Online Education Portfolio Faculty of Technology, Policy and Management, TU Delft

Contact: Joost Groot Kormelink, manager Open and Online Education faculty TPM

Last update: July 2023

Overview themes and courses

All courses are specified in the table below (see next page) including links to enrol.
The faculty offers courses around the following themes/topics:

- Responsible innovation and ethics
- Entrepreneurship and Business innovation
- 21st century skills
- Transition of Infrastructures including building with nature
- Climate change
- Open data / Cybersecurity.

Abbreviations:
- MOOC: Massive Open Online Courses (you can audit a MOOC for free) via EdX
- PCP: Professional certificate Program (cluster of MOOCs) via EdX
- ProfEd: Professional Education (tuition fee required).

Note: some courses are archived (re-run to be announced) but you can still enrol and audit the course.

Under development for launch in 2024
- *Economics of Cybersecurity (3 courses for professionals).*

Table: overview portfolio TPM July 2023

	Ethics and Responsible Innovation	
Type	**Course + Link**	**Learning objectives**
MOOC	Responsible Innovation: Ethics and risks of new Technologies	• Understand the urgent need to include ethical questions with respect to (new) technology. • Know various ways/instruments to analyse risks of new technologies, both forward looking as backward looking (causes of accidents) • Understand various types of innovation (like radical, niche, incremental, frugal) and the conditions for success • Know how to deal with unknown risks (deep uncertainty) when it comes to new technologies • Are able to critically reflect on new technologies from an ethical and risk perspective (case studies). • Understand the concept of responsible innovation and Value Sensitive Design (VSD) and the implications for the design process
MOOC	Robots in Society: Blessing or Curse	• The potential societal and ethical impacts of robot creation • The principles that should be taken into consideration during the development of social and AI robots • The choices that need to be made when developing social robots
MOOC	Open Science	• Describe concepts and objectives of open science • Analyse and discuss benefits and barriers of particular open science cases, including cases from within your own region or discipline • Set up an open data sharing strategy to increase your research visibility • Determine appropriate route to take when publishing an open access article
MOOC	Building tomorrows responsible firms	• Explore successful strategies for RRI and implications for corporate citizenship at business level • Review Key Performance Indicators for CSR and RRI • Utilize the toolkit we provide to install the processes required for RRI • Analyse best practices from different companies across Europe • Design a roadmap for RRI to embed in CSR policies
MOOC	Dealing with ethical-dilemmas in- professional engineering	• Understand the professional rules of conduct for engineers and how to apply them. • Appreciate codes of conduct as an expression of the professional rules of conduct. • Understand the conditions under which whistle blowing is warranted. • Recognize conflicts of interest and develop strategies for handling these. • Understand the importance of communication with all stakeholders. • Apply practical strategies for handling ethical dilemmas and putting them into practice overcome them. • Improve your ability to communicate the choices you make in your design in terms of underlying values
MOOC	Ethics in AI Design	• Identify and explain possible ethical issues in AI design and development • Analyze what ethical issues could arise in AI applications • Determine steps to take for more responsible use of AI applications • Apply the steps involved in responsible AI design

	21st century skills	
Type	**Course + Link**	**Learning objectives**
MOOC	Creative problem solving and- decision making	• Analytically based support of decision-making, design and implementation of solutions. • How to apply tools like actor analysis, causal modeling, goal trees and means-end diagrams, problem diagrams, uncertainty, decision support and score cards.

Entrepreneurship and Business Innovation

Type	Course + Link	Learning objectives
PCP	PCP Business Model Innovation (4 MOOCs in total)	• Why business models matter, and how tooling can help you innovate your business model • How to design your new business model in a structured way • How to evaluate the robustness of your business model towards trends and uncertainties • How to create a roadmap for business model innovation with concrete actions • How to grow your business with business model innovation
MOOC	The Value of Business Models (MOOC 1)	• What a business model is • Why business models matter to your firm and the value they bring • How business model innovation improves business performance • How tooling can help you to innovate your business model
MOOC	How to design a successful business model (MOOC 2)	• How to design a business model in a structured way • How to select the appropriate tools for designing or innovating a business model • How to present your business model in a single sheet • How to reason from your needs ("I want to's") to a business model solution
MOOC	Business Model Testing (MOOC 3)	• How to identify which trends and uncertainties will affect your business model • Evaluate how robust your business model is given trends and uncertainties • Formulate concrete actions to make your business model more robust
MOOC	Business Model Implementation (MOOC 4)	• How to create a business model roadmap • How to plan concrete actions to realize a new business model • How to find partners to realize a new business model.
MOOC	Entrepreneurship for Engineers (4TU)	• Learn what it takes to become a "technopreneur" • Explore various methods for identifying opportunities • Learn how to conduct market research and provide evidence for the viability of the business idea • Develop a viable business proposition and learn to pitch your ideas for various audiences • Understand the dynamics of new venture development and team building • Develop the ability to translate a business idea into marketing and financial plans.
MOOC	*Big data strategies to transform your business*	• identify the stakeholders and characteristics of your sector in the era of big data • Identify potential big data induced changes in strategy, business model, organization and job descriptions • Substantially change existing strategy, business model, organization or adopt new ones as required • Find and develop strategically important tasks for yourself in your organization.

	Climate	
Type	**Course + Link**	**Learning objectives**
PCP	Climate-Neutral World: Theory, Applications and Taking Action (4 MOOCs in total)	• To identify relevant greenhouse gas mitigation options for your specific need and situation. • To determine the costs and potential of the mitigation options in various sectors and construct marginal abatement cost curves. • To analyze the interaction between the various mitigation options from both qualitative and quantitative perspectives. • To set reduction targets for your specific professional sector, identify relevant policy incentives for your context and have a basic understanding of their quantitative impacts. • To identify the potential role of companies and cities in climate action.
MOOC	Designing a Climate Neutral World: An Introduction (MOOC 1)	• Understand what is needed to limit global average temperature rise to below 2 °C compared to pre-industrial levels • Understand current energy systems and energy demand in various sectors • Calculate emissions and emission reduction potentials. • Determine mitigation costs • Choose alternatives for maximum mitigation for the lowest cost • Understand the critical elements of the energy transition.
MOOC	Designing Climate Neutral Buildings and Transport (MOOC 2)	• Understand the big picture of how buildings contribute to global GHG emissions and differences between climate zones. • Analyze the contribution of heating, cooling, cooking, and use of electrical appliances to greenhouse gas emissions and examine options to mitigate CO_2 emissions from these activities. • Perform basic calculations on GHG emissions relating to different activities in buildings. • Consider how policies affect GHG emission in buildings. • Discuss the transport sector and its contribution to GHG emissions. • Calculate GHG emissions relating to different modes of transport and fuels. • Discover the efficiency and potential of alternate fuels and a variety of measures needed to decarbonize transport.
MOOC	Designing Climate-Neutral Industry and Electricity Generation (MOOC 3)	• Review the industrial sources of emissions and existing technological options to mitigate them. • Identify available methods and tools used to evaluate and deploy specific measures to mitigate emissions in the industrial sector beyond the boundaries of a single company. • Describe how the electricity system works and assess the resource potential, costs, and variability of different renewable generation options. • Explain the three main ways to deal with renewable generation variability and interpret energy system modelling results in order to quantify their trade-offs.
MOOC	Designing a Climate-Neutral World: Taking Action (MOOC 4)	• Understand how international climate agreements work. • Assess the sphere of influence of your own organization. • Learn how national climate policies are designed and work, and be able to evaluate the relevance of existing policies for your organization. • Learn how ambitious and feasible GHG emission reduction targets for companies are set and discover how to translate these into a climate action plan. • Learn to apply approaches to tackle greenhouse gas emissions in supply chains.

		• Learn how ambitious and feasible GHG emission reduction targets for cities and municipalities are set and learn how to translate these into climate action plans. • Decide in which areas the greatest acceleration of climate action is needed.

		Transition of infrastructures
Type	**Course + Link**	**Learning objectives**
MOOC	Room for Rivers: River basin Management in Times of Climate Change	• Examine a river (watershed) and a problem area (project level) from the perspectives of hydraulic engineering, governance and landscape design • To investigate a river (watershed) and a problem area (project level) by considering large spatial scales (from source to sea) considering the historical developments and long-term horizons; • To appreciate a river as a system with up- and downstream relationships between human interventions and water levels • To engage stakeholders in river basin management processes • To discover the potential role of landscape design in accommodating various societal functions, including water safety, over short- and long-term time horizons; • To understand the intricacies of bringing together water safety, governance and spatial quality aspects into one integrated program with a long-term planning perspective.
ProfEd	Adaptive planning for infrastructure and water management	• Articulate and defend choices in long-term planning or decision-making under uncertainty • Use a structured method to develop scenarios for plausible but uncertain futures • Identify indicators and actors for the monitoring and evaluation of an adaptation pathway • Design an adaptation pathway and evaluate its performance in a serious game • Make recommendations on how to deal with the strengths and weaknesses of adaptation pathways during their implementation.
PCP	Water Strategy and Planning (Joint program with IHE)	After completing this program, you will be able to: • Explain how policy analysis can support sustainable water management in a multi-actor setting. • Use a systems approach to structure complex water problems for strategic planning. • Consider different actor scenarios that may affect water management strategies. • Apply methods for advanced stakeholder analysis to real-world water problems.
ProfEd	Water Policy Analysis: A Systems Approach	• Support more effective policy making in a multi-actor setting. • Structure complex policy problems in a way that enables different stakeholders to discuss issues and agree on useful ways forward. • Apply a conceptual systems analysis to guide subsequent research activities and connect evidence and science to inform policy decisions.
ProfEd	Multi-stakeholder Strategies: Analysis for Winning Coalitions	• Explain and anticipate actor strategies in complex environments based on a coherent conceptual framework • Apply different actor and strategy models to sharpen your understanding of multi-stakeholder environments • Develop strategies that increase the chances of success in building winning coalitions and effective partnerships.
MOOC	inclusive energy systems: exploring-sustainable energy for all	• Describe and recognize continuous change in (the social and technological nature of) energy systems in terms of balancing the 4 As of energy services. • Identify key institutional characteristics of universal access to energy services. • Determine related major implications for society. • Analyse the security of supply and reliability of energy services in various energy systems and the related short- term versus long-term considerations. • Evaluate the consequences of change(s) in the energy system for

		affordability and energy poverty, in various user environments. • Evaluate the social and environmental acceptability of energy services provision in different economic and socio-cultural contexts. • Value trade-offs and their legitimacy regarding the roles and responsibilities of all parties in the energy system
MOOC	Intelligent and Integrated Energy Systems in Transition: an introduction for decision-makers	• Analyze the physical, operational, economic and policy aspects of the energy system and their interrelations. • Identify the roles of the different actors such as energy companies, network operators, consumers, aggregators, and government entities. This will enable the learner to actively engage with various stakeholders. • Clarify how energy markets work and are regulated and determine the changes renewable energy integration brings. • Recognize the importance of policy intervention in the energy system and compare what policy instruments are available for different policy goals. • Identify disruptive developments in technology and policy trends that will shape the future of our energy system.
PCP	The Economics of Energy Transition	• The functioning of energy markets, with the European electricity markets as an example. • The need for an energy transition and different economic approaches for achieving this. • The economic tools and instruments necessary for stimulating the energy transition. • To discuss energy transition policies and the regulations needed with policy makers and consumer organizations. • Assess the effectiveness of economic policy measures in energy transition.
MOOC	Energy markets of today	• How energy markets operate, including regulation and market organization; • To identify different market models and understand what affects the operation of the electricity sector; • Why policy makers need to incentivize investment and how it can be done; • How the electricity network operates and how network tariffs are determined.
MOOC	The Transition to the Decarbonised Economy of Tomorrow	• The impact of the energy transition on energy markets, including the introduction of renewable energy sources and storage technologies; • To understand the business case for renewable energy technologies and to detail different support schemes for renewable energy sources; • To discuss different methods of carbon pricing, including discussing the origin and the implementation of the emission trading scheme; • To describe the goals and appearance of the European energy system and energy market of 2050, discussing the steps necessary to achieve these goals.
MOOC	Electric Vehicles Policy	• Distinguishing between different policy perspectives and different levels of government pertaining to electric vehicles • Dealing with policy dilemmas and competing public values • Institutional theory and critical transactions in the future e-mobility/power system • Development and evaluation of effective e-mobility incentive schemes.
MOOC	Building With Nature	• Basic engineering design principles, and basic ecological principles, relevant to the Building with Nature approach • How to assess which principles are applied in several case studies and so form your own opinion on whether the hydraulic infrastructure is meeting engineering, ecosystem and societal goals • How to apply your new knowledge in assessing the potential for Building with Nature solutions where you live.
MOOC	Beyond Engineering: Building with Nature	• Identify relevant stakeholders for the design and implementation of nature-friendly hydraulic infrastructure. • Analyse the power and interests of these stakeholders, including their interdependence in terms of resources.

		• Apply basic game-theory principles in combination with the stakeholder analysis to determine potential coalitions in a Building with Nature project case. • Evaluate the suitability of the coalitions for designing and implementing a particular Building with Nature project case.
MOOC	Smart and Sustainable Cities: New Ways of Digitalization & Governance	• Review governance challenges for SSC (smart sustainable cities) • Reflect and debate on how to set priorities for smart sustainable city initiatives planning and management • Understand how to engage stakeholders and involve citizens in SSC development and apply co-creation pathways with stakeholders • Observe the conditions and risks related to IT and data governance in SSC • Define a draft of a governance and regulatory framework for implementing and monitoring SSC initiatives • Apply a roadmap for governing SSC initiatives in a real case.

Open data & Cybersecurity		
Type	**Course+ link**	**Learning objectives**
ProfEd	[Cybersecurity for executives](#)	• Develop strategies to build a cyber-resilient organization. • Identify cyber threats for your organization (including ransomware and phishing attacks), assess their risk levels, and determine how to mitigate these risks to acceptable levels. • Lead the cybersecurity initiative within your organization by developing solutions, including the design and implementation of cybersecurity action plans. Deal with cybersecurity crises at a strategic level.
MOOC	[Open and smart government](#)	• Basic concepts related to Open Government and Open Government Data • How to analyse and discuss benefits, barriers and potential negative effects of a particular open government case • How to analyse public values and best practices related to open government • How to make use of open data using algorithms and artificial intelligence techniques. • How to apply the open government principles in various situations • How to understand potential negative and positive effects Open Government might bring to the workplace
ProfEd	Economics of Cybersecurity (3 courses)	To be announced in spring 2024

	Dutch for Beginners for selected target groups	
Type	**Course+ link**	**Learning objectives**
MOOC	Dutch for beginners	• Learn the most frequent words, everyday phrases, and the basics of Dutch grammar and pronunciation. • Gain the confidence to speak Dutch in real life!