Course unit English denomination	RM: Research Methods
Teacher in charge	• Trentin Alessio • Bertolotti Fabiola (Università di Modena e Reggio Emilia) • Casarino Valentina • Danese Pamela • Forza Cipriano • Nosella Anna • Sandrin Enrico • Suzić Nikola (Università di Trento)
Teaching Hours	36
Number of ECTS credits allocated	6
Course period	• 11/11/2024 • 13/11/2024 • 14/11/2024 • 15/11/2024 • 18/11/2024 • 19/11/2024 • 21/11/2024 • 22/11/2024 • 25/11/2024
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☒ Yes (90% minimum of presence) ☐ No
Course unit contents	The course presents the components of a theory, as well as a wide range of research methods, covering both analytical and empirical research, both quantitative and qualitative research, that can be adopted, individually or in combination, to build and/or test a theory. More specifically, the course explains how to conduct a systematic literature review, introduces the basic mathematical notions used in machine learning, provides some guidelines for the formal conceptual definition of constructs, explains what action research is and how it should be designed, discusses how to design and execute survey-based quantitative research and presents the epistemological bases of qualitative research, compared with those of quantitative research, as well as the main techniques to gather and analyze qualitative data.
Learning goals	To understand what constitutes a theoretical contribution. To know how to conduct a systematic literature review, identifying research opportunities and positioning one's research project within the analyzed body of literature. To acquire the basic mathematical skills, in terms of both linear algebra and functional analysis, required in the field of machine learning. To know some rules that should guide the formal conceptual definition of constructs in the theory-building phase. To know what action research is and how it should be

	designed. To know the main techniques to collect and analyze qualitative data, as well as the main issues to consider in the design and execution of survey-based quantitative research.
Teaching methods	Frontal teaching, teamwork
Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☐ No
Available for PhD students from other courses	☐ Yes ☒ No
Prerequisites	
Examination methods	Grading (A=above the average; B=around the average; C=below the average) is based on assigned homework (20%) and class participation and interaction (80%).
Suggested readings	Please see the 'Teaching documents' section of the STEM page of the PhD Course.
Additional information	The seminar on Qualitative Research Methods will be online.

Course unit English denomination	S: Statistics for Engineers
Teacher in charge	• Salmaso Luigi • Disegna Marta • Arboretti Rosa
Teaching Hours	42
Number of ECTS credits allocated	7
Course period	• 03/02/2025 • 10/02/2025 • 27/06/2025-30/06/2025
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☒ Yes (90% minimum of presence) ☐ No
Course unit contents	In this course will be developed the following topics: 1) introduction to descriptive statistics; 2) introduction to inferential statistics; 3) introduction to linear and non-linear regression models; 4) introduction to supervised and unsupervised Machine Learning algorithms; 5) Design of Experiments.
Learning goals	The course develops in participants the statistical skills necessary to handle and analyse data of various kinds, including data from the doctoral project they are developing. Students will acquire both theoretical and practical knowledge to independently develop statistical analysis. During the course, students will gain basic skills to correctly use some user-friendly statistical software. Additionally, the course enables students to acquire the skills to effectively and correctly present and interpret statistical analysis.
Teaching methods	Frontal lessons, group works, workshops, case studies.
Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☐ No
Available for PhD students from other courses	☒ Yes ☐ No
Prerequisites	-
Examination methods	The final evaluation will be based on the discussion of two projects developed individually or in teams of no more than three people. Students are expected to

	describe and analyse one or two case studies using the statistical techniques presented during the course.
Suggested readings	Materials (slides, datasets, etc.) of the course will be provided by the course leaders.
Additional information	The course is structured into 2 online (February) and a Summer School of 4 days (June). The Summer School will take place in Villa San Giuseppe, Monguelfo, Bolzano province. During the course an introduction to the use of the following statistical software will be presented: • R and BlueSky, both open-source software. • MINITAB, licensed to University of Padova.

Course unit English denomination	OM: Operations and service management
Teacher in charge	• Andrea Vinelli • Marcos Dieste Gracia
Teaching Hours	6
Number of ECTS credits allocated	1
Course period	• 14/01/2025 • 22/01/2025
Course delivery method	☐ In presence ☐ Remotely ☒ Blended
Language of instruction	English
Mandatory attendance	☐ Yes (% minimum of presence) ☒ No
Course unit contents	The course introduces some relevant research fields in Operations Management (OM), related to service operations management and digital transformation. For each of these research streams, an overview of the topic will be presented, together with relevant gaps in the literature, promising areas for future research and academic debate. A lecture will be dedicated to Service Operations Management and will discuss the issue of servitization and the new trends for companies related to smart connected service-product systems.The second lecture will discuss the challenges that manufacturing companies encounter during digital transformation, from the perspective of an operations management researcher. These include topics such as technology acceptance, internal and external barriers, paradoxical tensions and sustainability trade-offs. These are current issues for industrial companies that need to be properly addressed by managers.
Learning goals	The course analyzes changes in the product-service offering, servitization in manufacturing, and the new challenges posed by smart connected service-product systems. It also explores the role of customer satisfaction. Additionally, it provides a description of the current challenges managers encounter in digital transformation, spanning from technology acceptance to sustainability, and includes guidance on conducting research on these topics.
Teaching methods	Lectures, group work, case studies
Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☐ No

Available for PhD students from other courses	☒ Yes ☐ No
Prerequisites	
Examination methods	Eligible, ineligible
Suggested readings	Suggested by professors
Additional information	--

Course unit English denomination	SPM: Sustainable process management
Teacher in charge	• Laura Macchion • Pamela Danese • Antonio Cavallin Toscani
Teaching Hours	12
Number of ECTS credits allocated	2
Course period	• 29/11/2024 • 04/12/2024 • 16/12/2024
Course delivery method	☐ In presence ☐ Remotely ☒ Blended
Language of instruction	English
Mandatory attendance	☐ Yes (% minimum of presence) ☒ No
Course unit contents	This course introduces some relevant research fields related to sustainability and circular economy, linked to waste reduction in processes, sustainable process management, and sustainability performance measurement. For each of these research streams, an overview of the topic will be presented, together with relevant gaps in the literature, promising areas for future research and academic debate. Waste reduction is a topic which has been receiving a renewed attention in process management. The lecture will provide students with an overview of the historical evolution of the debate on waste reduction in processes, until the recent debate. Sustainable process management is a further hot topic in management. The course will explain how companies/organizations can increase their social and environmental sustainability. Finally, the lecture on sustainability performance measurement will focus on how firms can assess and manage the sustainability impacts - especially climated-related impacts - of their operations and their products/supply chains.
Learning goals	The course allows understanding what waste management is and the evolution of the academic debate on waste management, the concepts of sustainability and circular economy in process management, as well as the different levels at which a company's sustainability performance can be measured and the related protocols/measurement tools.
Teaching methods	Lectures, group work, case studies
Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☐ No

Available for PhD students from other courses	☒ Yes ☐ No
Prerequisites	
Examination methods	assignments or group work in class or individual work (20%) and participation and interaction in class (80
Suggested readings	
Additional information	

Course unit English denomination	I4.0: Industry 4.0 and Mass Customization
Teacher in charge	• Lara Agostini • Marta Disegna • Cipriano Forza • Laura Macchion
Teaching Hours	18
Number of ECTS credits allocated	3
Course period	• 04/02/2025 • 05/02/2025 • 17/02/2025 • 18/02/2025
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☒ Yes (70% minimum of presence) ☐ No
Course unit contents	The course provides an overview of Industry 4.0 technologies and relates them to a firm's strategic and organizational choices. In particular, the course introduces the topics of Big Data and machine learning by describing these two phenomena and their applications, as well as by examining their critical aspects. In addition, the course presents new traceability technologies, with particular attention to the blockchain technology, and analyzes the knowledge frontier in this field. Finally, the course introduces mass customization, an important business model enabled by Industry 4.0.
Learning goals	To know Industry 4.0 technologies and their strategic and organizational implications. To have all the tools needed to understand the new, complex context represented by Big data and machine learning. To know new traceability technologies and, particularly, the blockchain technology. To have an overview of mass customization, an important business model enabled by Industry 4.0.
Teaching methods	Frontal lessons, group works, case studies
Course on transversal, interdisciplinary, transdisciplinary skills	☐ Yes ☒ No
Available for PhD students from other courses	☐ Yes ☒ No

Prerequisites	-
Examination methods	Grading (passed / not passed) is based on assignments and teamwork.
Suggested readings	Please see the 'Teaching documents' section of the STEM page of the PhD Course.
Additional information	

Course unit English denomination	IPM: Intellectual Property Management
Teacher in charge	• Lara Agostini • Federico Caviggioli
Teaching Hours	12
Number of ECTS credits allocated	2
Course period	• 26/11/2024 • 27/11/2024
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☐ Yes (% minimum of presence) ☒ No
Course unit contents	In this course the following topics will be addressed: definition and examples of IP and IPRs; basic principles of patentability of inventions; the patenting process and the components of a patent; patent searches, why they are useful and how they can be carried out, with exercise; basics of patent management. Case studies will support the theory.
Learning goals	Upon completion of the course, PhD students will have acquired a theoretical basis on what Intellectual Property (IP) and Intellectual Property Rights (IPRs) are, how IPRs can be used to generate value from innovation, and how IPRs can be managed, with a particular focus on patents. The theoretical part will be useful to the subsequent practical approach aimed at showing how to collect, analyze and use IP data, as well as how to address patentability issues during the R&D process. In so doing, PhD students could gain a basic knowledge of IP and IPRs and the ability to use databases and analytical tools they could take advantage from in several contexts after their PhD program.
Teaching methods	Classroom-taught lesson, interactive teaching using patent database, laboratory, project work
Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☐ No
Available for PhD students from other courses	☒ Yes ☐ No
Prerequisites	

Examination methods	Project with eligible/ineligible outcome
Suggested readings	Slide prepared by the professor
Additional information	

Course unit English denomination	IM: Innovation management, innovation strategies, and knowledge
Teacher in charge	• Ettore Bolisani • Enrico Scarso • Anna Tiso • Chiara Verbano
Teaching Hours	6
Number of ECTS credits allocated	1
Course period	01/2025-02/2025
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☐ Yes (% minimum of presence) ☒ No
Course unit contents	In this course will be developed the following topics: Innovation as knowledge management; Strategy, organisation and innovation management; Innovation and risk management.
Learning goals	The course will provide a general outline of innovation management in theoretical and practical terms, as well as a field of research. PhD students will acquire knowledge of general concepts and definitions, main theories explaining the phenomenon of innovation, and the primary challenges for management. They will also acquire the main concepts of knowledge management, seen as a central issue of innovation management. Particularly, the hot topics for research will be discussed with students. In practical terms, students will acquire skills of: a) how to analyze a case-study related to innovation, b) how to understand the strategic issues and possible solutions implemented by companies, c) how to manage innovations and innovation-intensive projects, d) how to plan and implement a research project related to innovation and knowledge management.
Teaching methods	Integral part of this course will be the engagement of students in active learning activities, including assigned tasks, 1-minute papers, and group work.
Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☐ No
Available for PhD students from other courses	☒ Yes ☐ No Depending on the number of attending PhD students

Prerequisites	
Examination methods	Students will be assigned a case study and will be involved in a class discussion. Grading (A=above the average; B=around the average; C=below the average) is based on assigned activity (50%) and class active participation/ interaction (50%).
Suggested readings	• Renn, O. 2(008). Concepts of risk: An interdisciplinary review – Part 1: Disciplinary risk concepts. GAIA, 17 (1), 50–66. • Verbano, C., & Venturini, K. (2011). Development paths of risk management: approaches, methods and fields of application. Journal of Risk Research, 14(5), 519-550. • De Araújo Lima, P. F., Crema, M., & Verbano, C. (2020). Risk Management in SMEs: a systematic literature review and future directions. European Management Journal. • Bolisani E., Bratianu C. (2018), Emergent Knowledge Strategies (chapter 3: Knowledge as a strategic weapon, 49-72), Springer, Berlin • Scarso, E., & Bolisani, E. (2023). Knowledge management processes and innovation phases: insights from metalworking SMEs. Knowledge Management Research & Practice, 1-11.
Additional information	

Course unit English denomination	SO: Strategy and organization
Teacher in charge (if defined)	• Patrizia Garengo • Anna Nosella • Moreno Muffatto
Teaching Hours	12
Number of ECTS credits allocated	2
Course period	01/2025-02/2025
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☐ Yes (% minimum of presence) ☐ No
Course unit contents	In this course will be developed the following topics: Systems approaches to organizational design; Organizational structures; The concept of strategy; From industrial economics to strategic management and beyond: the relations between strategic management and economics; Translate strategy into action through performance measurement; The Design Problem for Entrepreneurs; The Effectuation logic of StartUp
Learning goals	The objective of this course is to provide knowledge of models, concepts, and tools necessary to address the problem of organizational design and to understand the relationships between internal organization and firm's strategic choices. It delves into the key ideas and methods of strategic and competitive analysis and the processes by which strategy is formulated and translated into action also using performance measurement. Finally, the course addresses the issues of entrepreneurship.
Teaching methods	frontal lessons
Course on transversal, interdisciplinary, transdisciplinary skills	☐ Yes ☐ No
Available for PhD students from other courses	☒ Yes ☐ No
Prerequisites	

Examination methods	Grading (A=above the average; B=around the average; C=below the average) is based on assigned homework (20%) and class participation and interaction (80%)
Suggested readings	a. Porter, M.E., 1991. Towards a Dynamic Theory of Strategy. Strategic Management Journal, 12, 95-117. b. Grant, R.M., 1991. The resource based theory of competitive advantage: implications for strategy formulation, California management review, Spring, vol. 33 Issue 3, p 114-135 c. Sarasvathy, Saras D., and Sankaran Venkataraman. "Entrepreneurship as method: Open questions for an entrepreneurial future." Entrepreneurship theory and practice 35.1 (2011): 113-135. d. Kaplan R Norton D 1992 The Balanced Scorecard - Measures That Drive Performance"; Harvard Business Review, (January-February): 71-79 e. Eccles R. G.1991 The Performance Measurement Manifesto, Harvard Business Review (January–February): 131-7 f. Bititci U., Garengo P., Dorfler V., Nudurupati S. (2012), “Performance Measurement: Where Next?”, International Journal of Management Reviews, Vol. 14, pp. 305-327
Additional information	

Course unit English denomination	IDUU: Topics in capital budgeting and project valuation
Teacher in charge	• Chiara D'Alpaos • Michele Moretto
Teaching Hours	48
Number of ECTS credits allocated	8
Course period	Second semester
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☒ Yes (70% minimum of presence) ☐ No
Course unit contents	The firm and its goal; technology and production; costs; short-run and long run equilibrium; risk, return and the opportunity cost of capital; risk and capital budgeting; the Capital Asset Pricing Model; uncertainty and consumer/investor behavior; fundamentals of the Real Options Theory; examples, valuation problems, and real-world case studies.
Learning goals	Upon completion of the course, PhD students will have acquired a critical understanding of the basics principles of capital budgeting and investment decisions under uncertainty. Furthermore, they will be able to determine the value of investment projects and value of managerial and operational flexibility to change course of action under unexpected market events.
Teaching methods	Lectures Seminars Case studies Simulations
Course on transversal, interdisciplinary, transdisciplinary skills	☐ Yes ☒ No
Available for PhD students from other courses	☐ Yes ☒ No
Prerequisites	
Examination methods	Homeworks and oral examination

Suggested readings	Course materials, personal notes, texbook reported below: Brealey R., Myers S., Allen F., Edmans A. (2023): Principles of Corporate Finance 14th Edition, McGraw-Hill, International Edition. Ross S., Westerfield R., Jordan B. (2022): Fundamentals of Corporate Finance 13th Edition, McGraw-Hill, International Edition. Dixit A., Pindyck R. (1994), Investment under Uncertainty, Princeton University Press. Trigeorgis L. (1996): Real Options: Managerial Flexibility and Strategy in Resource Allocation, MIT Press.
Additional information	

Course unit English denomination	MCDA: MCDA and Decision Support Systems
Teacher in charge (if defined)	• Chiara D'Alpaos • Rubina Canesi
Teaching Hours	48
Number of ECTS credits allocated	8
Course period	Second semester
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☒ Yes (70% minimum of presence) ☐ No
Course unit contents	The course provides the fundamentals of decision theory and a review of multicriteria decision support systems. In detail, the course will cover the following topics: deciding vs aiding to decide; decision process vs decision problem; problem structuring, problem formulation and problem statement; primitives; basic concepts on mesaurement theory (e.g., orders, measures and measurement scales, etc.), graphs, optimisation, and algorithms; preference modelling; preference aggregation; multicriteria evaluation models; final recommendations; MCDA methods and Softwares; real world case studies. The course will also provide a focus on Value Focused Thinking, and value functions and ordinal values.
Learning goals	Upon completion of the course, PhD students will have acquired a critical understanding of the basics principles of Multiple Criteria Decision Aiding and Decision Theory. Furthermore, they will be able to structure a decision problem, structure a decision process (both private and public) and support the decision-maker in the decision process, develop multicriteria decision support systems, create consensus, transorm and manage conflicts arising in decision processes.
Teaching methods	Lectures Seminars Case studies Simulations
Course on transversal, interdisciplinary, transdisciplinary skills	☐ Yes ☒ No
Available for PhD students from other courses	☐ Yes ☒ No

Prerequisites	
Examination methods	Homeworks and oral examination
Suggested readings	Course materials, personal notes, texbook reported below: Bouyssou D., Marchant T., Pirlot M., Perny, P., Tsoukiàs A., Vincke P. (2000): Evaluation and Decision Models: A Critical Perspective. Kluwer Academic Publishers, Dordrecht. Bouyssou D., Marchant T., Pirlot M., Tsoukias A., Vincke P. (2006): Evaluation and Decision Models with Multiple Criteria: Stepping Stones for the Analyst. Kluwer Academic Publishers, Dordrecht (2006) Saaty T.L. (1980): The Analytic Hierarchy Process: Planning, Priority Setting, Resource Allocation. McGraw-Hill, New York.
Additional information	

Course unit English denomination	SREM: Shaping the real estate market in the future: new trends
Teacher in charge (if defined)	Ezio Micelli, Iuav University of Venice, Italy, micelli@iuav.it Laura Gabrielli, University of Ferrara, Italy, laura.gabrielli@unife.it Rubina Canesi, University of Padova, Italy, rubina.canesi@unipd.it Aurora Ruggeri, University of Padova, Italy, aurora.ruggeri@unipd.it Adriano Bisello, EURAC Bolzano, Italy, adriano.bisello@eurac.edu
Teaching Hours	12
Number of ECTS credits allocated	2
Course period	March
Course delivery method	☐ In presence ☐ Remotely ☒ Blended
Language of instruction	English
Mandatory attendance	☒ Yes (75 % minimum of presence) ☐ No
Course unit contents	The first module offers an overview of key issues in urban transformations and their impact on real estate markets. The second module explores recent research on the increasing importance of sustainability as a market driver. The third module examines the relationship between real estate and the energy market. The fourth module addresses the latest economic trends, techniques, and methodologies in real estate valuation and market analysis. The course is structured into four modules, each lasting 3 hours, and features professors from the University of Padua, the University of Ferrara, and the EURAC Research Center in Bolzano.
Learning goals	The course aims to provide PhD students with an overview of some of the most stimulating research perspectives related to the real estate market and urban transformation. The topics covered in the course focus on the new drivers of value that shape real estate market development and their resulting economic and social implications.
Teaching methods	Lectures
Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☐ No

Available for PhD students from other courses	☒ Yes ☐ No
Prerequisites (not mandatory)	None
Examination methods (in applicable)	None
Suggested readings	Laura Gabrielli, Aurora Greta Ruggeri, Developing a model for energy retrofit in large building portfolios: Energy assessment, optimization and uncertainty, Energy and Buildings, Volume 202, 2019, 109356. Ruggeri, A.G.; Gabrielli, L.; Scarpa, M.; Marella, G. What Is the Impact of the Energy Class on Market Value Assessments of Residential Buildings? An Analysis throughout Northern Italy Based on Extensive Data Mining and Artificial Intelligence. Buildings 2023, 13, 2994 Canesi, R., & Marella, G. (2023). Urban Density and Land Leverage: Market Value Breakdown for Energy-Efficient Assets. Buildings, 14(1), 45. Canesi, R., & Gallo, B. (2023). Risk Assessment in Sustainable Infrastructure Development Projects: A Tool for Mitigating Cost Overruns. Land, 13(1), 41. Mangialardo A., Micelli E., 2017. From sources of financial value to commons: Emerging policies for enhancing public real-estate assets in Italy. Papers in Regional Sciences,1-12. Mangialardo A., Micelli E., Saccani F., 2019. Does sustainability affect real-estate market values? Empirical evidence from the office buildings market in Milan. *Sustainability*, 11(2): 12.
Additional information	