Syllabus
Course description

Course title	Digital Transformation and Sustainability Management
Course code	47553
Scientific sector	ING-IND/35
Degree	Master Industrial Mechanical Engineering
Semester	2
Year	1
Academic year	2023-2024
Credits	5
Modular	*No*

Total lecturing hours	28
Total lab hours	
Total exercise hours	18
Attendance	Strongly recommended
Prerequisites	None
Course page	[Course Offering / Free University of Bozen-Bolzano (unibz.it)](unibz.it)

Specific educational objectives	The course provides a deep insight 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 analyse and influence the developments determining the changing boundary conditions of manufacturing and logistics systems.

Lecturer	Dr. Molinaro Margherita, margherita.molinaro@unibz.it
Scientific sector of the lecturer	ING-IND/35
Teaching language	English
Office hours	15 (By appointment)
Teaching assistant *(if any)*	None
List of topics covered	**Part 1: Digital Transformation**

| | **Introduction to digital transformation**
• The Fourth Industrial Revolution
• Digital technologies
• Digital 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
• Industry 4.0 and sustainability

Sustainability measurement and reporting
• Life Cycle Assessment
• Stakeholders and their importance
• Sustainability Reports: GRI framework and other reporting standards |
| **Teaching format** | Frontal lectures and exercises |

| **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 exemplary business models considering digital transformation and sustainability |

	• Ability to adjust exemplary 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 topics • Ability to structure and prepare Sustainability Reports for stakeholders Learning skills • Ability to autonomously extend the knowledge acquired during the study course by reading and understanding
Assessment	Written exam and case study presentations (around 15 minutes for a case study in Digital Transformation and 15 minutes for a case study in Sustainability Management)
Assessment language	English
Evaluation criteria and criteria for awarding marks	The grade 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 (15% each case study). 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 language (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/