Syllabus

Course Description

Course Title	Digital Transformation and Sustainability Management
Course Code	47553
Course Title Additional	
Scientific-Disciplinary Sector	ING-IND/35
Language	English
Degree Course	Master in Industrial Mechanical Engineering
Other Degree Courses (Loaned)	
Lecturers	Dott. Margherita Molinaro, Margherita.Molinaro@unibz.it https://www.unibz.it/en/faculties/engineering/academic-staff/person/43550
Teaching Assistant	
Semester	Second semester
Course Year/s	1
CP	5
Teaching Hours	28
Lab Hours	18
Individual Study Hours	79
Planned Office Hours	
Contents Summary	The course provides insights into the developments towards digital transformation and sustainability that are disruptively changing existing patterns of manufacturing and logistics. First, students will be guided in the adoption of a managerial view to understand digital transformation through a discussion of different digital technologies, new business models, implementation drivers, challenges, and barriers. Second, they will be able to understand key topics related to sustainability management, including its relationship with the digitalization strategy, through a discussion of solutions to implement, measure and report sustainability.

	Overall, the acquired knowledge will enable industrial and mechanical engineers to analyze and influence the developments determining the changing boundary conditions of manufacturing and logistics systems.
Course Topics	PART 1: DIGITAL TRANSFORMATION Introduction to digital transformation • The Fourth Industrial Revolution • Digital technologies and disruptions • Digital strategy The digital transformation framework • Digital business processes: Impact on operations and supply chain management • Digital business models: Impact on business scope • Organizational design for digital change • Managing the digital transformation: a roadmap Drivers, barriers and impacts of digital transformation • Drivers and barriers of digital transformation • Desired and undesired effects of digital transformation PART 2 : SUSTAINABILITY MANAGEMENT Introduction to sustainability • The history of sustainability • Sustainability and its components • Circular economy Sustainability implementation • Sustainability certifications • Sustainable business models and practices • Industry 4.0 and sustainability Sustainability measurement and reporting • Sustainability Reports: GRI framework and other reporting standards • European regulations • Tools for sustainability assessment: introduction to Carbon Footprint Analysis and Life Cycle Assessment

Keywords	Industry 4.0; digital business models; circular business models; sustainability measurement; sustainability reporting;
Recommended Prerequisites	None.
Propaedeutic Courses	
Teaching Format	Frontal lectures and exercises.
Mandatory Attendance	Strongly recommended.
Specific Educational Objectives and Learning Outcomes	Learning outcomes: Knowledge and understanding: • Advanced understanding of Digital Transformation and Sustainability Management concepts • Knowledge of the various tasks, methods and approaches of managing production networks regarding digital transformation and sustainability • Knowledge of the management models for digital transformation and sustainability management Applying knowledge and understanding: • Ability to adjust illustrative business models considering digital transformation and sustainability • Ability to adjust illustrative production networks considering digital transformation and sustainability Making judgements: • Ability to transfer the knowledge and methods learned to real practical applications thanks to groupworks and exercises • Systems Thinking – ability to judge the influences of digital transformation and sustainability on current and future production networks Communication skills: • Ability to prepare, conduct and join interactive discussions in class • Ability to structure, prepare, and present arguments related to digital transformation and sustainability management topics Learning skills: • Ability to autonomously extend the knowledge acquired during the study course by reading and understanding.

Specific Educational Objectives and Learning Outcomes (additional info.)	
Assessment	Written exam and case study presentations.
Evaluation Criteria	The mark is calculated from the results of the written exam and the case studies of both parts of the course (Digital Transformation and Sustainability Management). The written exam counts 70% and the case studies count 30% of the final grade. The following criteria are taken into consideration for the assignment of marks: • Ability to solve simple exercises about the topics of the course • Clarity of answers • Mastery of specialistic terminology (also with respect to teaching language) • Ability to summarize and establish relationships between topics.
Required Readings	Lecture notes and documents for exercises will be available on the Microsoft Teams and the Open Learning Environment (OLE) pages of the course.
Supplementary Readings	**Part 1: Digital Transformation** • Gupta, S. (2018). *Driving digital strategy: A guide to reimagining your business*. Harvard Business Press. • Hinterhuber, A., Vescovi, T., & Checchinato, F. (Eds.). (2021). *Managing digital transformation: Understanding the strategic process*. Routledge. • Rüßmann, M., Lorenz, M., Gerbert, P., Waldner, M., Justus, J., Engel, P., & Harnisch, M. (2015). Industry 4.0: The future of productivity and growth in manufacturing industries. *Boston consulting group*, 9 (1), 54-89. **Part 2: Sustainability Management** • Lacy, P., Long, J., & Spindler, W. (2020). *The Circular Economy Handbook*. Palgrave Macmillan, London. • GRI Standard Ed. 2021 (https://www.globalreporting.org/) • https://ellenmacarthurfoundation.org/

Further Information	
Sustainable Development Goals (SDGs)	Decent work and economic growth, Climate action, Responsible consumption and production, Industry, innovation and infrastructure