Tomorrow's Mobility

Syllabus

Objectives

After successfully completing this course, participants will be able to:

- Identify the world's energy context and its evolution, the evolution of the energy demand and the energy transition issues as a way to meet sustainability in development.
- Describe the current transport situation regarding pollutant emissions and legislation.
- Design an electric drive train taking into account the electric engine, the electronics, the type of battery and control system by finding the right trade-off between performances and the constraints of weight and price.
- Design a hybrid powertrain taking into account the hybridization degree and the different architectures.
- Analyze the advantages of these technologies and their limitations. Describe how they work.
- Understand autonomous and connected vehicle technologies, what they are and the working principles. Deduce the impact of these new technologies on society and the limiting factors.

Presentation of each week

Energy Transition, sustainable mobility and legislation

During the first week, you will explore the international energy scene and the energy transition issues. You will also discover the transport sector and the environmental regulations that drive technological developments in the automotive sector.

- The energy demand, the stresses on the energy demand and the solutions : approach from the society point of view.
- Transport context
- Pollution, legislation and Life Cycle analysis

The electric drive train and electric vehicles

After a brief introduction on electric vehicle, you will discover each component of the electric drive train : the electric machine, the power electronics, the battery and how the control works. You will also discover fuel cells vehicles.

- Introduction, why electric vehicles now?
- The electric drivetrain: electric machine, batteries, electronics and control. Description and conception of each element. The tradeoffs in electric drive train development.
- Fuel cell vehicles

Hybrid vehicles

After understanding the limitations of electric vehicles today before and why they are not yet massively used, you will explore hybrid vehicles: what it is, how does it work, the different degrees of hybridization and how the energy is performed depending on the functionalities.

- Limitations of electric vehicles
- Hybridization degrees: micro, mild, full and plug-in
- Hybrid technology architectures
- Energy management
- Life Cycle analysis and TCO

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Connected and Autonomous vehicles

In this last week, you will be introduced to connected and autonomous vehicles and how they work. You will learn the 6 levels of autonomy, the key technologies, how these new technologies will modify the way we travel and the constraints to their development.

- Connected vehicle: definitions, functionalities, energy management, car sharing, safety, maintenance
- Autonomous vehicle: technical issues (sensors, AI, ADAS) autonomous levels, developments
- New uses, changes in the mobility sector
- The limitations

How it works

Content

Every Monday at 15h, we will publish a module covering a specific theme. Each chapter of this module is illustrated by a video. In order to evaluate the acquisition of knowledge, you will be evaluated through quizzes, mini-games and serious-games. For more information on evaluations, refer to the "Assessment & Achievement Certificate" section of this document.

At the end of the module, you will find a download page from which you can download all the resources of the module, that is to say:

- All the videos, and their associated subtitles;
- Handouts, in PDF format, which will allow you to learn more about the concepts presented in each video.

Assessment & Achievement Certificate

During each module, you will be assigned quizzes, mini-games and/or serious-games. Each evaluation may include several questions. The number of attempts per question is limited and can differ from one question to another. For instance, you can have only 1 attempt for a quiz, 2 attempts for another or even unlimited attempts for the serious-game for example. So pay attention to the number of attempts (it will be always be mentioned at the beginning of the game) before answering a question. If you have any doubts, you can always watch the videos again and read the hand-outs.

Once you have validated your final attempt, your score is definitively registered for this evaluation. Then, you can still play for fun as « free practice », but your score will remain unchanged. If you have several attempts, **only the best score will be saved**.

How will I be evaluated?

- Evaluations throughout the 4 weeks:
  - Quizzes: **9** in total
  - Mini-games: **5** in total
  - Serious-game: **1** – divided into 5 parts
  - **1** induction survey and **1** end-of-course survey, (**bonus points!**)

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What is the condition to get my Certificate of Achievement?

You need to do ALL the activities proposed AND score at least 60% in average. Please note that, even if your average score is above 60%, if you are missing 1 activity, you won't get the certificate of achievement.

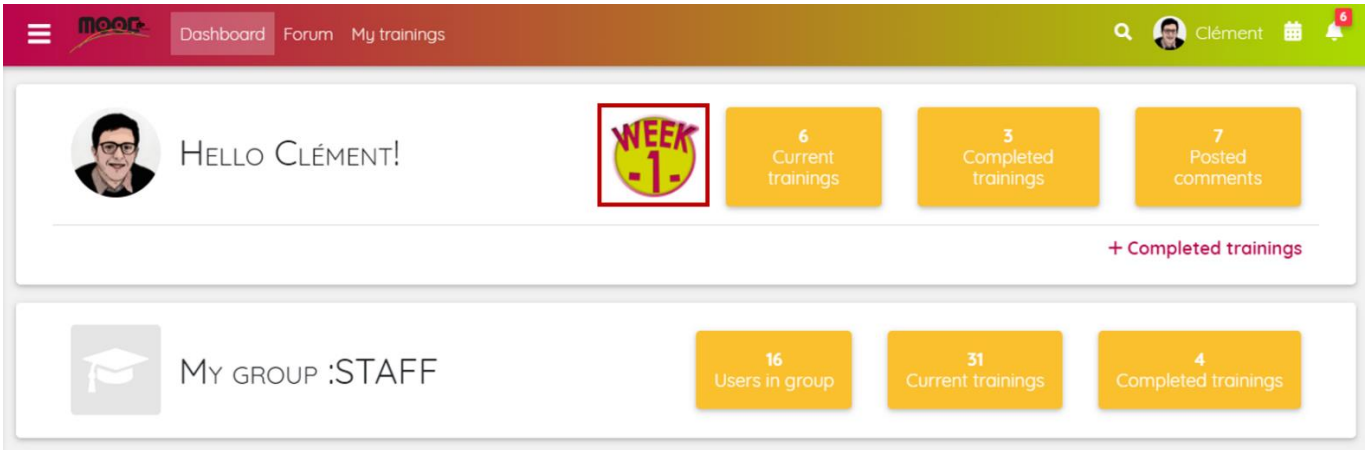
Reboot code

As you know, your mission during this MOOC is to help Otto, our mad scientist, to go back home, in the future. To do this, you must help him find the reboot code of his time travel machine. How to do this? Here are the explanations.

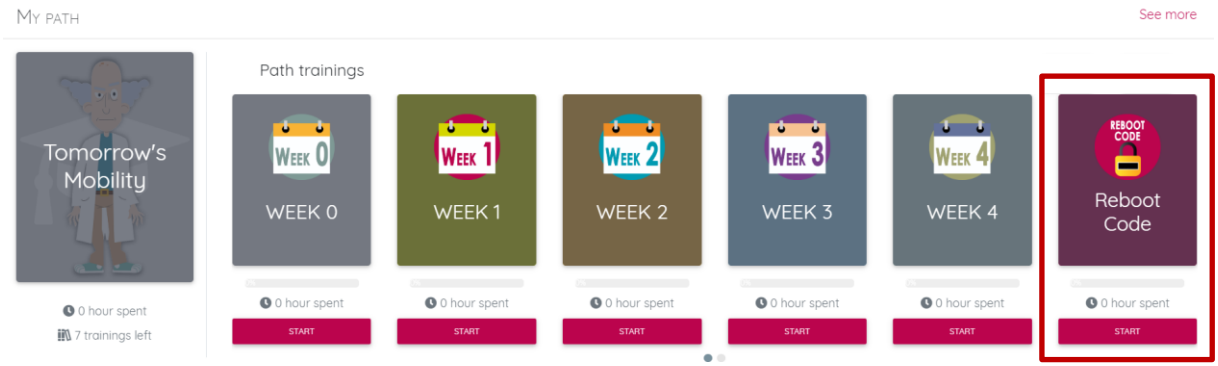
Otto's reboot code is composed of 4 5-digits codes. Each week, you will be able to discover one code. In order to unlock the weekly code, you have to:

- Achieve a minimum score of **60% for each evaluation of the corresponding week**
- Review **all the activities** of the week, including bonuses.

If you succeed, you will see a badge on your dashboard which looks like this:



Click on it to access your weekly code. Then, enter it in the Reboot code section:



By accumulating the 4 codes, corresponding to the 4 weeks of the MOOC, you will get the reboot code allowing Otto to return in the future, and will have succeeded in your mission! If you fail, Otto will remain stuck with us, in the present....

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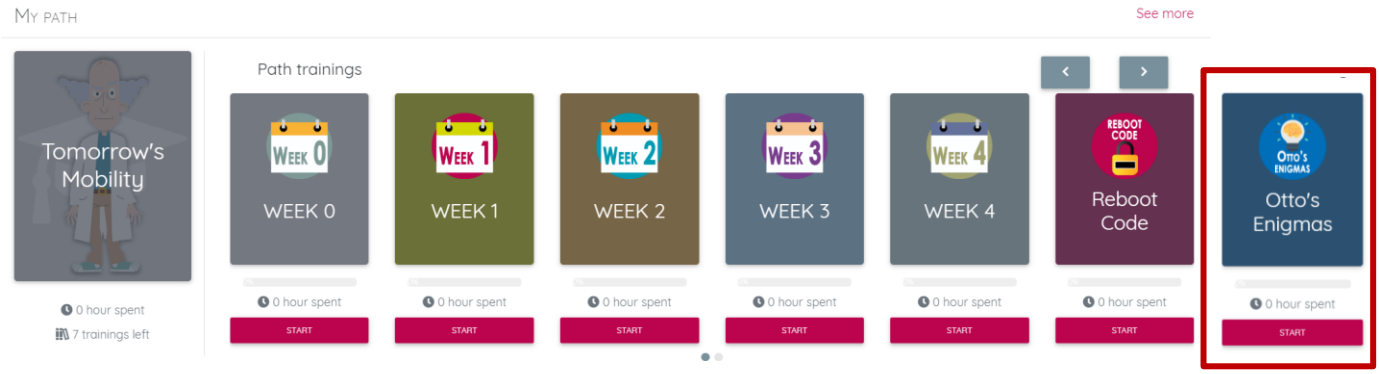
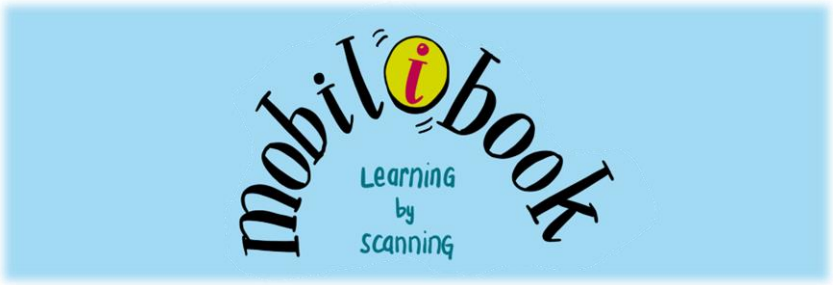
The MOOC certificate **is not correlated to the success of the reboot code mission**! Even if you fail to obtain the 4 codes, it will still be possible for you to pass the MOOC and receive the certificate. For more information, refer to the section "Assessment & Achievement Certificate"

Enigmas

Every week, you will be able to participate in Otto's enigmas. Every Tuesday at 12pm (GMT +1), and every Friday at 7pm (GMT +1), Otto will publish in the "**Otto's Enigmas**" section an enigma to solve.



If you are among the first three fastest participants to answer these riddles, you will win a **Mobilibook**, which is an interactive book displaying the summaries of this MOOC as sketchnotes, using Augmented Reality technology. You will be notified by email if you are a happy winner! All books will be shipped at the end of the MOOC, so expect a delivery at the end of December.



Forums

In case of technical questions or problems related to the use of the platform, you can use the forums that are provided to you. By clicking on "Forum" at the top left of the screen, you will access six forums: **five technical forums** corresponding to each week (Week 0, Week 1, Week 2, Week 2, Week 3 and Week 4), as well as **one forum concerning problems you may encounter with the platform** (loss of password, inability to perform an activity, etc.)

Our teams of trainers and students at the school will be happy to help you with any questions you may have.

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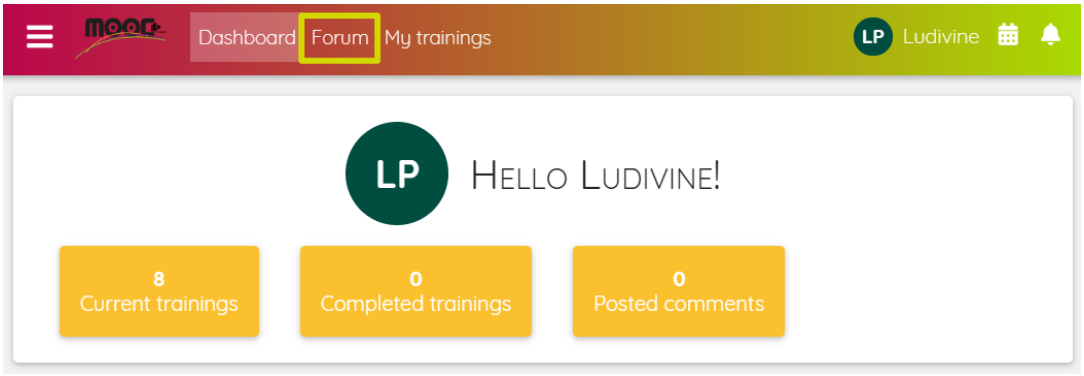
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Forum
My trainings
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LP
HELLO LUDIVINE!
8
Current trainings
0
Completed trainings
0
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