

GREEN DEAL COLLIDER: SUSTAINABLE FUTURES / ROHELEPPE KIIRENDI: JÄTKUSUUTLIK TULEVIK

EAX6040

BACKGROUND AND PROBLEM

Many recent crises have demonstrated the fragility of our environment, society, and economy. In response, the European Green Deal 2050 envisions to make the EU a climate-neutral, modern, and competitive economy by eliminating greenhouse gas emissions, decoupling economy from natural resources, and fostering engagement from all EU citizens across all regions. To achieve these ambitions, the Green Deal outlines eight strategic actions, positioning research and innovation as central to: (1) accelerating and guiding essential transitions; (2) deploying, demonstrating, and mitigating risks associated with new solutions; and (3) involving citizens in social innovation (Commission, 2020).

Addressing global climate challenges requires a comprehensive and extensive rethinking of policies, technologies, and educational frameworks. Bridging research, innovation, and entrepreneurship is crucial to drive societal and economic transformation in alignment with the Green Deal missions. At TalTech and Eindhoven University of Technology, extensive research across various disciplines already supports the green transition. However, translating scientific research and technological advancements into innovation and entrepreneurial ventures remains a slow and fragile process.

MAIN AIMS

The course is designed to empower organizations, academics, and students to advance research-driven entrepreneurship, with the goal of creating technically feasible and economically viable products, services, and business models that contribute to Europe's sustainable transformation. To accomplish this, the Collider course has outlined several core objectives:

1. Identify pressing global challenges and opportunities with high commercialization potential.
2. Guide participants through the design thinking stages with an emphasis on refining value propositions for sustainable commercialization.
3. Develop effective processes and best practices to strengthen science-based entrepreneurship education.

Together, the course's goals and objectives drive the innovation-led transformations required to meet Europe's 2050 climate neutrality targets. Focusing on the discovery phase, the Collider course provides a foundation for the development of sustainable products and services.

MAIN PROCESS AND MILESTONES

The course emphasizes discovering ideas and defining problems and solutions for sustainable entrepreneurship. Beyond the introductory and closing events, the Collider course unfolds across six major phases: Explore, Learn & Frame, Ideate & Concept, Analyze & Plan, Build, and Validate. The course begins with an introductory session, providing students with an overview of its objectives, process, teaching approach, assessment methods, and opportunities beyond the course. It culminates in a final showcase event. Throughout the course, students will participate in five intensive 8-hour sessions designed to support their progress as they work on their challenges through focused sprints between meetings.

LEARNING OUTCOMES

The key subject areas of the course include the European Green Deal and Green Transition, design thinking, startup entrepreneurship, and interpersonal skills. Notably, the focus will be on identifying relevant problems and synthesizing science-driven products and services. By the end of the course, students will have acquired the following learning outcomes:

- the learner will be able to rely on and understand the European Green Deal and Green Transformation-related visions, missions, and challenges.
- the learner will be able to apply design thinking and startup entrepreneurship concepts, processes, and methods to analyze problems and synthesize science-driven products, services, and business models.
- the learner will be able to prototype for validating the feasibility and viability of products, services, and business models.
- the learner will be able to use transferable and interpersonal skills in pursuing research-based entrepreneurship: persuasion, adaptability, negotiation and team, communication, and conflict management.

TARGET GROUP AND PRECONDITIONS

This course welcomes local and international students from TalTech, EuroTeQ partner universities, and institutions worldwide. It is designed primarily for graduate-level students across diverse departments and disciplines, with a preference for those in science, technology, engineering, or business-related fields. While doctoral and master's students are prioritized, students from all academic backgrounds, years, and experience levels are encouraged to apply.

*Participation is limited to 45 students.

LEARNING AND TEACHING METHODS

This course applies challenge-based learning principles and methods, guiding students through a hands-on, collaborative experience. Participants will identify global challenges, form interdisciplinary teams, and engage in framing and re-framing challenge-driven problems. They will develop business ideas and solution concepts, design, prototype, and validate their solutions, and practice communicating and presenting their ideas both within the course and to a broader audience. The course combines seminars, lectures, mentoring sessions, teamwork, and home assignments to support and enhance the learning process.

ASSESSMENT METHODS

TEAM PROJECT WORK

- Design Research/Proposal
- Business Model
- Prototype and Validation
- Final Pitch and Demonstration

RESPONSIBLE LECTURERS

ERGO PIKAS, Assistant Professor, Department of Civil Engineering and Architecture, TalTech

Ergo Pikas is an Assistant Professor at Tallinn University of Technology's Department of Civil Engineering and Architecture. He has held postdoctoral roles at Aalto University in Finland and the Technical University of Denmark, and was a Fulbright Visiting Researcher at the University of California, Berkeley. He earned his Master's degree from the Technion – Israel Institute of Technology in 2012 and his Doctor of Science degree through a joint program between Aalto University and Tallinn University of Technology in 2019.

With experience in entrepreneurship and consulting, Ergo has worked with construction companies in Estonia and internationally, and has been involved in the development of three construction startups. His research focuses on construction innovation, digitalizing processes, sustainable renovation, and design management, with an emphasis on energy performance.

Ergo also designs and teaches project-based and challenge-based courses, such as Construction Management Simulation, where students tackle real-world scenarios with industry mentors. In interdisciplinary courses like Startup Entrepreneurship for the Built Environment and Green Deal Collider: Sustainable Futures, students develop innovative solutions to real challenges in construction and sustainability. His teaching emphasizes flexibility and mentorship, encouraging students to take ownership of their learning and embrace failure as part of problem-solving.

KÄTLIN KANGUR, Lecturer, Department of Mechanical and Industrial Engineering, TalTech

Kätlin Kangur is the program director of the Design and Technology Futures master's program. Kätlin has a master's degree from Aalto University, School of Arts, Design and Architecture. Her primary focus is design for sustainability transitions and methods and approaches that help to facilitate the change for a better future.

GERT GURI, Coordinator of Education on Entrepreneurial Learning, Department of Industrial Engineering & Innovation Sciences, TU/e

Gert Guri has developed unique expertise in integrating real-life challenges with educational objectives in entrepreneurship courses over a decade at EIT Digital (European Institute of Technology and Innovation). His international background, being an Albanian-born Italian living in France and working in the Netherlands, and his experience in international organizations and with international students have enriched his global perspective and approach to education. Gert coordinates entrepreneurial learning at the TU/e, guiding students in hands-on projects that tackle real societal challenges. Through the Challenge-Based Learning (CBL) approach, he fosters an entrepreneurial mindset in curricular and extracurricular settings. As a co-teacher in the Innovation Space Project (ISP) course, Gert empowers students to make tangible societal impacts with their projects. His work is defined by ongoing experimentation, co-creation, and adaptability, enhancing the effectiveness of team-based learning.

MENTORS

Challenges and mentors come from FinEst Centre for Smart Cities different pilot projects:

- Reuse old buildings
- AI for detecting street markings
- Database of urban data
- 3D information models in city planning
- Healthy city: urban environment design and social interventions with community engagement
- Turning food waste into protein rich poultry and fish feed