

Syllabus

Course Description

Course Title	Quantitative Methods in Management
Course Code	30190
Course Title Additional	
Scientific-Disciplinary Sector	STAT-04/A
Language	German
Degree Course	Bachelor in Tourism, Sport and Event Management
Other Degree Courses (Loaned)	
Lecturers	Dott. Benjamin Weißing, Benjamin.Weissing@unibz.it https://www.unibz.it/en/faculties/economics-management/academic-staff/person/35796
Teaching Assistant	
Semester	Second semester
Course Year/s	3
CP	6
Teaching Hours	36
Lab Hours	-
Individual Study Hours	-
Planned Office Hours	18
Contents Summary	This course introduces students to essential quantitative techniques for informed decision-making in management. It covers foundational concepts in data analysis and optimisation (including linear and integer programming), with an emphasis on practical application. Students will gain experience using software tools such as Python to model and interpret quantitative problems.
Course Topics	Decision theory and utility maximisation Linear, integer and non-linear optimisation Graph theory and networks Project planning

	Statistics and probability theory Stochastic models Regression and modelling Time series analysis
Keywords	Optimisation, statistics, mathematical modelling, decision-making
Recommended Prerequisites	A basic understanding of linear algebra and statistics.
Propaedeutic Courses	A requirement for taking the exam is the completion of any additional requirements (OFA) that may have been assigned (see the course description 'OFA Mathematics').
Teaching Format	Lectures and tutorials in person, in real time.
Mandatory Attendance	-
Specific Educational Objectives and Learning Outcomes	ILO (Intended Learning Outcomes) ILO 1 - Knowledge and understanding ILO 1.1 The concept of uncertainty and the basic elements of probability theory. ILO 1.2 The fundamentals of linear programming in economics and management. ILO 1.3 The fundamentals of order theory, in particular partial and total (linear) order relations. ILO 1.4 The effects of non-total order relations on decision models ILO 2 – Ability to apply knowledge and understanding ILO 2.1 Formally define economic problems; find (optimal) solutions based on existing theories and interpret results. ILO 2.2 Use mathematical tools to analyse static and dynamic models. ILO 2.3 Mathematical problems and models as well as ideas for solving them. ILO 2.4 Use mathematical tools to analyse static and dynamic models with multiple variables. ILO 2.5 Use algorithms/applications to solve linear programmes and their dual problems. ILO 2.6 Solve zero-sum games between two people using linear programming. ILO 2.7 Solve linear programmes for business problems: cost and revenue optimisation, logistics design and optimisation, inventory flow planning, etc.

	ILO 2.8 Use mathematical methods to model risks (uncertainties) and solve expected utility maximisation problems. ILO 2.9 Distinguishing between decision situations with complete and incomplete preferences and then using the appropriate model. ILO 3 - Making judgements ILO 3.1 Identify the most important variables to be used in decision-making in complex situations. ILO 3.2 Report analytically and critically on information, empirical values and data in order to make adequate business decisions. ILO 3.3 Select the most appropriate quantitative and qualitative analysis tools to support decision-making. ILO 3.4 Find necessary additional information in databases, legal documents and scientific sources; ILO 3.5 Find solutions by using logical conclusions and combining information and analytical tools ILO 4 - Communication skills ILO 4.1 The educational activities in the first year include courses in all three official languages of instruction, covering communication and presentation strategies and techniques, as well as the acquisition of various skills for the cultural environment related to language. The second year includes a language course in a fourth language. Case studies, projects and exercises within the courses, as well as the written exams at the end of each course, also contribute to the development of students' communication skills. ILO 4.2 The achievement of this objective is assessed by means of written exams, group work, homework assignments, the presentation of case studies and projects, and the final thesis. ILO 5 - Learning skills ILO 5.1 the ability to retrieve and utilise information from databases, research studies, legal texts, regulations and standards that are required in their professional life; ILO 5.2 the ability to analyse, critically evaluate and integrate data, information and experience; ILO 5.3 the ability to develop possible solutions to problems in economic and operational areas relating to those work contexts
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	that represent potential career prospects for graduates.
Specific Educational Objectives and Learning Outcomes (additional info.)	
Assessment	Written examination with open-ended questions on the topics covered in the lecture (ILO 1–5). The examination is the same for both attending and non-attending students.
Evaluation Criteria	The accuracy and clarity of the answers given in the exam.
Required Readings	• Canela, Miguel Ángel; Alegre, Inés; Ibarra, Alberto. <i>Quantitative Methods for Management: A Practical Approach</i>. Cham: Springer Nature Switzerland, 2019. ISBN 978-3-030-17554-2 (eBook). • Bankhofer, Udo. <i>Quantitative Business Planning: Mathematical Methods and Practical Applications</i>. Wiesbaden: Springer Fachmedien Wiesbaden, 2022. ISBN 978-3-8348-2466-0 (eBook). • Werners, Brigitte. <i>Fundamentals of Operations Research: With Exercises and Solutions</i>. 3rd edition. Berlin/Heidelberg: Springer Gabler, 2013. ISBN 978-3-642-40102-2 (eBook).
Supplementary Readings	
Further Information	
Sustainable Development Goals (SDGs)	Quality education