

LEARNING OUTCOMES

DeepTech & Innovation Online School

Sustainable Product Design in a Digital Age

Type of Programme: Online training course, Professional development course, Non-formal learning contexts
Course Title: DEEPTech AND INNOVATION
Country of delivery: Online training course
Institution(s)/organisation(s) delivering the training, countries: in attached the detailed course syllabus - School Program
Lecturers: Academics and Business professionals (List of the Lecturers attached in the detailed course syllabus - School Program)
Course Status: Elective
ECTS credits: 2
Pre-Condition: None
<p>Course objective</p> <p>The objective of this course is to educate trainees for novel deeptech areas, focusing on sustainable product design and digitalization, and especially related to topics such as deep tech, product design, advanced technologies and advanced materials, AI and machine learning, sustainability in product design, digital culture in supporting innovation and entrepreneurship, also including entrepreneur pitch class. Based on the EntreComp conceptual model, https://publications.jrc.ec.europa.eu/repository/handle/JRC101581, the course will focus on: Ideas & Opportunities; Resources; Into Action, related to deep tech and sustainable product design and digitalization for an Improved EU Economy and Climate, from both the professional and scientific aspects. Objective of the training is to support integration of deep tech fields in course curricula, but also to support deep tech teams and start-ups and to facilitate deep tech innovations going to market.</p>
<p>Learning Outcomes</p> <p>Based on the EntreComp conceptual model https://publications.jrc.ec.europa.eu/repository/handle/JRC101581 and after finishing this course, students should be able to:</p> <p>Identify and seize opportunities to create value by exploring the social, cultural and economic landscape. Identify needs and challenges that need to be met. Establish new connections and bring together scattered elements of the landscape to create opportunities to create value.</p> <p>Develop several ideas to create value, including better solutions to existing and new challenges. Explore and experiment with innovative approaches. Combine knowledge and resources to achieve valuable effects.</p> <p>Recognise the potential an idea has for creating value and identify suitable ways of making the most out of it.</p> <p>Assess the consequences of ideas that bring value and the effect of entrepreneurial action on the target community, the market, society and the environment. Reflect on how sustainable long-term social, cultural and economic goals are, and the course of action chosen.</p> <p>Reflect on their needs, aspirations and wants in the short, medium and long term. Recognise the possibilities to get the competences needed at any stage, including technical, legal, tax and digital competences through suitable partnerships, networking, outsourcing and crowd-sourcing.</p> <p>Understand economic and financial concepts, of turning an idea into a value-creating activity.</p> <p>Inspire and enthuse relevant stakeholders. Get the support needed to achieve valuable outcomes. Demonstrate effective communication, persuasion, negotiation and leadership. Initiate processes that create value.</p> <p>Work together and cooperate with others to develop ideas and turn them into action. Network. Use any initiative for value creation as a learning opportunity. Learn with others, including peers and mentors.</p>

By participating in this course the participants are also eligible to join the EIT Alumni with different further opportunities by the EIT Community, <https://eitalumni.eu/>.

Syllabus – course content

Theoretical lectures with practical examples

What is Deep Tech. Practical Implementation of Deep Learning Solutions in Industry. Opportunities and synergies for innovation in deep tech. Promotion of new technologies for sustainable water management. Life Cycle Thinking Tools – using LCT to guide sustainable design and certification. AI-based image and data processing for applied research. Design and development of environmentally sustainable materials. Data-driven AI methods supporting sustainable product innovation.

AI-driven innovations in manufacturing and business. Data-driven surrogate models for sustainable design and optimization. DeepTech in cybersecurity products. Supercomputing and big data – industry use cases. AI tools and best practices for software development. Energy software – smart electricity. Machine learning for sustainable product design in energy, environment, and health. Atomistic calculations in energy materials research. Data management for local-level energy and climate transition plans. Technology adoption by energy-sector SMEs. Fuel cells as future energy converters. Sustainable antenna design for 5G and beyond via deep learning.

Railway transformation. Sustainable vehicle design for future mobility. AI-driven quality optimization in industry. Critical raw materials for a circular economy. Sustainability in conventional and advanced metallic manufacturing. AI for predictive maintenance. Additive manufacturing as a digital technology. Finishing operations for thin-walled LPBF structures. Urban air traffic transformation. Precise material modelling for optimized sheet metal forming. Design thinking as a problem-solving method. Joining technologies in the transport sector. Machine learning for predicting stainless-steel passive film behaviour.

AI-driven drug design. AI-generated pharmaceutical formulations. AI-first pharmaceutical innovation. Healthcare technologies in the DeepTech era. Photonics as a DeepTech tool. DeepTech for human-centered sustainable wearable AI. Strategic neurobranding in the digital age. Challenges in establishing a drug discovery startup. Microelectronics and sensors from IoT to high-energy physics. Diabetes market analysis for early-detection products. Reverse engineering and FEM for medical geometry reconstruction. Deep Tech in the browser for atomistic molecular research.

Pitching for support: customer, end user, funder focus. Unlocking intellectual property. Entrepreneurial experimentation. Exploitation readiness level (XRL) for tech valorisation. Impact finance and measurement. Sustainable product design in innovation and entrepreneurship. From laboratory to marketplace. Market research for new ventures. Sustainable business model innovation. Innovation thinking: creativity and critical thinking. Shallow tech vs deep tech. Practical entrepreneurship in a university setting.

Practical exercises

Pitching for support. Business communication during networking. Practical Assignment: Pitching presentations.

Literature

Prepared learning materials, uploaded to the shared Google folder during the school

Number of active classes	Theoretical classes: 31	Practical classes: 30
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Teaching methods

Theoretical lectures with practical examples and practical pitching excersices and networking sessions.

Competency assessment method (maximum number of points 100)

Pre-final testing	points	Final competency assessment	points
Pitching for support	30	Google test	70