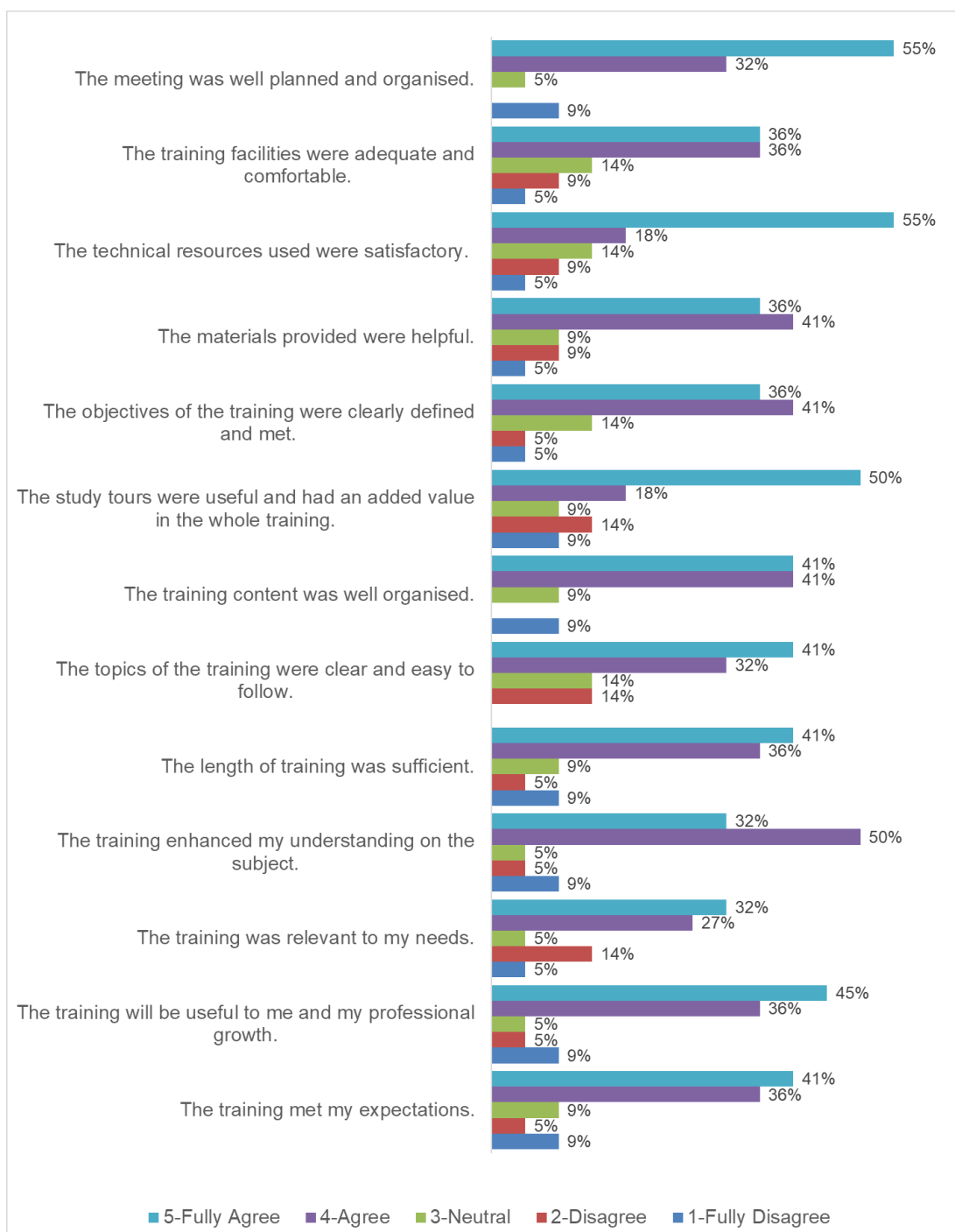


Figure 2. Analysis of responses on 1-5 scale for the Budapest Training.

Budapest Training									
		1 Fully Disagree	2 Disagree	3 Neutral	4 Agree	5 Fully Agree	Weighted Average	Combined %	Total
2- Your opinion of the Trainers:									
14	The trainer was knowledgeable about the training topic.	2	0	2	7	11	83%	91%	22
		9%	0%	9%	32%	50%			100%
15	The trainer succeeded to explain and illustrate concepts.	1	1	2	8	10	83%	91%	22
		5%	5%	9%	36%	45%			100%
16	The topics were presented in a clear and understandable manner.	2	0	2	9	9	81%	91%	22
		9%	0%	9%	41%	41%			100%
17	The trainer encouraged participation, interaction and answered questions clearly.	1	1	3	7	10	82%	91%	22
		5%	5%	14%	32%	45%			100%
18	The trainer's communication style kept me focused and interested.	1	1	2	10	8	81%	91%	22
		5%	5%	9%	45%	36%			100%

Table 2. Analysis of responses on 1-5 scale for the Budapest Training.

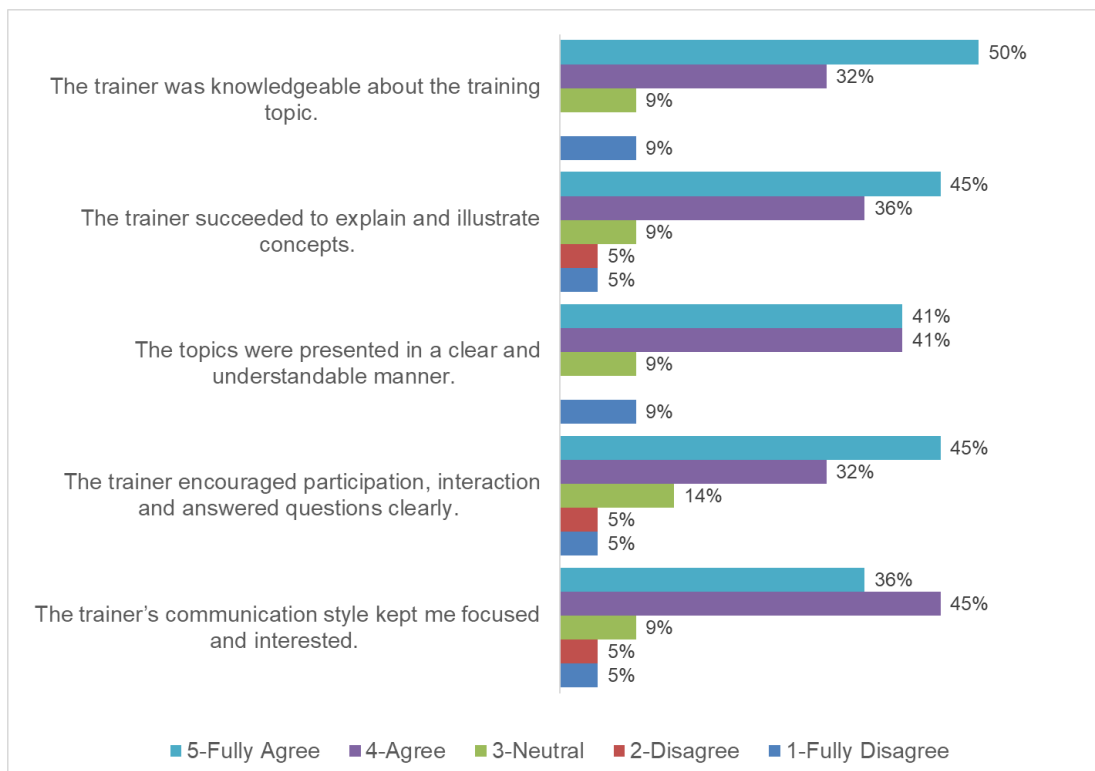


Figure 3. Analysis of responses on 1-5 scale for the Budapest Training.

3.3 Open ended questions

Was this training appropriate for your level of experience?

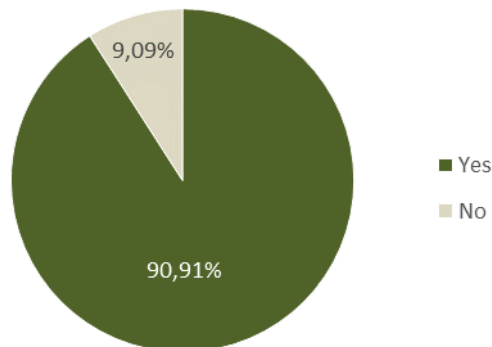


Figure 4. Percentage of responses Yes / No scale.

Which topics were not covered or insufficiently covered, in your opinion?

- Safety.
- Battery storage and charging.
- Electric machines.
- Maintenance aspects.
- Some topics.
- The practical topic.
- HV system.
- Safety and security.
- I suggest for coming workshops to make up groups of the participants (guests and hosts) and the presenters to arrange brainstorming sessions in the selected topic and increase the time in workshops and practical sessions while decreasing the time of conventional presentations.
- More practical training is needed.

Which topics were not relevant in your opinion?

- The Roundabout PhD thesis work.
- Nothing.
- Transportation roundabout.
- Non.
- Torsional vibration measurements.
- internal combustion engine.
- 0.
- No thing .
- All are relevant.

- We went to Zalazone but unfortunately we could not conduct the test in the vehicle so I think it was a waste of time.
- Everything is relevant.

What did you like best about the training?

- ZalaZONE idea.
- ZalaZone visit.
- Zala zone experience.
- All the lectures and zalazone.
- Vibration and testing.
- New experience.
- Measurements, vibration and data acquisition.
- Modelling.
- More practical aspects instead of too much theory.
- Everything.
- If the practical topic will be added.
- It will be very useful if we had any thing about the vehicle diagnosis.
- Well organized.
- Level of training.

What suggestions or comments do you have for making the program more effective?

- Give more practical training.
- It is very good.
- More lab work.
- To apply some diagnosis and fault isolation.
- Cut down the theory drastically. i am not interested to hear for graduate students on their thesis.
- More workshops.
- No thing.
- No added comments.
- Social program is needed.

Date of Review: 03/06/2022 – 05/06/2022

Reviewer's Name:

- Hussam Khasawneh.
- Ayman Abubaker.
- Nabeel.
- Mohammad Bani-Khaled.

- Jju.
- Dr. Falah Al-Saraireh.
- Mohamad masad.
- Wail Murtada Adaileh.
- Waleed Sunjuq.
- Ahmed Al-Salaymeh.

Your position:

- Assistant professor.
- Associate Professor.
- Professor.
- Head and vice dean.
- Lecturer.
- Assist. Professor.
- Associate professor.
- Lab Engineering.
- Assistance manager of consultation and training center.
- Associate professor.
- Electrical Engineering Professor.
- Project Coordinator.
- Assistant manager of consultation center.

Additional comments:

- Give more practical training.
- It is very good.
- More lab work.
- To apply some diagnosis and fault isolation.
- Cut down the theory drastically. i am not interested to hear for graduate students. on their thesis.
- More workshops.
- No thing.
- No added comments.
- Social program is needed.

4. OVERALL CONCLUSIONS

The value of the weighted average of all items is more than 70% so it is not considered necessary to establish any improvement plan with respect to the results of the meeting assessed.