TUM School of Management
Technische Universität München

Module Catalog

B.Sc. Management and Data Science (Heilbronn)

TUM School of Management
Technische Universität München

www.tum.de/
www.mgt.tum.de

Module Catalog: General Information and Notes to the Reader

What is the module catalog?
One of the central components of the Bologna Process consists in the modularization of university curricula, that is, the transition of universities away from earlier seminar/lecture systems to a modular system in which thematically-related courses are bundled together into blocks, or modules.
This module catalog contains descriptions of all modules offered in the course of study.
Serving the goal of transparency in higher education, it provides students, potential students and other internal and external parties with information on the content of individual modules, the goals of academic qualification targeted in each module, as well as their qualitative and quantitative requirements.

Notes to the reader:

Updated Information
An updated module catalog reflecting the current status of module contents and requirements is published every semester. The date on which the module catalog was generated in TUMonline is printed in the footer.

Non-binding Information
Module descriptions serve to increase transparency and improve student orientation with respect to course offerings. They are not legally-binding. Individual modifications of described contents may occur in praxis.
Legally-binding information on all questions concerning the study program and examinations can be found in the subject-specific academic and examination regulations (FPSO) of individual programs, as well as in the general academic and examination regulations of TUM (APSO).

Elective modules
Please note that generally not all elective modules offered within the study program are listed in the module catalog.

Index of module handbook descriptions (SPO tree)

Alphabetical index can be found on page 73

Basics | Grundlagen

Basics in Management | Betriebswirtschaftliche Grundlagen

Module Description

MGTHN0131: Accounting | Accounting

Version of module description: Gültig ab summerterm 2023

Module Level: Bachelor	**Language:** English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 6	**Total Hours:** 180	**Self-study Hours:** 120	**Contact Hours:** 60

Number of credits may vary according to degree program. Please see Transcript of Records.

Description of Examination Method:
Grading based on a written examination of 90 minutes (100%). In the examination, participants have to demonstrate their theoretical, conceptual, and practical competences related to both managerial decision-making and communication of corpo-rate data to stakeholders outside the company. Therefore, participants have to prove that they have gained the competences stated below (see intended learning outcomes of the module) by successfully working on separate assignments in the fields of generating/collecting, aggregating/processing, and using/reporting corporate date. Moreover, participants have to demonstrate that they can interpret and critically evaluate the accounting outcomes from a business, ethical, and societal perspective. In the examination, participants are allowed to use a non-programmable calculator. The final grade can be enhanced by one third of a grade through successful mid-term assignments.

Repeat Examination:
Next semester

(Recommended) Prerequisites:
none

Content:
The module introduces to the essential techniques and requirements how companies generate/ collect, aggregate/process, and use/report corporate data for both managerial decision-making and stakeholders outside the company. The module captures established accounting techniques, legal requirements, managerial incentives, ethical considerations of accounting practices, and contemporary developments in the context of the digital transformation. The module captures the following topics:

• Corporate data and digital accounting tools
• Recording of business transactions and bookkeeping
• Cost accounting and performance analysis
• Financial reporting in line with the International Financial Reporting Standards (IFRS)
• Sustainability reporting
• Tax accounting
• Accounting incentives, accounting policies, and reporting analysis

Intended Learning Outcomes:
After successfully completing the module, participants have gained the competence to:
• systematically record business transactions,
• classify, distribute, and assign costs for operating performance analysis,
• produce and analyze financial reports in line with a major financial reporting system,
• produce and analyze sustainability reports and/or reports for tax authorities, and to
• critically discuss incentives and ethics of accounting choices.

Teaching and Learning Methods:
The module consists of a lecture with integrated exercise. In the lecture, the methods, regulations, practices, and ethics of accounting are presented and discussed with the participants. The lecture introduces to both the theoretical fundament and real-life practices of accounting and reporting. In the exercise, the content is trained with practical examples through exercise sheets and case studies.

Media:
Lecture slides, exercises, reporting standards, datasets, and financial reports available in TUM Moodle

Reading List:
• Alexander and Nobes. 2020. Financial accounting: An international introduction
• Korkmaz. 2022. Financial reporting with SAP S/4HANA
• Weetman. 2019. Financial and management accounting

Responsible for Module:

Courses (Type of course, Weekly hours per semester), Instructor:

For further information in this module, please click campus.tum.de or here.

Module Description

MGTHN0132: Business Case Study | Business Case Study

Version of module description: Gültig ab summerterm 2023

Module Level: Bachelor	**Language:** English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 60	**Contact Hours:** 30

Number of credits may vary according to degree program. Please see Transcript of Records.

Description of Examination Method:
Grading based on a group presentation of 15 minutes per participant (100%). In the presentation, participants have to demon-strate that they have achieved conceptual and practical competences related to the essential functions and units of a compa-ny. To prepare and successfully pitch their proposal for a specific business challenge, participants have to effectively work in groups of two to five students. Participants have to proof that they have gained the competences stated below (see intended learning outcomes of the module) by successfully addressing business challenges related to their presentation topic.

Repeat Examination:
End of Semester

(Recommended) Prerequisites:
none

Content:
The module introduces to the essential functions and units of a company. Further, it provides an overview of the challenges to describe, develop, and execute a business model. The module captures the fundamental steps from identifying a business opportunity, developing a business plan, and assessing and communicating the performance and sustainability-related impacts of a business.

Intended Learning Outcomes:
After successfully completing the module, participants have gained the competence to:
• identify a business opportunity and to describe a business model and basic business processes,
• develop a business model and to state a business plan, and to
• evaluate and communicate the performance and sustainability-related impacts of a business.

Teaching and Learning Methods:
The lecturer guides the participants through a series of assignments that refer to the essential steps of business. The participants work on assignments in teams of two to five students and discuss their solution proposals with the lecturer.

Media:
Assignments and datasets available in TUM Moodle

Reading List:
• Needle and Burns. 2019. Business in context: An introduction to business and its environment
• Nieto-Rodriguez. 2021. Harvard Business Review project management handbook
• A topic-specific reading list is announced at the beginning of the module.

Responsible for Module:

Courses (Type of course, Weekly hours per semester), Instructor:

For further information in this module, please click campus.tum.de or here.

Module Description

MGTHN0133: Entrepreneurship and Family Enterprise | Entrepreneurship and Family Enterprise

Version of module description: Gültig ab summerterm 2023

Module Level: Bachelor	**Language:** English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 6	**Total Hours:** 180	**Self-study Hours:** 120	**Contact Hours:** 60

Number of credits may vary according to degree program. Please see Transcript of Records.

Description of Examination Method:
Grading based on a written examination of 90 minutes (100%). The written form of the exam allows a comprehensive assessment of the competences gained by the participants and their understanding of the basic principles of entrepreneurship and family enterprise.

Repeat Examination:
Next semester

(Recommended) Prerequisites:
none

Content:
The module introduces participants to the essential principles, concepts, and methods of entrepreneurship and family enterprise. The module captures the following topics:
• Definitions, regional aspects, and special forms of entrepreneurship, including personality, creativity, idea devel-opment, cognition, opportunity recognition, decision making, affect, and moving forward from failure of entrepre-neurial individuals
• Entrepreneurial companies, including growth strategies, strategic alliances, and resources
• Family entrepreneurship as the most important innovation driver and sustainable value creator of the German economy and aspects related to founding, operating, and succeeding a family enterprise
• Process of opportunity recognition and development, including teamwork, applying concepts to real-world prob-lems, presenting insights, and discussing results
• Basic problems, arguments, and theoretical approaches of business ethics

Intended Learning Outcomes:
After successfully completing the module, participants have gained the competence to:

• explain the basic concepts of entrepreneurship, including basic definitions, psychological processes and char-acteristics of the entrepreneur, and potential development paths of young companies,
• reflect about the specific challenges and sets of family entrepreneurship,
• transfer essential knowledge and theoretical frameworks of the entrepreneurial process to real world cases, and to
• decide on ethical matters in business drawing on established ethical theories and concepts.

Teaching and Learning Methods:
The lecture provides essential knowledge on entrepreneurship and family enterprise. Discussions and active partici-pation is encouraged. The exercise allows working in smaller groups and to apply the theoretical basics to real-world problems. Additional background is provided through self-studying related scientific literature.

Media:
Lecture slides and exercises available in TUM Moodle

Reading List:
• Crane and Matten. 2003. Business ethics: A European perspective
• Hisrich, Peters, and Shepherd. 2010. Entrepreneurship
• Read, Sarasvathy, Dew, Wiltbank, and Ohlsson. 2010. Effectual e

Responsible for Module:

Courses (Type of course, Weekly hours per semester), Instructor:

For further information in this module, please click campus.tum.de or here.

Module Description

MGTHN0134: Strategic and International Management | Strategic and International Management

Version of module description: Gültig ab summerterm 2023

Module Level: Bachelor	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 6	**Total Hours:** 180	**Self-study Hours:** 120	**Contact Hours:** 60

Number of credits may vary according to degree program. Please see Transcript of Records.

Description of Examination Method:
Grading based on a written examination of 90 minutes (100%). Competences are tested on different levels. First, knowledge questions examine whether the participant can reflect about concepts (e.g., reproductions of change management models). Second, decision questions aim at classifying or interpreting the content of the module (e.g., contrasting and comparison of different strategies of multinational companies). Third, application and scenario ques-tions evaluate the ability to transfer the concepts to real-life settings (e.g., identification of solutions for short practical cases in conflict management). The final grade can be enhanced by one third of a grade through successful mid-term assignments.

Repeat Examination:
End of Semester

(Recommended) Prerequisites:
none

Content:
The lecture covers the most important theories and methods of strategic and international management. Given the ongoing globalization, companies of almost all industries and sizes have to include an international dimension in their strategic considerations. Strategic and international management competences are needed to formulate and implement competitive strategies. Therefore, the module puts special emphasis on strategic and international man-agement topics. More in detail, the module captures the following topics:
• Fundamental principles of leadership
• Fundamentals and characteristics of strategic and international management
• General conditions of strategic and international management
• Effects of individual personality characteristics and motivation in organizations

• Ethical behavior in organizations and sustainability-related issues
• Team structures and processes
• Change management in national and international organizations
• Theories and strategies of multinational enterprises
• International dimension of certain functional areas of business
• National and international organizational culture

Intended Learning Outcomes:
After successfully completing the module, participants have gained the competence to:
• apply basic concepts of strategic and international management,
• transfer essential theoretical concepts to practical problems and challenges,
• explain theories, models, and methods related to strategic and international management,
• identify and analyze challenges and problems related to strategy and management, motivation, teamwork, deci-sion making, and communication in business organizations, and to
• outline practical solutions to strategy and management challenges, conflict management, organizational change, and ethical issues by applying acquired theoretical concepts.

Teaching and Learning Methods:
The lecture introduces and discusses the most important concepts, approaches, theories, and empirical studies in the field of strategic and international management. Practical examples and case studies serve to illustrate the rele-vant theories and methods. Moreover, participants are encouraged to engage in individual exercises and/or small group assignments during the lectures in order to look deeper into the content and to support transfer of the acquired theories and methods. Further, self-studying of relevant literature is elementary part of the module. In addition, participants have the possibility to participate in psychological studies/experiments (http://motivatum.wi.tum.de/); details are announced per semester.

Media:
Lecture slides, exercises, case studies, and further documents available in TUM Moodle

Reading List:
• Cavusgil, Knight, and Riesenberger. 2008. International business: Strategy, management, and the new realities
• Hill. 2014. International business: Competing in the global market place
• Landy and Conte. 2013. Work in the 21st century
• Wood. 2016. Organisational behavior: Core concepts and applications

Responsible for Module:

Courses (Type of course, Weekly hours per semester), Instructor:

For further information in this module, please click campus.tum.de or here.

Module Description

MGTHN0135: Marketing | Marketing

Version of module description: Gültig ab summerterm 2023

Module Level: Bachelor	**Language:** English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 6	**Total Hours:** 180	**Self-study Hours:** 120	**Contact Hours:** 60

Number of credits may vary according to degree program. Please see Transcript of Records.

Description of Examination Method:
Grading based on a written examination of 90 minutes (100%). In the examination, participants are allowed to use a non-programmable calculator. The final grade can be enhanced by one third of a grade through successful mid-term assignments.

Repeat Examination:
Next semester

(Recommended) Prerequisites:
none

Content:
The module introduces the goals, tasks, and instruments of the marketing mix and introduces to fundamentals of marketing theory and practice. The module outlines why marketing plays a central role for every company and its success. The module also addresses how marketing tasks and instruments are continuously changing in the context of the digital transformation and how to consider ethical aspects when deciding on marketing activities. The module is structured as follows:
• Subject and basic concepts of marketing
• Branding
• Product policy and product innovation
• Pricing policy
• Communication policy and social media marketing
• Distribution policy

Intended Learning Outcomes:
After successfully completing the module, participants have gained the following competences:
• Ability to summarize the core elements of the marketing management process

• Ability to apply important theories, models, and strategies for building brand equity
• Ability to explain and apply goals and instruments of product policy and new product development
• Ability to explain and apply characteristics and elements of pricing policy, communication policy, and social media marketing
• Ability to design distribution systems
• Ability to apply data science and artificial intelligence to analyze consumer behavior, optimize marketing strate-gies, and enhance customer engagement
• Ability to discuss and argue for alternative ways of organizing, developing, and implementing practical marketing projects and to consider environmental and ethical effects
• Ability to reflect on and discuss central aspects in relation to the marketing research literature

Teaching and Learning Methods:
The module consists of a lecture with integrated exercises. The lecture explains the theoretical and conceptual basics of marketing. In the exercise, the gained competences are trained based on practical assignments. Participants will be asked to read the literature before the lecture and to prepare for each lecture using provided texts and slides. Partici-pants will be enabled to relate the provided materials to decision making in practice, by means of examples and cas-es. Participants are encouraged to contribute to the lecture by giving a short presentation about a current research topic.

Media:
Lecture slides, exercises, and journal articles available in TUM Moodle

Reading List:
• Blythe and Martin. 2019. Essentials of marketing
• Kotler and Keller. 2021. Marketing management
• Sudhir and Toubia. 2023. Artificial intelligence in marketing

Responsible for Module:

Courses (Type of course, Weekly hours per semester), Instructor:

For further information in this module, please click campus.tum.de or here.

Module Description

MGTHN0136: Operations and Supply Chain Management | Operations and Supply Chain Management

Version of module description: Gültig ab summerterm 2023

Module Level: Bachelor	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 6	**Total Hours:** 180	**Self-study Hours:** 120	**Contact Hours:** 60

Number of credits may vary according to degree program. Please see Transcript of Records.

Description of Examination Method:
Grading based on a written examination of 90 minutes (100%). In the examination, participants are allowed to use a non-programmable calculator. The final grade can be enhanced by one-third of a grade through successful mid-term assignments.

Repeat Examination:
Next semester

(Recommended) Prerequisites:
Competences gained in the modules Calculus for Management Studies (NEW),
Probability Theory for Management Studies (NEW),
Programming for Management Studies, and Statistics for Management Studies (NEW).

Content:
The module introduces production-related problems within a company, including process analysis, capacity man-agement, forecasting, inventory management under certainty and uncertainty, and lean management. Further, the module covers issues arising in supply chains, including supply chain management, bullwhip effect, supply chain coordination, supply chain finance, supply chain finance, and ethical considerations along the supply chain.

Intended Learning Outcomes:
After successfully completing the module, participants have gained the following competences:
• The ability to analyze planning problems and to apply solution approaches to address them effectively
• The ability to critically evaluate essential management decisions in production and logistics planning

• The ability to reflect on operations and supply chain management tasks from a business and ethical perspective
• The ability to derive and operate inventory management models and to identify efficient solutions
• The ability to analyze the impact of approaches to managing financial flows along supply chains
• The ability to assess recent developments in operations and supply chain management particularly in digital transformation and the general effort to create a sustainable global economy

Teaching and Learning Methods:
The module consists of an interactive lecture and a supplemental exercise.

Media:
Lecture slides and exercises available in TUM Moodle

Reading List:
• Cachon and Terwiesch. 2012. Matching supply with demand
• Chopra. 2019. Supply chain management: strategy, planning, and operations
• Jacobs and Chase. 2016. Operations and supply chain management: the core

Responsible for Module:

Courses (Type of course, Weekly hours per semester), Instructor:

For further information in this module, please click campus.tum.de or here.

Module Description

WIHN0219_E: Investment and Financial Management | Investment and Financial Management

Version of module description: Gültig ab winterterm 2019/20

Module Level: Bachelor	**Language:** English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 6	**Total Hours:** 180	**Self-study Hours:** 120	**Contact Hours:** 60

Number of credits may vary according to degree program. Please see Transcript of Records.

Description of Examination Method:
The grading is based on a written exam with a duration of 120 minutes. The exam covers all material from both the lecture (Corporate Finance) and the exercise (Mathematical Basics in Finance). To test whether the students acquired the theoretical basics, multiple-choice questions are asked, where they have to find the correct or incorrect statement among several alternative statements. By using a calculator and the formulary issued by the chair, the students for example have to analyze investment projects, create the optimal capital structure of projects or firms, or evaluate bonds, stocks, and equity options to demonstrate their ability to apply financial tools based on finance theory and to critically analyze different problem sets which finally results in a context-based conclusion.

Repeat Examination:
Next semester

(Recommended) Prerequisites:
None

Content:
Lecture in Corporate Finance The course will give students a broad understanding of the instruments to analyze and evaluate investment opportunities. The following topics are discussed: Financial Statement Analysis (balance sheet analysis, analysis of profit and loss account), Investment Analysis (net present value method, internal rate of return, other methods), Capital Budgeting (determination of free cash flows, choosing between alternatives), Cost of Capital (equity costs, borrowing costs, weighted average cost of capital), Capital Structure (including influencing factors and the importance of taxes).

Exercise on Mathematical Basics The module deals with the active and practical use of mathematics in finance, with particular focus on the calculation of interests and valuation of financial instruments. The following topics are covered: Interests, Annuities, Redemptions, Bonds, Stocks and Options.

Intended Learning Outcomes:
Upon completion of the lecture of this module students will be able to name and apply important measures of company performance indicators, determine an optimal capital structure for companies and value investment projects in a world without taxes (Modigliani-Miller) and with taxes. This will allow them to analyze and evaluate investment opportunities. Students will be able to understand and analyze companies' investment decision-making process and to create investment- as well as capital budget plans. Furthermore, students will be able to remember and understand key theories of corporate finance and to apply fundamental methods of corporate finance that sets the fundamental basis for the overall module. The primary learning goals of the exercise course are to 1) introduce students to the concepts in financial mathematics; 2) introduce students to financial instruments as they relate to financial mathematics; 3) introduce students to the use of mathematical models for financial products; 4) develop student abilities to create and apply mathematical models. The specific content goals are the understanding of: the concepts of bond, stocks, and financial derivative products; the time value of money; compound interest; annuities; loan concepts and amortization; mathematics of financial products.

Teaching and Learning Methods:
The weekly lecture contains presentations of theoretical basics and applied examples, supported by slides. For a better learning experience and to enhance the understanding of the course content, the lectures are supported by a) smaller exercises that are discussed in class, and b) quiz questions at the end of sessions. In addition, through real-life examples and various calculation questions that are discussed in class, the exercise on mathematical basics deepens the understanding of interest, annuities, and financial assets. Depending on availability, there might be an additional optional exercise for students which discusses the answers to various MC questions/ problem sets that are related to both the lecture and exercise content.

Media:
Exercise sheets, PowerPoint

Reading List:
Berk/DeMarzo, Corporate Finance, 3rd. Edition, Pearson.

Responsible for Module:
Müller, Sebastian; Prof. Dr. rer. pol.

Courses (Type of course, Weekly hours per semester), Instructor:
Investment and Financial Management (WIHN0219_E) BMT Heilbronn - Exercise (Übung, 2 SWS) Bax K, Breitung C

Investment and Financial Management (WIHN0219_E) BMT Heilbronn - Lecture (Vorlesung, 2 SWS)
Bax K, Breitung C
For further information in this module, please click campus.tum.de or here.

Basics in Economics | Volkswirtschaftliche Grundlagen

Module Description

MGTHN0137: Microeconomics | Microeconomics

Version of module description: Gültig ab winterterm 2023/24

Module Level: Bachelor	**Language:** English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 6	**Total Hours:** 180	**Self-study Hours:** 120	**Contact Hours:** 60

Number of credits may vary according to degree program. Please see Transcript of Records.

Description of Examination Method:
Grading based on a written examination of 90 minutes (100%). Participants have to demonstrate their ability to ade-quately apply and interpret microeconomic concepts and methods.

Repeat Examination:

(Recommended) Prerequisites:
None

Content:
The module introduces to the essential concepts of microeconomics. It deals with the behavior of individual econom-ic units (e.g., households, companies, and public institutions) and how these economic units interact to form markets and industries. Important questions discussed in the module:
• How can consumer decisions be explained and how can aggregate demand be derived from consumer choice?
• Which are the factors that determine the production decisions of companies?
• How do equilibrium prices emerge in competitive markets and how in monopoly markets?
• What is the effect of government interventions in markets?
• How does market power affect social welfare?
• Which factors lead to market failure?

Intended Learning Outcomes:
After successfully completing the module, participants have gained the competence to:
• describe economic tradeoffs, in particular of consumers and companies in scarcity situations,

• solve tradeoffs and to apply these approaches to new situations,
• explain fundamental economic mechanisms underlying specialization and trade, in particular in the context of technological progress,
• predict governmental interventions and how they affect simple competitive markets,
• explain why certain industries are prone to market concentration and how market power affects social welfare, and
• distinguish which types of goods are efficiently provided on free markets and which not.

Teaching and Learning Methods:
The module consists of an interactive lecture which introduces essential microeconomic concepts and theories. The lecture illustrates them with topical empirical examples. Classroom experiments nudge participants to put themselves into the position of specific economic players, thereby requiring them to actively reflect the concepts discussed. Online surveys at the end of each topic enable participants to select which topics they would like to intensify in sub-sequent classes. In the accompanying exercise, participants practice mathematical techniques needed to develop a deeper understanding of economic concepts by applying them to specific problems and examples. A textbook ena-bles the participants to repeat the concepts and to apply them to additional examples.

Media:
Textbook, lecture slides, exercises, classroom experiments, and online surveys available in TUM Moodle

Reading List:
Pindyck and Rubinfeld. 2013. Microeconomics.

Responsible for Module:

Courses (Type of course, Weekly hours per semester), Instructor:

For further information in this module, please click campus.tum.de or here.

Module Description

MGTHN0138: Macroeconomics | Macroeconomics

Version of module description: Gültig ab winterterm 2023/24

Module Level: Bachelor	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 6	**Total Hours:** 180	**Self-study Hours:** 120	**Contact Hours:** 60

Number of credits may vary according to degree program. Please see Transcript of Records.

Description of Examination Method:
Grading based on a written examination of 90 minutes (100%). Participants have to demonstrate their ability to apply macroeconomic theory in order to discuss and solve real-world problems of the economy as a whole.

Repeat Examination:
Next semester

(Recommended) Prerequisites:
None

Content:
The module introduces to the essential concepts of macroeconomics. Important aspects discussed in the module:
• Key institutions of capitalism as an economic system
• Technological change as a trigger for economic growth
• Price-taking and competitive markets
• Price-setting, rent-seeking, and market disequilibrium
• Market successes and failures
• Markets, contracts, and information
• Credit, banks, and money
• Economic fluctuations and unemployment
• Inflation, fiscal policy, and monetary policy
• Technological progress and living standards
• Milestones of economic history (e.g., the great depression, the golden age of capitalism, international financial crisis, and need to work on a sustainable global economy)

Intended Learning Outcomes:
After successfully completing the module, participants have gained the competence to:
• think in economic models and provide quantitative solutions when applying them to specific economic ques-tions,
• describe the drivers and distribution of the gross domestic product,
• analyze economic mechanisms underlying unemployment,
• evaluate monetary policy and inflation, and
• reflect about economic crises, sustainable development, and wealth differences among countries.

Teaching and Learning Methods:
The module consists of a lecture and an exercise. A textbook including recent economic history accomplishes the lecture and exercise which include both theoretical considerations and real-life examples. The module aims at en-couraging participants to independently think about economic problems discussed in the lecture and in the current literature.

Media:
Textbook, lecture slides, and exercises available in TUM Moodle

Reading List:
CORE Project. 2015. The economy (http://www.core-econ.org/)

Responsible for Module:

Courses (Type of course, Weekly hours per semester), Instructor:

For further information in this module, please click campus.tum.de or here.

Basics in Law | Rechtswissenschaftliche Grundlagen

Module Description

MGTHN0139: Business Law for Family Enterprises | Business Law for Family Enterprises

Version of module description: Gültig ab summerterm 2023

Module Level:	Language: English	Duration: one semester	Frequency: summer semester
Credits:* 6	Total Hours: 180	Self-study Hours: 120	Contact Hours: 60

Number of credits may vary according to degree program. Please see Transcript of Records.

Description of Examination Method:
Grading based on a written examination of 90 minutes (100%). Participants are allowed to use the applicable statutory law. The exam consists of two parts which form the overall mark together. In the first part, participants have to answer theoretical questions to demonstrate that they have understood principles of the law of contracts (incl., formation, discharge, and liability), torts, and company law under German, European, and common law. Moreover, the partici-pants have to apply their knowledge to known and fictional cases. In the second part, participants have to demon-strate the required legal analytical skills, the ability to apply knowledge to fact settings which were not discussed in the lecture, and the competence to evaluate legal consequences.

Repeat Examination:
Next semester

(Recommended) Prerequisites:
none

Content:
The module covers the legal essentials of running a business. It includes an overview of the legal framework in Ger-many and Europe, the formation and termination of contracts, selected types of contract (in particular sale of goods), torts, property law, and company law. The module covers aspects of the German legal framework as well as the common law.

Intended Learning Outcomes:
After successfully completing the module, participants have gained the competence to:

• name and understand the rules and principles of both German business law and the common law which are most important for family enterprises,
• grasp and apply the legal principles regulating business activity, in particular regarding liability under tort, con-tract and company law,
• analyze legal implications of typical business situations and to identify their options,
• consider ethical aspects when formatting and executing legal contracts, and to
• present the results of their analysis in a written analysis.

Teaching and Learning Methods:
The lecture covers the theoretical aspects of the module in a discussion with the lecturer. The exercise is focused on case studies. It provides the opportunity to work individually or in groups on known and unknown case scenarios, covering various issues of German and the common law. The purpose is to repeat and to intensify the content dis-cussed in the lecture and to review and evaluate legal issues from different areas of law in everyday situations. Partic-ipants develop the ability to present these findings in a concise and well-structured written analysis.

Media:
Lecture slides, cases, and exercises available in TUM Moodle

Reading List:
Robbers. 2017. An introduction to German law

Responsible for Module:

Courses (Type of course, Weekly hours per semester), Instructor:

For further information in this module, please click campus.tum.de or here.

Quantitative basics | Quantitative Grundlagen

Module Description

MGTHN0140: Calculus for Management Studies | Calculus for Management Studies

Version of module description: Gültig ab summerterm 2023

Module Level: Bachelor	**Language:** English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 9	**Total Hours:** 270	**Self-study Hours:** 150	**Contact Hours:** 120

Number of credits may vary according to degree program. Please see Transcript of Records.

Description of Examination Method:
Grading based on a written examination of 120 minutes (100%). In the examination, participants have to demonstrate that they have theoretical and task-solving competences related to the essential topics of calculus with a focus on aspects relevant for managerial and stakeholder decision making and data science. Therefore, they have to prove that they have gained the key competences stated below (intended learning outcomes) by successfully working on separate assignments in the fields of numbers, sequences and series, functions, differential calculus, integral calcu-lus, and differential equations. The assignments of the examination evaluate whether the participants are able to summarize the elementary notions and methods of real analysis, apply differential calculus to functions with several variables, apply integral calculus to functions, and to apply differential equations to selected cases. In the examina-tion, participants are allowed to use a non-programmable calculator.

Repeat Examination:
Next semester

(Recommended) Prerequisites:
none

Content:
The module introduces the elementary topics of calculus with a focus on topics relevant for managerial and stakeholder decision making and data science. The module captures the following topics:
• Numbers
• Sequences and series

• Important classes of functions
• Differential calculus of functions with a single variable and with several variables
• Integration calculus of functions with a single variable
• Differential equations

Intended Learning Outcomes:
After successfully completing the module, participants have gained the competence to:
• summarize the elementary notions and methods of real analysis,
• apply differential calculus to functions with several variables,
• apply integral calculus to functions with a single variable, and to
• apply differential equations to selected cases.

Teaching and Learning Methods:
The module consists of a lecture and an accompanying exercise. In the lecture, the theoretical content is presented with illustrative examples and through discussion with the participants. The lectures motivates participants to carry out their own analyses of the topics in the context of management and data science and to independently apply the gained competences for own studies. In the exercise, the content is trained with practical examples through exercise sheets with solution hints.

Media:
Lecture slides and exercises available in TUM Moodle

Reading List:
• Collins. 2006. Differential and integral equations
• Kearns. 2015. Introductory calculus
• Kolmogorov, Fomin, and Silverman. 2000. Introductory real analysis

Responsible for Module:

Courses (Type of course, Weekly hours per semester), Instructor:

For further information in this module, please click campus.tum.de or here.

Module Description

MGTHN0141: Linear Algebra for Management Studies | Linear Algebra for Management Studies

Version of module description: Gültig ab winterterm 2023/24

Module Level: Bachelor	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 6	**Total Hours:** 180	**Self-study Hours:** 120	**Contact Hours:** 60

Number of credits may vary according to degree program. Please see Transcript of Records.

Description of Examination Method:
Grading based on a written examination of 90 minutes (100%).
In the examination, participants are allowed to use a non-programmable calculator.

Repeat Examination:
End of Semester

(Recommended) Prerequisites:
Competences gained in the module Calculus for Management Studies (NEW)

Content:
The module introduces the elementary topics of linear algebra with a focus on topics relevant for managerial and stakeholder decision making and data science. The module is structured as follows:
• Complex numbers
• Vector and matrix calculus
• Systems of linear equations
• Vector spaces
• Linear combinations and bases
• Dimensions
• Linear maps and representation matrices
• Determinants
• Eigenvalues
• Scalar products
• Symmetric matrices

Intended Learning Outcomes:
The module consists of a lecture and an accompanying exercise. In the lecture, the theoretical content is presented with illustrative examples and through discussion with the participants. The lectures motivates participants to carry out their own analyses of the topics in the context of management and data science and to independently apply the gained competences for own studies. In the exercise, the content is trained with practical examples through exercise sheets with solution hints.

Teaching and Learning Methods:
After successfully completing the module, participants have gained the following competences:
• Ability to use vector and matrix calculus in the theory and to apply linear mappings
• Ability to work with determinants and eigenvalues as essential characteristics of matrices
• Ability to handle the objects of linear algebra in computational and algorithmic ways
and to apply them to problems of management and data science

Media:
Lecture slides and exercises available in TUM Moodle

Reading List:
• Boyd and Vandenberghe. 2018. Introduction to applied linear algebra
• Neri. 2020. Linear algebra for computational sciences and engineering
• Strang. 2021. Introduction to linear algebra

Responsible for Module:

Courses (Type of course, Weekly hours per semester), Instructor:

For further information in this module, please click campus.tum.de or here.

Module Description

MGTHN0142: Statistics for Management Studies | Statistics for Management Studies

Version of module description: Gültig ab winterterm 2023/24

Module Level: Bachelor	**Language:** English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 6	**Total Hours:** 180	**Self-study Hours:** 120	**Contact Hours:** 60

Number of credits may vary according to degree program. Please see Transcript of Records.

Description of Examination Method:
Grading based on a written examination of 90 minutes (100%). In the examination, participants are allowed to use a non-programmable calculator. The final grade can be enhanced by one third of a grade through successful mid-term assignments.

Repeat Examination:
Next semester

(Recommended) Prerequisites:
Competences gained in the modules Calculus for Management Studies (NEW),
Linear Algebra for Management Studies (NEW), and
Probability Theory for Management Studies (NEW)

Content:
The module introduces the conceptual underpinning, techniques, and practices of collecting, processing and using data
for business decision-making. It takes a mathematical approach to statistical inference. The course is structured as follows:
• Collecting data, creating datasets, and providing descriptive statistics
• Estimation theory, estimators for different purposes, and estimation approaches
• Statistical hypotheses testing
• Ethical issues of use and misuse of statistics

Intended Learning Outcomes:
After successfully completing the module, participants have gained the competence to:
• collect data, construct datasets, and conduct descriptive analyses with a mainstream software package,

• assess and select estimators for specific problems,
• assess statistical models for hypotheses testing,
• provide statistical inference based on datasets with a mainstream software package, and to
• critically reflect on ethical considerations of statistical analyses.

Teaching and Learning Methods:
The module consists of an interactive lecture and a supplemental exercise.
In the exercise, participants are introduced to a mainstream software package.

Media:
Lecture slides, exercises, codes, and datasets available in TUM Moodle.

Reading List:
• Diez, Çetinkaya-Rundel and Barr. 2019. Open intro statistics (https://www.openintro.org/stat/textbook.php)
• Field, Miles, and Field. 2012. Discovering statistics using R
• Greene. 2020. Econometric analysis
• Verzani. 2014. Using R for introductory statistics
• Wooldridge. 2019. Introductory econometrics: A modern approach

Responsible for Module:

Courses (Type of course, Weekly hours per semester), Instructor:

For further information in this module, please click campus.tum.de or here.

Module Description

WIHN0261: Empirical Research Methods | Empirical Research Methods [ERM]

Version of module description: Gültig ab winterterm 2019/20

Module Level: Bachelor	**Language:** German/English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 6	**Total Hours:** 180	**Self-study Hours:** 120	**Contact Hours:** 60

Number of credits may vary according to degree program. Please see Transcript of Records.

Description of Examination Method:
Exam
Grading is based on a 100% multipe-choice exam (120 minutes) with about 50-60 questions at the end of the lecture. The questions will be of different character and allow students to show that they have understood basic concepts of empirical research and that they can analyze and evaluate research design and research outputs on their empirical and conceptual accuracy

Extra credit (Mid term assignment)
Accompanying this class, you will be able to participate in two types of work to earn extra credit toward your grade. This means that completing this work is not mandatory, and full marks can be achieved without participating. The first assignment is a teamwork task and focuses on the comprehension of a chosen scientific paper of the management literature. Each student has to write a short précis (1-2 pages). The second assignment is an individual task and is about the systematic creation and processing of a data set. The workload for this task is on average about 4-6 hours. Both extra assignments help to improve class performance and can improve the final grade. Participating successfully in these assignments may improve the final grade by 0,3.

Repeat Examination:
Next semester

(Recommended) Prerequisites:
Mathematics, Statistics

Content:
Understanding how research works is essential for any student and practitioner of management. All insights we draw on—may they come from teaching, research, or actual business activities

—must meet a certain level of academic rigor to be trustworthy, and only trustworthy information should become a source of learning and a foundation of managerial decision making.

Topics:
• Research ethics
• Research question and their implications
• Paper reading, positioning, and contributions
• Correlation and causality
• Choosing a research design
• Qualitative research
• Quantitative analysys & quantitative research design
• Using existing scales and data
• Data preparation and descriptive statistics
• Advanced quants

Intended Learning Outcomes:
This module will give you an introduction to empirical research methods, including the higher aims of empirical research, the standards it needs to meet, and a set of methods that you can directly apply. By the end of the module, you will thus be able to understand the scientific process in general—and in the context of management studies in particular—and be able to evaluate whether a result or statement you are confronted with is indeed trustworthy. In doing so, not only will you become able to more critically evaluate everyday information (such as news items or pseudo-scientific studies) but you will also be prepared to participate in the scientific process yourself by improving your ability to read and understand academic work, and getting to know the steps you will need to take to make a contribution yourself, as you will be required to do in other parts of your study programs, such as in research seminars or your final thesis.

Knowledge Objectives
After the module students will be able to:
• understand the nature of the scientific process, in particular in the context of management studies
• explore different approaches toward solving (scientific) problems
• use and apply selected empirical research methods (e.g., for seminar of final theses)
• understand the structure and evaluate the quality of academic papers in management studies
• (in parts) create their own research projects

Skills Objectives
• improve diagnostic and analytical skills
• think creatively about how best to solve complex problems
• build up critical thinking as well as judgment and interpretation skills
• learn how to evaluate different strategic options
• work together efficiently and effectively in groups

Learning Objectives

At the end of this module, students will be able to demonstrate understanding, critical assessment and application of the following:
• assess (pseudo-)scientific work in general, and in particular in the context of management studies
• understand and evaluate potential approaches toward answering academic questions
• utilize tools and techniques of empirical research for their own future studies

Teaching and Learning Methods:
Lectures will be largely taught by an instructor based on a slide deck with some interactive elements.
Excercises will feature a lower number of slides and largely build on class contributions.
Exercises will actually take place in the computer pools (CIP) where you will be doing hands-on work.

In order to ensure you get most out of the module, we suggest you adhere to the principles that guide all our teaching:
Have fun
Our challenge is to make sure that you learn about the importance of empirical research methods and their relevance to and application in today's business environment. Importantly, even if you do not intend to embark on a career on an academic career, knowing about the research process and how it is executed well are essential pieces of knowledge for anyone in any industry. Thus, look at this class as an opportunity to acquire and sharpen a set of skills you will need in a couple of months/years when you might be working in a company, possible using or evaluating one of the methods explored in this very lecture!

Attend and prepare for class
While we understand that many of you will not be able to come to all sessions of this module, our hope and ambition is that you will try. Put differently, we promise to make the lectures interesting enough so that they are worth attending. Also, we will provide you with instructions as to how to prepare so that you can take the most out of each lecture – at the very least, you should have looked at these in advance! Note how your preparation is essential for the excercises and labs, the success for which depends on your contributions.

Participate Actively
Despite this being a fairly large class, we will try to conduct this module in an interactive manner. The more actively you participate during class, the better you will be prepared for the exam and the more of this module you will remember for your work life. Thus, do not try to hide in a large crowd, but summon your courage, take a chance, and rise to the challenge of participating.

Design your own learning experience
At several places throughout this module, we will give you an opportunity to participate in the design and execution of this module. For example, over the module of the term, you will have the

opportunity to contribute multiple choice question for each class, which everyone in the end can use to prepare for the exam.

Give feedback
Your feedback – in class or in private – on any aspect of this module is welcome at any time. It can help make this module an excellent experience for you and for us. We encourage you to comment on this module on Moodle and we will respond as quickly as possible. If you wish to see one of us in person, please let us know and schedule an appointment in advance so that we can prepare. Come prepared. I will also usually try to be available directly after the lecture.

Media:
Powerpoint, Board, Videos, Flipchart, Debates

Reading List:
For each session, we will upload individual preparation sheets specifying what we recommend you to have done before class. These sheets will also contain information on reading materials that elaborate on what we cover in class. Everything specified as “mandatory” by these preparation sheets is also part of the subject matter for the exam. All mandatory readings will be provided when they cannot be easily accessed through the library resources available to you. Also note how everything we do in class is relevant to the exam—importantly, this includes all questions asked in class, irrespective of whether they are answered in class.

In case you want to do preparatory or additional reading on empirical research methods, we recommend the following textbooks (on which we will also draw to some degree for the lecture):
• Singleton, R. A., Straits, B. C., & Straits M. M.1993 (or newer). Approaches to Social Research (≥2nd ed.). Oxford University Press. (Abbreviated “ASR” in preparation sheets)
• In German: Backhaus, K., Erichson, B., Plinke, W., & Weiber, R. 2010 (or newer). Multivariate Analyse¬methoden: Eine anwendungsorientierte Einführung (≥13th ed.). Berlin: Springer.
• Salkind, N.J. 2008 (or newer)). Statistics for people who think they hate statistics (≥ 3rd ed.). Thousand Oaks, CA: Sage.
• Hair, J. F., Jr., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. 2005 (or newer. Multivariate data analysis (≥6th ed.). Upper Saddle River, NJ: Prentice Hall.

Responsible for Module:
Förderer, Jens; Prof. Dr. rer. pol.

Courses (Type of course, Weekly hours per semester), Instructor:
Empirical Research Methods – BMT Heilbronn (WIHN0261) – Lecture (Vorlesung, 2 SWS)
Förderer J

Empirical Research Methods – BMT Heilbronn (WIHN0261) – Exercise (Übung, 2 SWS)
Förderer J [L], Kircher T
For further information in this module, please click campus.tum.de or here.

Technical basics (Data Science) | Technische Grundlagen (Data Science)

Module Description

MGTHN0143: Probability Theory for Management Studies | Probability Theory for Management Studies

Version of module description: Gültig ab winterterm 2023/24

Module Level: Bachelor	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 6	**Total Hours:** 180	**Self-study Hours:** 120	**Contact Hours:** 60

Number of credits may vary according to degree program. Please see Transcript of Records.

Description of Examination Method:
Grading based on a written examination of 90 minutes (100%). In three different types of assignments, the written examination evaluates whether the participants have gained the competences stated below (intended learning out-comes). More specifically, the examination contains the following three parts. First, comprehensive assignments to test whether the participants properly understand the basic concepts and theorems of the module. Participants are required to apply these basic concepts and theorems to business, economic, and ethical cases. Second, algorithmic assignments evaluate whether the participants know and are able to apply the presented probability rules to selected cases. Third, modelling assignments test the ability of the participants to use mathematical tools discussed in the module to solve specific problems. In the examination, participants are allowed to use a non-programmable calcula-tor.

Repeat Examination:
End of Semester

(Recommended) Prerequisites:
Competences gained in the module Calculus for Management Studies (NEW).

Content:
The module introduces the essential theories, techniques, and applied approaches of probability relevant for busi-ness
decision-making and data science. It takes a mathematical approach to probability theory. The course is structured as follows:
• Fundamentals of probability theory
• Random variables

• Discrete and continuous distributions
• Stochastic processes

Intended Learning Outcomes:
After successfully completing the module, participants have gained the competence to:
• apply essential concepts of discrete and continuous probability spaces and stochastic processes and, in large part, deduct such concepts themselves,
• master calculation rules for the determination and estimation of probabilities, expected values, and variances, and to
• map real business, economic, and ethical problems to abstract probability spaces.

Teaching and Learning Methods:
The module consists of a lecture and a supplemental exercise. In the lecture, the conceptual basics and elementary techniques are presented and discussed with the participants. In the exercise, the content is trained with practical examples through weekly exercise sheets and tutorials.

Media:
Lecture slides, exercises, codes, and datasets available in TUM Moodle.

Reading List:
• Diez, Çetinkaya-Rundel, and Barr. 2019. Open intro statistics (https://www.openintro.org/stat/textbook.php)
• Gordon. 1997. Discrete probability
• Motwani. 1995. Randomized algorithms

Responsible for Module:

Courses (Type of course, Weekly hours per semester), Instructor:

For further information in this module, please click campus.tum.de or here.

Module Description

MGTHN0144: Programming for Management Studies | Programming for Management Studies

Version of module description: Gültig ab winterterm 2023/24

Module Level: Bachelor	**Language:** English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 6	**Total Hours:** 180	**Self-study Hours:** 120	**Contact Hours:** 60

Number of credits may vary according to degree program. Please see Transcript of Records.

Description of Examination Method:
Grading based on exercises (100%). Participants have to deal with programming assignments provided in exercise sheets. During the semester, participants have to hand in their individual solutions at deadlines announced at the beginning of the module. To ensure that the tasks were individually fulfilled, a certain percentage of participants is randomly selected per assignment to orally explain the code handed in. The weighting of each assignment to the final grade of the module is announced at the beginning of the module.

Repeat Examination:
End of Semester

(Recommended) Prerequisites:
Competences gained in the module Informatics for Management Studies (NEW)

Content:
The module introduces to programming with a focus on topics relevant for managerial and stakeholder decision making and data science. The major programming language used in the module is Python. The module captures the following topics:
• Basic data structures
• Recursion
• Objects, classes, and methods
• Lists, queues, and trees
• Concepts of object-oriented programming
• Concurrency

Intended Learning Outcomes:
After successfully completing the module, participants have gained the competence to:

• apply fundamental concepts of informatics in a major coding language,
• object-oriented programming, in particular to generate conclusions for business problems, and to
• independently realize programs in a major coding language.

Teaching and Learning Methods:
Building on exercises related to general tasks of informatics and data science, the participants enhance their coding competences under guidance in an object-oriented programming language.

Media:
Exercises, datasets, and codes available in TUM Moodle

Reading List:
• Bakre. 2023. Python programming in management problems
• Lott and Banffy. 2022. Functional Python programming
• Python. 2023. Introductory manual to Phython (https://www.python.org/)

Responsible for Module:

Courses (Type of course, Weekly hours per semester), Instructor:
Programming for Management Studies (Seminar, 4 SWS)
Sun M, Xie J
For further information in this module, please click campus.tum.de or here.

Module Description

MGTHN0145: Quantitative Modeling | Quantitative Modeling

Version of module description: Gültig ab winterterm 2023/24

Module Level: Bachelor	**Language:** English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 6	**Total Hours:** 180	**Self-study Hours:** 120	**Contact Hours:** 60

Number of credits may vary according to degree program. Please see Transcript of Records.

Description of Examination Method:
Grading based on a written examination of 90 minutes (100%). In the examination, participants have to answer ques-tions, apply algorithms to solve problems, create mathematical models, and discuss the derived results.

Repeat Examination:
Next semester

(Recommended) Prerequisites:
Competences gained in the modules Calculus for Management Studies (NEW),
Probability Theory for Management Studies (NEW),
Programming for Management Studies, and Statistics for Management Studies (NEW).

Content:
The module introduces to theoretical and empirical approaches of decision making and to specific aspects of opera-tions research and business analytics. More specifically, the module make participants familiar with essential mathe-matical concepts to model, solve, and analyze planning and decision problems which are particularly relevant for management and data science.

Intended Learning Outcomes:
After successfully completing the module, participants have gained the competence to:
• model planning problems,
• solve business problems by using mathematical models,
• evaluate optimality of solutions identified in models,
• use methods of linear, horizontal, and dynamic programming, graph theory, network flow, and of decision theory,
• apply statistical approaches to gain insights about business transactions and companies, and
• reflect about the ethical implications of decision made based on mathematical models.

Teaching and Learning Methods:
Module consists of a lecture and an exercise. In the lecture, the content is interactively developed with the partici-pants. The focus of the lecture is on theoretical basics of decision making which are illustrated with practical exam-ples. In the exercise, the conceptual insights of the lecture are repeated based on exercise sheets.

Media:
Lecture slides and exercise sheets provided available in TUM Moodle

Reading List:
• Bradley, Hax, and Magnanti. 1977. Applied mathematical programming
• Hillier and Lieberman. 2010. Introduction to operations research

Responsible for Module:

Courses (Type of course, Weekly hours per semester), Instructor:

For further information in this module, please click campus.tum.de or here.

Project Study | Project Study

Module Description

MGTHN0147: Project Study | Project Study

Version of module description: Gültig ab winterterm 2023/24

Module Level: Bachelor	**Language:** English	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 12	**Total Hours:** 360	**Self-study Hours:** 360	**Contact Hours:** 0

Number of credits may vary according to degree program. Please see Transcript of Records.

Description of Examination Method:
The module is a practical project where a group of two to five students works on a specific practical task of a compa-ny or of an institution (e.g., public/governmental institution, research institute, and professorship). The major task(s) of the module must be related to the focus areas of the study program – management and data science – and partici-pants have to demonstrate that they have gained practical competences in these fields. The working period from the announcement of the task to the delivery data of the report should be between three and six months.

The module is examined with a group report of 2,000 to 2,500 words per participant (plus title page, tables and figures, authors' declarations, appendices, and references) and an accompanying group presentation of 10 to 15 minutes per participant. However, the project is set up in a way which enables identification and evaluation of each participant's individual contribution to the project's success.

Likewise in the report and the presentation, participants have to demonstrate that they have gained the competences stated below (intended learning outcomes). More specifically, in the report, the participants have to precisely state the economic content of the project's task(s), describe their approach/plan how to handle and work on the task(s), ex-plain the developed solution(s), and self-critically discuss both the progress of the project over the working period and the business, societal, and ethical implications of the project outcome. Participants have to prove that they have worked on these tasks in a systematical and science-based way. In the presentation, the participants have to demon-strate that they can present the essential aspects of the task(s), their solution strategy, and the outcome(s) of the project under time constraints and that they can discuss the pros and cons of their decisions along the working period of the project. Grading particularly bases on assessments whether and how effectively participants have dealt with these challenges.

Details of the grading and topic-specific expectations about the framework, content, and style of the report and the presentation are announced at the beginning of the module. Please note § 37 a of the program-specific academic and examination regulations (Fachprüfungs- und Studienordnung) which defines the basics of the examination method of this module.

Repeat Examination:
End of Semester

(Recommended) Prerequisites:
Competences gained in the mandatory management, economics, law, quantitative, and technology modules

Content:
Participants gain practical experience how to identify, handle, process, and conclude tasks in the context of man-agement and data science. The specific content of the module is determined by the nature/type, objectives, and com-plexity of the project's task(s). Moreover, participants learn how to effectively form, organize, and use a team to devel-op a solution. Generally, the module is supervised by a professor of the TUM School of Management and a compa-ny/institution representative. Participants can either apply to work on a topic proposed by the professors of the TUM School of Management or on a self-proposed topic which needs to be supported by a professorship.

Intended Learning Outcomes:
After successfully completing the module, participants have gained the competence to:
• work on a business and/or societal project in a systematic and science-based way,
• organize a group and to originally contribute to a joint group work,
• apply mainstream techniques for problem solving and effectively communicating practical solutions,
• conduct a business and/or societal project under time and resource constraints, and to
• critically reflect about the business, societal, and ethical implications of the project outcome.

Teaching and Learning Methods:
The module is organized as a practical project where a group of two to five students, generally under the joint guid-ance of a professor and a representative of a company or of an institution, works on a specific practical task of this company or of this institution. Participants acquire hands-on experience by working in student teams on real-world tasks. Through developing the report, holding the presentation, and discussing the project with the advisors, the participants learn how to identify, handle, process, and conclude tasks in the context of management and data science.

Media:
Not applicable to the module

Reading List:
• Nieto-Rodriguez. 2021. Harvard Business Review (HBR) project management handbook
• Rowe. 2015. Project Management for small projects
• A topic-specific reading list is announced at the beginning of the module

Responsible for Module:

Courses (Type of course, Weekly hours per semester), Instructor:

For further information in this module, please click campus.tum.de or here.

Communication and Intercultural Competencies | Communication and Intercultural Competencies

Module Description

MGTHN0146: Communication and Intercultural Competencies | Communication and Intercultural Competencies

Version of module description: Gültig ab summerterm 2023

Module Level: Bachelor	**Language:** English	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 6	**Total Hours:** 180	**Self-study Hours:** 120	**Contact Hours:** 60

Number of credits may vary according to degree program. Please see Transcript of Records.

Description of Examination Method:
To pass the module, participants can choose from a set of courses addressing different challenges related to com-munication and/or intercultural competences. The module is not graded (Studienleistung). For the courses included in this module, all examination modes stated in § 41.1 FPSO are possible. The course language can be English and/or German. For language courses, also other languages are possible. Detailed information about the examination mode, content, and learning outcomes of the courses available for this module are announced in the individual course descriptions (Lehrveranstaltungsbeschreibungen) provided in TUM Online at the beginning of the semester.

Repeat Examination:
Next semester

(Recommended) Prerequisites:
none

Content:
Exemplary course content related to communication and/or intercultural competencies:
• Conflict management and/or conducting negotiations
• Defining and communicating a business plan
• Discussion, debate, and speech techniques
• Foreign language
• Intercultural communication
• International business contracts and trading

• Politics/society, business/governance, and/or art/history related to intercultural questions
• Presentation and/or moderation techniques

Intended Learning Outcomes:
After successfully completing the module, participants have gained at least one of the following competencies. Competency to:
• state and discuss a communication and/or intercultural question or problem and to suggest an effective solution path,
• handle, discuss, and to solve a conflict related to communication deficits
and/or intercultural conflicts in international business and/or society,
• reflect about the impacts of politics/society and/or art/history on managerial and stakeholder decision making, or to
• communicate within an international group or within a multinational company or organization about business and/or societal issues in a foreign language.

Teaching and Learning Methods:
Teaching and learning methods depend on the course(s) included in the module.
Details are announced at the beginning of the module.

Media:
Not applicable to the module

Reading List:
A topic-specific reading list is announced at the beginning of the module.

Responsible for Module:

Courses (Type of course, Weekly hours per semester), Instructor:

For further information in this module, please click campus.tum.de or here.

Electives in Management and/or Technology | Wirtschaftswissenschaftlich-technische Wahlmodule

Electives in Management | Betriebswirtschaftliche Wahlfächer

Module Description

MGTHN0056: Seminar Innovation and Entrepreneurship: Innovation Management in Family Enterprises | Seminar Innovation and Entrepreneurship: Innovation Management in Family Enterprises

Version of module description: Gültig ab summerterm 2021

Module Level: Bachelor	**Language:** English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 6	**Total Hours:** 180	**Self-study Hours:** 120	**Contact Hours:** 60

Number of credits may vary according to degree program. Please see Transcript of Records.

Description of Examination Method:
Each seminar participant will work either in teams (preferably) or individually to develop a concrete question within a project thesis. The goal of the project work is to apply knowledge acquired in the seminar sessions to real business problems. Students can choose between developing a topic offered in the seminars, or one of their own personal choice (in agreement with the lecturer). Specifically, students should work on topics related to innovation management in family enterprises. The examination consists of two parts:

1) Project report (80 % of the overall grade). Students should demonstrate that they:
- Have gained a deeper knowledge of the topics dealt within the seminar.
- Are able to work on a project work that follows a clear logic and is based on sound literature.
- Are able to address relevant practical-oriented questions and know how to structure and write a project work.

The project report has to be written according to the general guidelines of the Global Center for Family Enterprise.

2) Presentation of the project work (20 % of the overall grade). Students should demonstrate that they:
- Have gained practical skills to present their project work to an academic audience.
- Are able to answer questions related to specific parts of their work.

The final grade will be based on the two parts (80 % project work and 20 % presentation and discussion of the project work).

Repeat Examination:
Next semester

(Recommended) Prerequisites:
Fluency in spoken and written English

Content:
Family enterprises are owned and/or managed by families which face unique challenges to achieve growth and long-term sustainability. In doing so, innovation represents a critical antecedent to firm survival. Family entrprises often have long traditions and introducing innovation is often associated with tensions. This course addresses various aspects of such innovation management processes in family enterprises- Particular attention is paid to how family enterprises innovate, types of innovation that family firms integrate as well as which benefits innovation brings to them. An examination on digitalization of family firms as a way to implement innovation is also included in this course.

Subject-specific content:
- Basic concepts in the fields of innovation management as well as family enterprises
- Innovation from a family firm perspective, including the management of innovation processes
- Types and determinants of innovation management in family enterprises
- Digital transformation in family enterprises

Methodological content (limited to an introductory level)
- Conducting scientific research
- Presenting academic pieces of work

Intended Learning Outcomes:
After completing the seminar, students are able to:
- understand the basic concepts in the fields of innovation management as well as family enterprises,
- analyze the challenges and opportunities that family enterprises face in order to promote corporate innovation,
- analyze different types of innovations and the innovation processes in family enterprises
- evaluate the meaning as well as challenges and opportunities of digital transformation in family enterprises, and
- apply the learned concepts in giving management recommendations in the context of innovation managment in family firms

In addition, students will be able to:
- understand selected research papers and evaluate their key findings,

- present and explain research studies in a comprehensible and interesting manner in front of an academic audience;
- correctly search for academic literature, apply rigorous methods for data collection and data analysis as well as know-how to structure and write a seminar thesis.

Teaching and Learning Methods:
- Through lectures, supported by Power-Point presentations, the instructors will provide the theoretical foundations of innovation management in family enterprises.
- The content is discussed in the course by openly exchanging ideas. Questions, and comments will encourage a vivid and learning atmosphere and constructive discussions.
- Every sessions contains exercises, in which the students apply their learnings in practical context (e.g. case studies with family enterprises struggling to promote innovation by Harvard Business Review).
- Guest speakers will share practical insights and will strengthen the understanding of key concepts and will therefore complement the perspectives of the seminar.
- In their seminar papers, students should investigate a selected topic within the field. For instance, they could conduct a literature review or develop or explain the innovation management approach of a specific family firm which they identify themselves.

Media:
Powerpoint, Zoom- & Breakout-Sessions, Kahoot-Sessions, Online Simulations

Reading List:

Bessant, J., & Tidd, J. (2007). Innovation and Entrepreneurship (John Wiley & Sons). Chichester, UK.
Knight, K. E. (1967). A descriptive model of the intra-firm innovation process. The Journal of Business, 40(4), 478–496.
Ritala, P., Schneider, S., & Michailova, S. (2020). Innovation management research methods: Embracing rigor and diversity. R&D Management, 50(3), 297–308. https://doi.org/10.1111/radm.12414
Berent-Braun, M. M., & Uhlaner, L. M. (2012). Family governance practices and teambuilding: Paradox of the enterprising family. Small Business Economics, 38(1), 103–119. https://doi.org/10.1007/s11187-010-9269-4
Davis, P. (1983). Realizing the potential of the family business. Organizational Dynamics, 12(1), 47–56. https://doi.org/10.1016/0090-2616(83)90026-8
Gomez-Mejia, L., Basco, R., Gonzalez, A. C., & Muller, C. G. (2020). Family business and local development in Iberoamerica. Cross Cultural & Strategic Management, 27(1), 51–66. https://doi.org/10.1108/CCSM-02-2020-223
Le Breton-Miller, I., & Miller, D. (2018). Beyond the firm: Business families as entrepreneurs. Entrepreneurship Theory and Practice, 42(4), 527–536. https://doi.org/10.1177/1042258717739004

Chrisman, J. J., Chua, J. H., Massis, A. D., Frattini, F., & Wright, M. (2015). The ability and willingness paradox in family firm innovation. Journal of Product Innovation Management, 32(3), 310–318. https://doi.org/10.1111/jpim.12207
Erdogan, I., Rondi, E., & De Massis, A. (2020). Managing the tradition and innovation paradox in family firms: a family imprinting perspective. Entrepreneurship Theory and Practice, 44(1), 20–54. https://doi.org/10.1177/1042258719839712
Miller, D., Wright, M., Breton-Miller, I. L., & Scholes, L. (2015). Resources and innovation in family businesses: The Janus-face of socioemotional preferences. California Management Review, 58(1), 20–40. https://doi.org/10.1525/cmr.2015.58.1.20
Cassia, L., De Massis, A., & Pizzurno, E. (2012). Strategic innovation and new product development in family firms: An empirically grounded theoretical framework. International Journal of Entrepreneurial Behavior & Research, 18(2), 198–232. https://doi.org/10.1108/13552551211204229
Massis, A. D., Frattini, F., Pizzurno, E., & Cassia, L. (2015). Product innovation in family versus nonfamily firms: An exploratory analysis. Journal of Small Business Management, 53(1), 1–36. https://doi.org/10.1111/jsbm.12068
De Massis, A., Frattini, F., & Lichtenthaler, U. (2013). Research on technological innovation in family firms: Present debates and future directions. Family Business Review, 26(1), 10–31. https://doi.org/10.1177/0894486512466258
Pittino, D., Visintin, F., Minichilli, A., & Compagno, C. (2021). Family involvement in governance and firm performance in industrial districts. The moderating role of the industry's technological paradigm. Entrepreneurship & Regional Development, 0(0), 1–18. https://doi.org/10.1080/08985626.2021.1925848

Responsible for Module:
Bird, Miriam; Prof. Dr.

Courses (Type of course, Weekly hours per semester), Instructor:
Seminar Innovation and Entrepreneurship (MGTHN0056): Innovation Management in Family Enterprises (BMT Heilbronn) (Seminar, 4 SWS)
Bird M, Hafner A
For further information in this module, please click campus.tum.de or here.

Module Description

MGTHN0059: Negotiation Seminar | Negotiation Seminar

Version of module description: Gültig ab summerterm 2021

Module Level: Bachelor	**Language:** English	**Duration:** one semester	**Frequency:** irregularly
Credits:* 6	**Total Hours:** 180	**Self-study Hours:** 120	**Contact Hours:** 60

Number of credits may vary according to degree program. Please see Transcript of Records.

Description of Examination Method:
The examination consists of a presentation of contents and results of the seminar paper in an oral report, including subsequent discussion (25% of the grade) of the results. Moreover, students will prepare a seminar paper. In order to support students in writing their seminar papers, there will be regular discussions about the progression of the project and next steps (seminar paper and regular discussions = 50% of the grade). On top of that, students participation in the negotiation simulations and the subsequent discussions will be evaluated (25% of the grade). The seminar paper and the corresponding presentation are a means to measure the student's ability to understand a scientific subject, to evaluate literature as well as to develop, conduct and analyze questionnaires/surveys. By doing a presentation, students show that they can summarize the subject, present it to an audience, and to conduct a discussion about the presented subject. Regular discussions with the instructor measure the student's ability to develop an idea from initial concepts to the complete picture within a given timeframe. The participation in the negotiation simulations measure the students ability to apply their theoretical knowledge in practice and to reflect on it afterwards.

Repeat Examination:
End of Semester

(Recommended) Prerequisites:
None

Content:
Basic terms of contract negotiations (like BATNA and ZOPA etc.);
Negotiation strategies and concepts (Harvard negotiation concept, win-win, win-lose etc.);
Effects of behavioural economics and negotiation tactics based on it (anchoring effect etc.);
Negotiation tactics (based on deception, pressure and defensive tactics etc.);

Communication (question techniques, answer techniques, argumentation techniques); framework conditions in negotiations (e.g. principal-agent-problems, emotions etc.)

Intended Learning Outcomes:
Students learn the economic and psychological basics of contract negotiations as well as important communication tools for negotiations. They know the Harvard negotiation concept and the most important strategies in contract negotiations. They are familiar with essential negotiation tactics. Students know how to apply these tactics or respectively how to react to these tactics if applied by the negotiation partner. They can distinguish different negotiation styles. Students have experienced the functioning of individual tactics during negotiation simulations and are able to understand the dynamics underlying a specific negotiation.
In the area of interdisciplinary competences, students strengthen their communication and argumentative skills (especially through the negotiation simulations) and their ability to work in a team (especially through group work in the context of presentations and negotiation simulations in a team).

Teaching and Learning Methods:
This module is held as an interactive seminar/lecture. Negotiation simulations and games are integrated into the course so that students learn to implement tactics and strategies. The negotiation games are designed to simulate practice. Students are encouraged to actively participate in the negotiation simulations and to get involved in the subsequent discussions. Video recordings are used to reflect on what has been experienced. Moreover, students will do research on a specific research question and write a seminar paper. In this framework, students will have to perform research of reference materials, design a questionnaire, conduct interviews with negotiators and analyse the answers. In order to support the students in their work individual appointments will be offered. Students will present their work in class.

Media:
Simulations, Exercises, Videos, Self-Tests, PPT, Whiteboard

Reading List:
Jung/Krebs, The Essentials of Contract Negotiation (2019)

Responsible for Module:
Jung, Stephanie; Dr. rer. nat.

Courses (Type of course, Weekly hours per semester), Instructor:
Negotiation Seminar (BMT Heilbronn) (MGTHN0059) (Seminar, 4 SWS)
Gelvez Alvarez L, Jung S
For further information in this module, please click campus.tum.de or here.

Module Description

MGTHN0061: Corporate Campus Challenge | Corporate Campus Challenge

Version of module description: Gültig ab summerterm 2021

Module Level: Bachelor	**Language:** English	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 6	**Total Hours:** 180	**Self-study Hours:** 150	**Contact Hours:** 30

Number of credits may vary according to degree program. Please see Transcript of Records.

Description of Examination Method:
Participants describe the business case, actual development, and the ultimate features of the created business solution/prototype in a final report (50% of the final grade) and a 20 minutes-presentation (50% of the final grade).

Repeat Examination:
End of Semester

(Recommended) Prerequisites:
Prior attendance of the following modules is recommended: Cost Accounting; Foundations of Entrepreneurial & Ethical Business; Investment & Financial Management.

Content:
The course captures a wide spectrum of practical challenges in the field of accounting, entrepreneurship, and financial management when developing a solution/prototype (e.g., modeling of business ideas and ecosystems, evaluation of customer needs, design thinking methodology, planning and reporting about milestones, rapid prototyping, and value forecasting).

Intended Learning Outcomes:
After successfully passing the module, the participants can
• apply different techniques of idea generation/identification and demands evaluation to stimulate creativity and recognize business opportunities,
• create design prototypes in order to demonstrate their proposed solutions and gather feedback,
• practically develop business plans, presentations, and video prototypes in order to communicate the novelty of the solution to stakeholders, and
• self-critically evaluate their ideas by involving peers, academics, and industry partners.

Teaching and Learning Methods:
Participants work in interdisciplinary teams to develop innovative solutions for current challenges in management, applied technologies, and societal provided by industry partners. Throughout the course, students receive coaching, individual mentoring, tutorials, and practical trainings on the use of machines and equipment (e.g., 3D printers, laser cutters, sensors, etc.).

Media:
Moodle; slides; handbook; physical events in the lab.

Reading List:
• Lewrick M, Link P, Leifer L. 2018. The design thinking playbook: Mindful digital transformation of teams, products, services, businesses, and ecosystems. John Wiley & Sons, 1. Edition
• Ridley M. 2020. How innovation works. Fourth Estate, 1. Edition
• Turrin R. 2019. Innovation lab excellence: Digital transformation from within. Authority Publishing, 1. Edition.

Responsible for Module:
Stich, Michael; Prof. Dr. rer. oec.

Courses (Type of course, Weekly hours per semester), Instructor:
Corporate Campus Challenge (MGTHN0061) (Vorlesung, 4 SWS)
Stich M
For further information in this module, please click campus.tum.de or here.

Module Description

MGTHN0065: Conducting Empirical Research in Finance | Conducting Empirical Research in Finance

Version of module description: Gültig ab winterterm 2021/22

Module Level: Bachelor	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 6	**Total Hours:** 180	**Self-study Hours:** 150	**Contact Hours:** 30

Number of credits may vary according to degree program. Please see Transcript of Records.

Description of Examination Method:
The examination comprises an individual or group-based scientific coursework (approx. 30 pages) about a research project, which is supposed to be conducted together with and under the guidance of the project supervisors.
The research projects will be fixed by the project supervisors in advance and will be in accordance with their research interests.
The coursework should comprehensively document the research project (research question, literature contribution, data elicitation and data preparation, data analysis, results and interpretation, further research questions). Additional to the written scientific report, candidates are required to showcase main findings within a 30-minute presentation and answer further questions following their presentation. In doing so, it can be assessed to what extent the students have been able to successfully conduct the research project.

To maintain the seminar atmosphere, the number of participants is generally limited. If the course is offered in a hybrid format, Munich students may also participate in the course. More information will be provided in the introductory session.
.
The written assigment will be weighted 80% and the formal presentation will make 20% of the final grade. The assessment is based on the groupwork (no indivudual assessment).

Repeat Examination:
Next semester

(Recommended) Prerequisites:
Basic knowledge in corporate finance;
basic knowledge in scientific writing;

motivation letter

Content:
The research project is in the field of empirical capital market research and will be announced at the beginning of each semester. The project will be developed and implemented in joint meetings and on the basis of independent (group-)work.

Candidates are expected to conduct a comprehensive literature review of the most important scientific articles related to the research topic in order to address the given research questions in a systematic and structured manner. It is further expected that candidates learn how to work with capital market databases and mathematical-statistical software packages and learn how to apply appropriate analysis methods.

This modules requires an intensive supervision by and collaboration with the lectures. The maximum number of course participants is therefore set to three students for each supervising research assistant. Candidates are chosen on the basis of their motivation letter.

Intended Learning Outcomes:
Upon completion of the module, students will be able to …

- conduct an independent literature analysis;
- work with some capital market databases;
- conduct basic empirical analyses for a research project alone and in a research team;
- derive answers to posed research questions in a systematic and structured manner;
- create/draft a scientific report independently

Teaching and Learning Methods:
Types of instruction comprise regular meetings with the lecturer about the current status of the research project and further steps as well as the corresponding main seminar;

Methods of teaching comprise a group-based coursework and the formal presentation of obtained results;

the learning methods of the students primarily comprise the following activities:
- Independent literature research (usage of scientific articles published in international top journals);
- Collaborative Implementation of the research project (research question, literature contribution, data elicitation and data preparation, data analysis, results and interpretation, further research questions);
- Collaborative writing of a scientifc report;

- Exercise of a deductive, logic and consistant argumenation to specifically address and answer the posed research questions;
- Preparation and executation of a final presentation;
- Ability to answer advanced thematic issues

The chosen types of instruction / methods of teaching are considered adequate to foster/extend the students' ability to conduct independent academic work and to elaborate thematically complex contents on their own. It is considered to be a good preparation for the students' master theses.

Media:
Exercise sheets, PowerPoint

Reading List:
Eine erweiterte Literaturliste zum Forschungsvorhaben wird zu Beginn des Semesters zur Verfügung gestellt. Zur Einarbeitung in die entsprechenden Softwarepakete und ökonometrischen Konzept empfiehlt sich folgende Basisliteratur:

Angrist, J., Pischke, J.-S. (2009). Mostly Harmless Econometrics: An Empiricist's Companion. Princeton University Press.

Gujarati, D., Porter, D., Gunasekar, S. (2009). Basic Econometrics. McGraw-Hill/Irwin.

Responsible for Module:
Müller, Sebastian; Prof. Dr. rer. pol.

Courses (Type of course, Weekly hours per semester), Instructor:

For further information in this module, please click campus.tum.de or here.

Module Description

MGTHN0066: Business Ethics in the Digital Age | Business Ethics in the Digital Age

Version of module description: Gültig ab winterterm 2021/22

Module Level: Bachelor	**Language:** English	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 6	**Total Hours:** 180	**Self-study Hours:** 150	**Contact Hours:** 30

Number of credits may vary according to degree program. Please see Transcript of Records.

Description of Examination Method:
The grading of the module is determined by a report on methods or practical questions discussed in the seminar (one third of the total grade), a presentation on methods or practical questions discussed in the seminar (one third of the total grade), and a report on one selected question in the context of sustainability management or sustainability reporting (one third of the total grade).

Repeat Examination:
End of Semester

(Recommended) Prerequisites:
Prior attendance of the following module is recommended: Financial Accounting.

Content:
In the first part of the module, the participants acquire conceptual and methodological baseline skills that enable them to critically discuss issues of business ethics in the digital age. In the second part of the module, these competences are applied to concrete questions and openly discussed. In the third part of the module, the participants gain competences on selected issues of sustainability management and sustainability reporting.

Intended Learning Outcomes:
After successful completion of the module, the participants have both conceptual and methodological competences to discuss ethical questions of the digital age in-depth and open-ended. In particular, planners, developers, and users of digital technologies are enabled to holistically assess the environmental and societal consequences of their decisions and working outcomes.

Teaching and Learning Methods:
The module is conducted as a seminar with lecture, exercise, presentation, and discussion elements.

Media:
Presentations, discussion documents, lecture script, exercises, and e-learning (Moodle).

Reading List:
Topic-specific literature is announced in the module.

Responsible for Module:
Stich, Michael; Prof. Dr. rer. oec.

Courses (Type of course, Weekly hours per semester), Instructor:
Business Ethics in the Digital Age (MGTHN0066) (Seminar, 4 SWS)
Stich M
For further information in this module, please click campus.tum.de or here.

Module Description

MGTHN0069: Seminar Marketing, Strategy & Leadership: Digital Marketing - Social Media Research | Seminar Marketing, Strategy & Leadership: Digital Marketing - Social Media Research

Version of module description: Gültig ab winterterm 2021/22

Module Level: Bachelor	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 6	**Total Hours:** 180	**Self-study Hours:** 120	**Contact Hours:** 60

Number of credits may vary according to degree program. Please see Transcript of Records.

Description of Examination Method:
Seminar paper with presentation:
In groups, seminar participants are required to hand in a proposal for a research project related to social media (80%, ca. 20 pages) and present their results to their peers (20%).

Repeat Examination:
Next semester

(Recommended) Prerequisites:
It is recommended but not required that participants have successfully completed the module 'Empirical Research Methods' before enrolling in this seminar.

Content:
Social media have gained strong importance in both practice and academia. Corresponding digital technologies changed the way how consumers communicate, how they gather information, and how they spend large portions of their life. In this spirit, social media also opened up new opportunities for marketers to target and reach potential customers online and they revealed important questions for policy makers regarding how to regulate newly emerging business practices. For marketing researchers, the rise of social media introduced interesting research venues related to, for instance, new forms of social influence, privacy concerns, and the effects of corresponding technologies on users' mental and physical well-being.

In this seminar, we aim at imparting:
1) broad knowledge about key areas and approaches in social media marketing for practictioners and academics, 2) the methodological know-how to analyze and steer through the increasing body of scientific literature on social media marketing and identify research gaps to be addressed in

this discipline, 3) the necessary skills to design a valuable research project and write a convincing research proposal.

Intended Learning Outcomes:
In an introductory block, seminar participants will be familiarized with key areas in social media marketing and related methodological concepts for researchers. By critically dissecting extant scientific articles and adapting their knowledge gained in the primer sessions, participants train to identify research gaps in the domain of social media marketing and formulate proposals for own research projects to contribute to the literature. Seminar participants learn both to precisely formulate their scientific work and to comprehensibly convey their ideas to the community by formally writing down their research proposal and presenting/discussing it in front of their peers.

In this seminar, we aim at imparting:
1) broad knowledge about key areas and approaches in social media marketing for practictioners and academics, 2) the methodological know-how to analyze and steer through the increasing body of scientific literature on social media marketing and identify research gaps to be addressed in this discipline, 3) the necessary skills to design a valuable research project and write a convincing research proposal.

Teaching and Learning Methods:
This seminar is intended to be structured into three main blocks during which attendance (physically if the circumstances allow it) is required: 1) semester start: introduction, 2) middle of semester: group project phase and discussion of extant literature, 3) end of semester: final presentation of research proposal (and deadline for written proposal).

Lecture-style input, interactive class discussions, group work (literature research, definition of research gap, formulation of research proposal, and presentation of proposed study to peers), remote / in class coaching.

Media:

Reading List:
Appel, G., Grewal, L., Hadi, R., & Stephen, A. T. (2020). The future of social media in marketing. Journal of the Academy of Marketing Science, 48(1), 79-95.

Additional references will be provided in the course.

Responsible for Module:
Meißner, Martin; Prof. Dr. rer. pol.

Courses (Type of course, Weekly hours per semester), Instructor:

For further information in this module, please click campus.tum.de or here.

Module Description

MGTHN0088: Seminar Management & Marketing: Foundations in Strategic Management | Seminar Management & Marketing: Foundations in Strategic Management

Version of module description: Gültig ab summerterm 2022

Module Level: Bachelor	**Language:** English	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 6	**Total Hours:** 180	**Self-study Hours:** 120	**Contact Hours:** 60

Number of credits may vary according to degree program. Please see Transcript of Records.

Description of Examination Method:
Preparation of a seminar paper and presentation: In this course, students are to independently and individually prepare a scientific seminar paper and give a presentation on it.

Repeat Examination:
Next semester

(Recommended) Prerequisites:
Required are very good English language skills, as well as an understanding of basic principles of management, innovation and organization. Recommended (but not mandatory) is the attendance of the course Empirical Research Methods in Management and Economics.

Content:
The students will be prepared for their Bachelor´s Thesis by teaching them how to search, understand and analyze academic literature. Moreover, they learn how to structure and write a paper and give presentations to an academic audience, including a discussion on it.

Intended Learning Outcomes:
After attending the course the students can define, explain and apply selected key concepts in the field of strategic management. They will be able to read and understand academic literature and write and present an academic paper. The students will improve their writing and written communication skills, strengthen their verbal skills with presentations and group discussions, and gain skills in critical thinking and interpretation. After the course the students will be able to show their understanding, critical assessment and application of how to evaluate academic literature, interact within an academic debate, put together, elaborate and defend an academic argument as well as specialist knowledge on the topic of interest, they selected.

Teaching and Learning Methods:
The first session will be lecture-like, providing introductions to the core topics and scientific writing. The other sessions will have a focus on the individual student presentations, in which each student presents their seminar paper to the class. After the presentations all students are encouraged to discuss the papers.

Media:
Powerpoint

Reading List:
The literature is selected specifically for each semester and will be distributed in class.

Responsible for Module:
Li, Chengguang; Prof. Dr. rer. pol.

Courses (Type of course, Weekly hours per semester), Instructor:
Seminar Management & Marketing: Foundations in Strategic Management (MGTHN0088) (Seminar, 4 SWS)
Li C, Pohl R
For further information in this module, please click campus.tum.de or here.

Electives in Technology (Data Science) | Technische Wahlfächer (Data Science)

Module Description

MGTHN0091: Web Scraping with Python | Web Scraping with Python [WSP]

Version of module description: Gültig ab summerterm 2022

Module Level: Bachelor	**Language:** English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 6	**Total Hours:** 180	**Self-study Hours:** 120	**Contact Hours:** 60

Number of credits may vary according to degree program. Please see Transcript of Records.

Description of Examination Method:
The examination takes the form of individual take-home programming exercises. Students submit code, documentation, and results for 2-4 exercise sheets. By completing the exercises, students show that they understand the methods of web scraping. Moreover, by completing the exercises, students show that they can apply the methods of web scraping with a programming language. In addition, by completing the exercises student document that they can create web scraping applications for real-live application scenarios.

Repeat Examination:
Next semester

(Recommended) Prerequisites:
Basic skills in Python

Content:
The increasing availability of data on the Internet provides enormous opportunities for business and research. The Internet represents a limitless source of data, including product prices and customer reviews, social media posts, movie ratings, restaurant locations, or satellite images.

Being able to obtain such data can create enormous profit potentials for companies. For example, by obtaining prices and customer reviews for competitors' products, companies can inform their own product development. Or, by monitoring hashtags and comments posted on social media platforms, companies can understand how they are perceived by the public. Overall, web data is a key input for data science or machine learning techniques.

The key challenge is that this data cannot readily be downloaded. In addition, the data is usually too large to be collected by hand.

The solution is to program a web scraper. Web scraping (sometimes also called web crawling) refers to extracting data from webpages in an automated, and large-scale way.

The overall goal of this course is to learn how to develop an own web scraper with Python. More specifically, the course will cover the following topics:
HTML and CSS structure of websites
Fundamentals of Python programming for web scraping
Costs and benefits of different approaches to collecting data from the web
Deriving requirements for a web scraper from the structure of a website
Crawling, in terms of obtaining a list of data units that are to be collected
Fetching, in terms of fetching
Parsing, in terms of processing the web data to make it useable for data analysis
Advanced scraping (e.g., using Selenium)
Methodological and ethical issues of web scraped data

Intended Learning Outcomes:
After completing the course, participants are able to …
… discuss the problem of collecting massive data from the Internet
… score different approaches for obtaining web data in terms of expected costs and benefits
… deduce requirements for a web scraper given different website structures
… construct a web scraper with the programming language Python
… explain methodological and ethical problems of data obtained via web scraping

Teaching and Learning Methods:
This module is a practical course. The course will begin with several lectures by the instructor. The lectures will provide fact-based information on the development of web scrapers as well as an introduction to programming web scrapers with Python. Students are provided with exercise sheets in order to apply the foundational information in a real-life setting. In particular, the exercise sheets ask students to develop web scrapers for different websites. Students have the option to receive individual advice. Students submit their exercise solutions and receive feedback.

Media:
Slides, whiteboard, exercise sheets

Reading List:

Mitchell, R. (2018). Web scraping with Python: Collecting more data from the modern web. O'Reilly Media, Inc.
https://www.oreilly.com/library/view/web-scraping-with/9781491985564/

Responsible for Module:
Förderer, Jens; Prof. Dr. rer. pol.

Courses (Type of course, Weekly hours per semester), Instructor:
Web Scraping with Python (BMT Heilbronn) (MGTHN0091) (Vorlesung mit integrierten Übungen, 4 SWS)
Förderer J, Gölz J
For further information in this module, please click campus.tum.de or here.

Module Description

WIHN0038: Business Analytics | Business Analytics

Version of module description: Gültig ab winterterm 2020/21

Module Level: Bachelor	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 6	**Total Hours:** 180	**Self-study Hours:** 120	**Contact Hours:** 60

Number of credits may vary according to degree program. Please see Transcript of Records.

Description of Examination Method:
The module is evaluated by assignments and projects. Each student should finish the assignments during the semester (40%) and work on a final project, which includes a written report (weighs 40%) and present in the last session of the course (weighs 20%).
In the report, the students show the understanding of the theories and methods in the fields of business analytics, and their ability to apply them to analyze real world data, and to implement the solution with a programming language (Python or R). The presentation takes 20 minutes with 20 minutes discussion.

Repeat Examination:
Next semester

(Recommended) Prerequisites:
Prerequisites: Statistics, Machine Learning, Econometrics, Management Science

Content:
The module covers different state of the art methods for business analytics. Specifically the topics cover:
1. Descriptive Analytics
Review of statistics
Introduction to R
Introduction to Python
2. Predictive Analytics
Review of machine learning (deep learning)
Review of econometrics
Regression models
Time series models
Simulation

3. Prescriptive Analytics
Review of Linear programming (Management Science)
Review of Dynamic programming (Reinforcement Learning)
Nonlinear optimization
Convex optimization
Robust optimization

Intended Learning Outcomes:
After successful completion of this module, the students will (1) understand of the key concepts and the most important issues of business analytics, (2) have a overview over diverse and innovative ways of collecting and analyzing data. Furthermore, by the software exercise, the students (3) learn to implement the data analysis approaches.

Teaching and Learning Methods:
The module consists of a series of lectures and software exercise. The lecture introduce the theory and illustrate the examples and applications in practical.
The software seminar offers instructions of Python and R, by which the business analytics methods could be implemented.
The final project for the students is aim to practice the classical algorithms learned in classes.
In the written report, the students should learn to model a real world problem and implement by programming. .

Media:
Presentation slides, software exercise, technical papers

Reading List:
Business Analytics: Data Analysis & Decision Making, 7th Edition, S.Christian Albright, Wayne L. Winston
Business Analytics, 4th Edition, Jeffrey D. Camm, James J. Cochran, Michael J Fry, Jeffrey W. Ohlmann
An Introduction to Statistical Learning with Applications in R, Gareth James, Daniela Witten, Trevor Hastie and Robert Tibshirani.

Responsible for Module:
Xie, Jingui; Ph.D.

Courses (Type of course, Weekly hours per semester), Instructor:
Business Analytics - lecture (WIHN0038) (Vorlesung, 2 SWS)
Lou Z, Xie J

Business Analytics - exercise (WIHN0038) (Übung, 2 SWS)
Xie J, Yang N
For further information in this module, please click campus.tum.de or here.

Module Description

WIHN0042: Seminar Operations & Supply Chain Management Reinforcement Learning | Seminar Operations & Supply Chain Management Reinforcement Learning

Version of module description: Gültig ab winterterm 2020/21

Module Level: Bachelor	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 6	**Total Hours:** 180	**Self-study Hours:** 135	**Contact Hours:** 45

Number of credits may vary according to degree program. Please see Transcript of Records.

Description of Examination Method:
The module is evaluated by two parts. The students should finish a written report (weighs 75%) and present in the last session of the course (weighs 25%).
In the report, the students show the understanding of the theories, methods and literature in the fields of reinforcement learning, and the application in the healthcare management area, and their ability to model real world problems in a innovative way, and find proper algorithm to find the optimal solution. It is encouraged to implement the solution with a programming language (Python). The presentation takes 20 minutes with 20 minutes discussion.

Repeat Examination:
Next semester

(Recommended) Prerequisites:
The module requires a solid knowledge in advanced mathematics. It is better to know machine learning. The experience of programming is helpful.

Content:
In this seminar, we will discuss how to apply reinforcement learning to solve business problems. In particular, we will focous in the area of healthcare management. The seminar generally has three parts. Part 1: Review the literture on reinforcement learning, review the literature on healthcare decision making. Part 2: Propose a research question, build the correct model and find the approporiate algorithm. Part 3. Present research ideas and write an academic report. Thus, this course will be especially valuable to inspire research ideas and prepare for scientific work on the subsequent bachelor thesis or master study.

Intended Learning Outcomes:
After successful completion of this module, the students will (1) have a comprehensive understanding of the scientific process; (2) get deep understanding of the concepts and algorithms of reinforcement learning, (3) have a solid overview over diverse and innovatives of the application of reinforcement learning , based on the theoretical backgrounds, the students are able to (4) think critically, and (5) solve problems efficiently and innovatively using reinforcement learning.

Teaching and Learning Methods:
Presentation, interactive teaching, e-learning, group discussions

Media:
Zoom, technical papers

Reading List:
Top 24 leading business journals - see https://jindal.utdallas.edu/the-utd-top-100-business-school-research-rankings/. In particular, we focus on the following five journals: Management Science, Operations Research, Journal of Operations Management, Manufacturing and Service Operations Management, Production and Operations Management.

Responsible for Module:
Xie, Jingui; Ph.D.

Courses (Type of course, Weekly hours per semester), Instructor:
Seminar Operations & Supply Chain Management: Reinforcement Learning (WIHN0042) (Seminar, 4 SWS)
Sun M, Xie J, Zhou H
For further information in this module, please click campus.tum.de or here.

Bachelor’s Thesis | Bachelor’s Thesis

Module Description

MGTHN0148: Bachelor's Thesis | Bachelor's Thesis

Version of module description: Gültig ab summerterm 2023

Module Level: Bachelor	**Language:** German/English	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 12	**Total Hours:** 360	**Self-study Hours:** 360	**Contact Hours:** 0

Number of credits may vary according to degree program. Please see Transcript of Records.

Description of Examination Method:
Grading based on an individual written scientific work (75%) and a defense (25%). The module is passed when both components are grades at least as “sufficient” (4.0). The written scientific report is produced over a three months period. Participants have to focus on a specific topic relevant for the study program announced by the supervising professorship. Topic-specific requirements and expectations for the written scientific report are communicated at the beginning of the module. Tools and documents allowed in the defense are announced at the beginning of the module.

Repeat Examination:
Next semester

(Recommended) Prerequisites:
Competences gained in the mandatory modules of the Bachelor in Management and Data Science

Content:
The Bachelor's Thesis focuses on a research topic in business administration and economics, usually at the interface to engineering and natural sciences. The Thesis is always supervised by a professor of TUM School of Management, often in cooperation with an organization of industry or research. The topic of the Thesis is created so that it can be treated extensively within three months.

Intended Learning Outcomes:
At the end of the module "Bachelor's Thesis", students are able to handle and develop a project in an autonomic, systematic and scientific way Therefore, the students deploy scientific knowledge and methodical skills to the specific subject. They script the state-of-the-art knowledge, based on

research, and classify the findings within the scientific and/or practical discussion. The students are able to cope with new and complex subjects in an autonomous way.

Teaching and Learning Methods:
The creation of the thesis encourages the students to deal soundly with a scientific subject. Therefore, they apply the knowledge and methodical skills acquired during the studies, and create an elaborated scientific documentation within the set time frame.

Media:
Not applicable to the module

Reading List:
A topic-specific reading list is announced at the beginning of the module.

Responsible for Module:

Courses (Type of course, Weekly hours per semester), Instructor:

For further information in this module, please click campus.tum.de or here.

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