

## IDEA LEAGUE EXECUTIVE PROGRAM ON EMERGING TECHNOLOGIES

### Moocs at Chalmers University of Technology

See more information here: [Chalmers University of Technology | edX](#)

NAME	PREREQUISITES	WORKLOAD	COURSE OCCASIONS	LINK
Electrical and conventional vehicles	Bachelor level physics (aimed at learners with a bachelor's degree or engineers in the automotive industry)	10-20 hours/week in 6 weeks = 60-120 hours	2-3 times a year	<a href="#">Electric and Conventional Vehicles   edX</a>
Model-based automotive systems engineering	Bachelor level mathematics (aimed at learners with a bachelor's degree or engineers in the automotive industry)	10-20 hours/week in 7 weeks = 70-140 hours	2-3 times a year	<a href="#">Model-Based Automotive Systems Engineering   edX</a>
Hybrid vehicles	Mooc: Electric and Conventional Vehicles	10-20 hours/week in 6 weeks = 60-120 hours	2-3 times a year	<a href="#">Hybrid Vehicles   edX</a>
Sensor fusion and non-linear filtering for automotive systems	Mathematical statistics and MATLAB	10-20 hours/week in 8 weeks = 80-160 hours	2-3 times a year	<a href="#">Sensor Fusion and Non-linear Filtering for Automotive Systems   edX</a>
Decision-making for autonomous systems	None (aimed at learners with a bachelor's degree or engineers in the automotive industry)	10-20 hours/week in 6 weeks = 60-120 hours	2-3 times a year	<a href="#">Decision-Making for Autonomous Systems   edX</a>
Multi-object tracking for automotive systems	Mooc: Sensor Fusion and Non-linear Filtering for Automotive Systems	10-20 hours/week in 10 weeks = 100-200 hours	2-3 times a year	<a href="#">Multi-Object Tracking for Automotive Systems   edX</a>
Road traffic safety in automotive engineering	None (bachelor's degree in mechanical engineering or similar)	10-20 hours/week in 8 weeks = 80-160 hours	2-3 times a year	<a href="#">Road Traffic Safety in Automotive Engineering   edX</a>
Computer system design for energy efficiency	General understanding of programming computers, but with no prior knowledge of how a computer works	4-6 hours/week in 6 weeks = 24-36 hours	1 time per year	<a href="#">Computer Systems Design for Energy Efficiency   edX</a>

Computer system design: Advanced concepts of modern microprocessors	Undergraduate degree from a computer science/engineering program with basic knowledge in computer organization including familiarity with basic concepts of computer design, as well as pipelining and caches.	4-6 hours/week in 6 weeks = 24-36 hours	1 time per year	<a href="#">Computer System Design: Advanced Concepts of Modern Microprocessors   edX</a>
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## Moocs at Politecnico di Milano

NAME	PREREQUISITES	WORKLOAD	COURSE OCCASIONS	LINK
Artificial Intelligence: An Overview	No prerequisite knowledge is required.	5 weeks: 1-2 hours/week	2-3 times a year	<a href="#">POK - MOOCs portal of Politecnico di Milano   POK (polimi.it)</a>
Ethics of Artificial Intelligence	No prerequisite knowledge is required.	4 weeks: 1-2 hours/week	2-3 times a year	<a href="#">POK - MOOCs portal of Politecnico di Milano   POK (polimi.it)</a>
Artificial Intelligence and legal issues	No prerequisite knowledge is required.	4 weeks: 1-2 hours/week	2-3 times a year	<a href="#">POK - MOOCs portal of Politecnico di Milano   POK (polimi.it)</a>
Technologies and platforms for Artificial Intelligence	The MOOC is aimed in particular at technical staff in charge of developing or adopting artificial intelligence solutions based on Machine and Deep Learning techniques. However, it may be of interest to all those who wish to better understand the platforms and technological solutions in the Machine and Deep Learning field.	4 weeks: 1-2 hours/week	2-3 times a year	<a href="#">POK - MOOCs portal of Politecnico di Milano   POK (polimi.it)</a>
Machine Learning	No prerequisites are required: however, having basic statistical notions may help you better understand some considerations.	3 weeks: 1-2 hours/week	2-3 times a year	<a href="#">POK - MOOCs portal of Politecnico di Milano   POK (polimi.it)</a>

Platform Thinking: designing a Platform	No prerequisite knowledge is required for this course.	1 week: 6-8 hours/week	2-3 times a year	<a href="#">POK - MOOCs portal of Politecnico di Milano   POK (polimi.it)</a>
Platform Thinking: what's beyond Uber?	No prerequisite knowledge is required for this course.	1 week: 5-8 hours/week	2-3 times a year	<a href="#">POK - MOOCs portal of Politecnico di Milano   POK (polimi.it)</a>
Platform Thinking: exploiting data through platforms	No prerequisite knowledge is required.	1 weeks: 6-8 hours/week	2-3 times a year	<a href="#">POK - MOOCs portal of Politecnico di Milano   POK (polimi.it)</a>
Introduction to nuclear	As prerequisite it is recommended to have some basic knowledge of chemistry and physics.	4 weeks: 6 hours/week	2-3 times a year	<a href="#">POK - MOOCs portal of Politecnico di Milano   POK (polimi.it)</a>

## Moocs at RWTH Aachen University

NAME	PREREQUISITES	WORKLOAD	COURSE OCCASIONS	LINK
Mechanism Theory and Machine Dynamics for Robotics	Degree in a STEM higher education program or 1st/2nd year of studies completed in a STEM program Proficient in the English language	10 weeks: 6 hours/week (self-paced)	2-3 times a year	<a href="https://idea-league.academy-rwth.de/">https://idea-league.academy-rwth.de/</a>
Introduction to Mechanism Theory and Machine Dynamics for Robotics	Degree in a STEM higher education program or 1 <sup>st</sup> /2 <sup>nd</sup> year of studies completed in a STEM program Proficient in the English language	60 hours		<a href="https://idea-league.academy-rwth.de/">https://idea-league.academy-rwth.de/</a>

## Moocs at TU Delft

NAME	PREREQUISITES	WORKLOAD	COURSE OCCASIONS	LINK
AI in practice: preparing for AI	AI in Practice' is for everyone, no complicated math or programming expertise is required	5 weeks: 3–5 hours per week	Rerun will be scheduled	<a href="https://www.edx.org/course/ai-in-practice-preparing-for-ai">https://www.edx.org/course/ai-in-practice-preparing-for-ai</a>

AI in practice: applying AI	AI in Practice' is for everyone, no complicated math or programming expertise is required	5 weeks: 3–5 hours per week	Rerun will be scheduled	<a href="https://www.edx.org/course/ai-in-practice-applying-ai">https://www.edx.org/course/ai-in-practice-applying-ai</a>
The quantum internet and quantum computers: how will they change the world?	Students should have a strong interest in the topic and enter the course with an open mind. A technical background is not necessary.	6 weeks: 2–3 hours per week	Available as self-paced throughout the year	<a href="https://www.edx.org/course/the-quantum-internet-and-quantum-computers-how-w-2">https://www.edx.org/course/the-quantum-internet-and-quantum-computers-how-w-2</a>
Architecture, Algorithms, and Protocols of a Quantum Computer and Quantum Internet	You should have a background in or deep interest in technology and familiarity with math. You should be able to read and understand popular written scientific contents, such as articles in New Scientist. Completion of the first course in the program, <i>The Hardware of a Quantum Computer</i> , is recommended. If you are not yet familiar with quantum technology, enrol in our introductory course <i>The Quantum Internet and Quantum Computers: How Will They Change the World?</i>	6 weeks: 6–8 hours per week	Available as self-paced throughout the year	<a href="https://www.edx.org/course/architecture-algorithms-quantum-computer-internet">https://www.edx.org/course/architecture-algorithms-quantum-computer-internet</a>
The Hardware of a Quantum Computer	You should have a background in or deep interest in technology and familiarity with math. You should be able to read and understand popular written scientific contents, such as articles in New Scientist. If you are not yet familiar with quantum technology, enrol in our introductory course <i>The Quantum Internet and Quantum Computers: How Will They Change the World?</i>	6 weeks: 6–8 hours per week	Available as self-paced throughout the year	<a href="https://www.edx.org/course/hardware-of-quantum-computer">https://www.edx.org/course/hardware-of-quantum-computer</a>

Fundamentals of quantum information	<ul style="list-style-type: none"> <li>• The Quantum Internet and Quantum Computers: How Will They Change the World?</li> <li>• Quantum 101: Quantum Computing and Quantum Internet</li> </ul>	4 weeks: 6–8 hours per week	Available as self-paced throughout the year	<a href="https://www.edx.org/course/fundamentals-of-quantum-information">https://www.edx.org/course/fundamentals-of-quantum-information</a>
Hello (Real) World with ROS – Robot Operating System	<ul style="list-style-type: none"> <li>• Basic programming in Python (variables, conditionals, loops and functions)</li> <li>• A computer ready for Ubuntu-Linux installation</li> <li>• The knowledge of basic Linear Algebra, computer science concepts and Linux command line is preferred, but students may also choose to learn these skills on their own along the course.</li> </ul>	7 weeks: 8–12 hours per week	Available as self-paced until September 23, 2022, rerun to be announced	<a href="https://www.edx.org/course/hello-real-world-with-ros-robot-operating-system">https://www.edx.org/course/hello-real-world-with-ros-robot-operating-system</a>

## Moocs at ETH Zurich

NAME	PREREQUISITES	WORKLOAD	COURSE OCCASIONS	LINK
Self driving cars with Duckietown	None	14 weeks: 2–4 hours per week	Rerun will be scheduled	<a href="https://www.edx.org/course/self-driving-cars-with-duckietown">https://www.edx.org/course/self-driving-cars-with-duckietown</a>
Autonomous Mobile Robots	Good basic mathematics, physics, system modeling and control.	15 weeks: 4–8 hours per week	Available: started May 19, 2022	<a href="https://www.edx.org/course/autonomous-mobile-robots">https://www.edx.org/course/autonomous-mobile-robots</a>

## IDEA LEAGUE EXECUTIVE PROGRAM ON SUSTAINABILITY

### Moocs at Chalmers University of Technology

See more information here: [Chalmers University of Technology | edX](#)

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## Moocs at Politecnico di Milano

NAME	PREREQUISITES	WORKLOAD	COURSE OCCASIONS	LINK
Sustainable business in the renewable energy sector	No prerequisite knowledge is required.	3 Weeks: 1-2 hours/week	2-3 times a year	<a href="#">POK - MOOCs portal of Politecnico di Milano   POK (polimi.it)</a>
Deep renovation for energy efficient residential buildings	As prerequisite it is recommended to have some basic knowledge of different aspects of buildings, such as building design, sustainable design, building physics, building energy balance, building services, engineering, sustainable building technologies and building renovation.	6 weeks: 2-3 hours/week	2-3 times a year	<a href="#">POK - MOOCs portal of Politecnico di Milano   POK (polimi.it)</a>
Sustainable building design for tropical climates: principles and guidelines for EAC	No prerequisite knowledge is required.	4 Weeks: 2-3 hours/week	2-3 times a year	<a href="#">POK - MOOCs portal of Politecnico di Milano   POK (polimi.it)</a>
Sustainable building design for tropical climates: integrating design of buildings and technology systems	No prerequisite knowledge is required, but it is recommended to know the topics covered in the MOOC: "Sustainable building design for tropical climates: principles and guidelines for EAC".	3 Weeks: 1-2 hours/week	2-3 times a year	<a href="#">POK - MOOCs portal of Politecnico di Milano   POK (polimi.it)</a>
Share Food Cut Waste	No formal knowledge is required.	6 Weeks: 1 hours/week	2-3 times a year	<a href="#">POK - MOOCs portal of Politecnico di Milano   POK (polimi.it)</a>

Modelling the Energy Transition: the revolution of open-source software	For this course is required MS Excel proficiency.	3 Weeks: 1-2 hours/week	2-3 times a year	<a href="#">POK - MOOCs portal of Politecnico di Milano   POK (polimi.it)</a>
Sustainable Urban Water Systems	No prerequisite knowledge is required for this course.	3 Weeks: 1-2 hours/week	2-3 times a year	<a href="#">POK - MOOCs portal of Politecnico di Milano   POK (polimi.it)</a>
New paradigms in wastewater management: from a sanitation problem to a circular sustainable solution	Basic knowledge about environmental technologies for water and wastewater treatment	4 Weeks: 1-2 hours/week	2-3 times a year	<a href="#">POK - MOOCs portal of Politecnico di Milano   POK (polimi.it)</a>

## Moocs at TU Delft

NAME	PREREQUISITES	WORKLOAD	COURSE OCCASIONS	LINK
Electric Cars: Introduction	None, but affinity with the basic concepts that the different tracks (technology of electric cars, business or policy) offer is recommended.	4 weeks: 4–5 hours per week	Self-paced, available throughout the year	<a href="https://www.edx.org/course/electric-cars-introduction">https://www.edx.org/course/electric-cars-introduction</a>
Electric Cars: Technology	It is recommended that learners complete the first course, Electric cars: Introduction (DelftX-eCars1x) before beginning this course to be familiar with the basic concepts.	4 weeks: 4–5 hours per week	Self-paced, available throughout the year	<a href="https://www.edx.org/course/electric-cars-technology">https://www.edx.org/course/electric-cars-technology</a>
Electric Cars: Business	It is recommended that learners complete the first course, Electric cars: Introduction (DelftX-eCars1x) before beginning this course to be familiar with the basic concepts.	4 weeks: 4–5 hours per week	Self-paced, available throughout the year	<a href="https://www.edx.org/course/electric-cars-business">https://www.edx.org/course/electric-cars-business</a>



Electric Cars: Policy	It is recommended that learners complete the first course, Electric cars: Introduction (DelftX-eCars1x) before beginning this course to be familiar with the basic concepts.	4 weeks: 4–5 hours per week	Self-paced, available throughout the year	<a href="https://www.edx.org/course/electric-cars-policy">https://www.edx.org/course/electric-cars-policy</a>
Sustainable Urban Development	There are no prerequisites for this course.	7 weeks: 4–6 hours per week	Self-paced, available throughout the year	<a href="https://www.edx.org/course/sustainable-urban-development">https://www.edx.org/course/sustainable-urban-development</a>
Drinking Water Treatment	High school level of mathematics and chemistry is recommended.	7 weeks: 6–8 hours per week	Self-paced, available throughout the year	<a href="https://www.edx.org/course/drinking-water-treatment-2">https://www.edx.org/course/drinking-water-treatment-2</a>
Urban Sewage Treatment	High school level of mathematics and chemistry is recommended.	7 weeks: 6–8 hours per week	Self-paced, available throughout the year	<a href="https://www.edx.org/course/urban-sewage-treatment-2">https://www.edx.org/course/urban-sewage-treatment-2</a>
Circular Economy: An Introduction	None	7 weeks: 3–6 hours per week	Self-paced and Instructor-paced (alternating), available throughout the year	<a href="https://www.edx.org/course/circular-economy-an-introduction">https://www.edx.org/course/circular-economy-an-introduction</a>
Sustainable Packaging in a Circular Economy	Intended for students and professionals with basic knowledge of the circular economy with an interest in packaging, or students and professionals experienced in packaging looking for circular opportunities. If you want to learn the basics of a Circular Economy we invite you to take a look at the Circular Economy: An introduction MOOC before the start of this course.	6 weeks: 3–4 hours per week	Self-paced, available most of the year	<a href="https://www.edx.org/course/sustainable-packaging-in-a-circular-economy">https://www.edx.org/course/sustainable-packaging-in-a-circular-economy</a>
Circular Economy for a Sustainable Built Environment	The course will be of interest and value to students and working professionals in the fields of	6 weeks: 3–5 hours per week	Self-paced, available most of the year	<a href="https://www.edx.org/course/circular-economy-for-a-sustainable-built-environ-2">https://www.edx.org/course/circular-economy-for-a-sustainable-built-environ-2</a>

	<p>architecture, urbanism, and building/infrastructure engineering.</p> <p>The course builds upon basic knowledge of architectural and urban design and engineering, as well as general knowledge of Circular Economy theory.</p>			
Engineering Design for a Circular Economy	<p>Intended for design and engineering students and professionals. This course is aimed at students and working professionals with a basic background knowledge of design, engineering, and Circular Economy. If you want to learn the basics of Design for a Circular Economy we invite you to take a look at Circular Economy: An introduction before the start of this course. Previous knowledge of Circular Economy concepts is preferred but not necessary.</p>	6 weeks: 3–4 hours per week	Self-paced, available most of the year	<a href="https://www.edx.org/course/engineering-design-for-a-circular-economy">https://www.edx.org/course/engineering-design-for-a-circular-economy</a>
Zero-Energy Design: an approach to make your building sustainable	Bachelor Technical Study 1st year	7 weeks: 4–6 hours per week	Self-paced, available at least 6 months per year	<a href="https://www.edx.org/course/zero-energy-design-an-approach-to-make-your-buildi">https://www.edx.org/course/zero-energy-design-an-approach-to-make-your-buildi</a>
Sustainable Aviation: The Route to Climate-Neutral Aviation	None, however some introductory-level university calculus is used in the course.	6 weeks: 4–5 hours per week	Self-paced, 31 May – 30 August 2022, rerun to be scheduled	<a href="https://www.edx.org/course/sustainable-aviation">https://www.edx.org/course/sustainable-aviation</a>
Solar Energy	Basic knowledge of physics and mathematical skills, such as	8 weeks: 6–8 hours per week	Self-paced, available until August 1, 2022, will be updated after	<a href="https://www.edx.org/course/delftx-solar-energy">https://www.edx.org/course/delftx-solar-energy</a>

	integration and differentiation, are preferred.		that and available in Autumn 2022	
Sustainable Urban Freight Transport: A Global Perspective	None	5 weeks: 4–6 hours per week	Self-paced, available throughout the year	<a href="https://www.edx.org/course/sustainable-urban-freight-transport-a-global-persp">https://www.edx.org/course/sustainable-urban-freight-transport-a-global-persp</a>

## Moocs at ETH Zurich

NAME	PREREQUISITES	WORKLOAD	COURSE OCCASIONS	LINK
Worldviews - From Sustainability to Regeneration	<p>You should</p> <ul style="list-style-type: none"> <li>• be curious to expand from your own expertise and life situation and open for new thinking, philosophical discourse, designerly practice, and real-world infusion.</li> <li>• come with interest and motivation to find your role in contributing to a more sustainable and regenerative world, in various ways.</li> <li>• be willing to enact within the region you live in, physically, and actively connect with various stakeholders.</li> <li>• be open to challenge yourself: mentally, physically, socially.</li> </ul> <p>For MOOC 1 you need no specific further prerequisites; the didactics are designed to be accessible to a very diverse audience, for current science or engineering students in diverse disciplines, for design students, architects, landscape planners, urban planners, and also for people of praxis, for those of use who have been working for many years and who want to re-connect, expand and re-direct.</p>	3 weeks: 2–4 hours per week	Available: started May 9, 2022	<a href="https://www.edx.org/course/worldviews-from-sustainability-to-regeneration">Worldviews - From Sustainability to Regeneration   edX</a>
Landscape Ecology	<ul style="list-style-type: none"> <li>• High school level mathematics</li> <li>• Basic knowledge in GIS and statistics (or willingness to put in some extra effort)</li> <li>• Basic knowledge in ecology</li> </ul>	14 weeks: 2–4 hours per week	Available: started May 19, 2022	<a href="https://www.edx.org/course/landscape-ecology">https://www.edx.org/course/landscape-ecology</a>

	<ul style="list-style-type: none"><li>• A good understanding of maps</li></ul>			
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