CONSTRUCTOR UNIVERSITY

Study Program Handbook

Global Economics and Management

Bachelor of Arts

Subject-specific Examination Regulations for Global Economics and Management (Fachspezifische Prüfungsordnung)

The subject-specific examination regulations for Global Economics and Management are defined by this program handbook and are valid only in combination with the General Examination Regulations for Undergraduate degree programs (General Examination Regulations = Rahmenprüfungsordnung). This handbook also contains the program-specific Study and Examination Plan (see Chapter 6).

Upon graduation, students in this program will receive a Bachelor of Arts (BA) degree with a scope of 180 ECTS (for specifics see Chapter 4 of this handbook).

Current version	**Valid as of**	**Decision**	**Details**
Fall 2024- V1.1		Mar 14, 2025	<u>Nonsubstantial change (GEM-2025-2):</u> Replacement of Development Economics with 'Public Economics and Policy' Addition of Core Module 'Investment and Capital Markets' & Specialization module 'Current Topics in Business and Economics' Assessment change in 'Advanced Econometrics' <u>Nonsubstantial change (IBA-2025-9):</u> Assessment change in 'Managerial Accounting' Changes to module description, recommendations and literature of 'Marketing'
Fall 2024 – V1	Sept 1, 2024		
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1 Program Overview

1.1 Concept

1.1.1 The Constructor University Educational Concept

Constructor University aims to educate students for both an academic and a professional career by emphasizing three core objectives: academic excellence, personal development, and employability to succeed in the working world. Constructor University offers an excellent research driven education experience across disciplines to prepare students for graduate education as well as career success by combining disciplinary depth and interdisciplinary breadth with supplemental skills education and extra-curricular elements. Through a multi-disciplinary, holistic approach and exposure to cutting-edge technologies and challenges, Constructor University develops and enables the academic excellence, intellectual competences, societal engagement, professional and scientific skills of tomorrows leaders for a sustainable and peaceful future.

In this context, it is Constructor University's aim to educate talented young people from all over the world, regardless of nationality, religion, and material circumstances, to become citizens of the world who are able to take responsible roles for the democratic, peaceful, and sustainable development of the societies in which they live. This is achieved through a high-quality teaching as well as manageable study loads and supportive study conditions. Study programs and related study abroad programs convey academic knowledge as well as the ability to interact positively with other individuals and groups in culturally diverse environments. The ability to succeed in the working world is a core objective for all study programs at Constructor University, both in terms of actual disciplinary subject matter and also to the social skills and intercultural competence. Study-program-specific modules and additional specializations provide the necessary depth, interdisciplinary offerings and the minor option provide breadth while the university-wide general foundation and methods modules, optional German language and Humanity modules, and an extended internship period strengthen the employability of students. The concept of living and learning together on an international campus with many cultural and social activities supplements students' education. In addition, Constructor University offers professional advising and counseling.

Constructor University's educational concept is highly regarded both nationally and internationally. While the university has consistently achieved top marks over the last decade in Germany's most comprehensive and detailed university ranking by the Center for Higher Education (CHE), it has also been listed by one of the most widely observed university rankings, the Times Higher Education (THE) ranking. More details on the current ranking positions can be found at https://constructor.university/more/about-us.

1.1.2 Program Concept

The Global Economics and Management (GEM) study program is among the Constructor University's longest standing programs. In line with the university's chief mission, the GEM program delivers high quality research and teaching to train students from all over the world in the economic analysis and managerial skills they need to understand and address complex global problems affecting markets, organizations and society. Students explore questions of utmost importance to contemporary economies and public affairs, such as: How do economic agents contribute to and how are they impacted by global economic dynamics such as trade, growth and inequality? How do governments

respond to the challenges of climate change and environmental sustainability? And how do economic agents bring about and purposefully manage institutional change?

The purpose of the GEM study program is to enable graduates to take an active role in shaping future economic and social processes. This program therefore combines the disciplines of Economics and Management Studies. Economics studies examine how individuals, households, firms and governments make decisions regarding the production, distribution, acquisition and allocation of scarce resources. The Management discipline studies the design and administration of firms, nonprofits and public organizations, as well as the consequences of managerial actions and decisions on individuals, society and economies. Students discover the mechanisms connecting globalized economic dynamics, business interests, and managerial action to prepare them for future responsibilities in an increasingly interconnected world, shedding light on issues such as inequalities, economic development, global trade, and climate change. This scientific education offers a solid foundation in quantitative techniques and introduces students to qualitative research methods as well. Their work in seminars is designed to develop skills in professional communication, writing, and problem-solving and to help students develop their academic and professional profiles.

Our learning and teaching methods rely on a mix of lectures, seminars and tutorials. The lectures and seminars provide introductions to fundamental knowledge in general fields of economics and management. We encourage interactivity during these sessions through a variety of inputs, including group discussions of academic papers, case studies using the Harvard case method, exercises, role-playing, and workshop-like sessions on writing and presenting skills. Accompanying tutorials help the students to prepare and review the material and to prepare for the examinations.

1.2 Program-specific Educational Aims

1.3 Specific Advantages of the Global Economics and Management Program at Constructor University

Constructor University students can choose to specialize in GEM or to combine their GEM studies with a minor from another discipline at Constructor University, such as International Relations: Politics and History, Integrated Social Sciences, Psychology, Earth and Environmental Sciences, Industrial Engineering and Management, or Computer Science. Upon completing the program, typical GEM graduates have acquired knowledge in their academic fields of choice, and developed scientific rigor and ethics, reflexivity, and the capacity to integrate multiple disciplines, points of view and opinions into their decisions. These qualities qualify them for graduate studies in the fields of economics, development studies, management, and business administration, as well as for positions as consultants, analysts and roles in business development more generally.

Economics and management are two disciplines that complement each other. In most professions, both perspectives are needed. Managers need to understand the greater economic environment in which they operate; and national and international governmental institutions need to understand how private organizations and businesses are run. As Constructor University's campus includes students from more than 100 countries on the Constructor University campus, GEM graduates are in the best environment to discuss and understand why the prior conditions and outcomes of economic and managerial decisions can be so different in different parts of the world.

Our first year courses include introductory modules on economics, international business, and quantitative skills and methods. In the second year, the curriculum explores global policy questions,

such as economic development, environmental challenges, the globalization of economic agents and institutions, and the management of increasingly diversified organizations. In the third year, students delve deeper into selected, contemporary topics and techniques of utmost importance for their career and future studies, including modules on information economics, advanced econometrics, and public and non-profit management, as well as modules from other programs. Our students thus come to appreciate that political, social, cultural, and technological framework conditions have a decisive influence on economic outcomes on all continents.

1.3.1 Qualification Aims

The GEM study program awards a Bachelor of Arts degree. This program is interdisciplinary and does not compare to a classical economics degree. The GEM study program seeks to explain how economies and economic agents operate and coordinate their interactions, both economically and managerially. The program is oriented more toward economic and management theories and policy discussions than towards mathematics. The scientific education provided by the program includes both quantitative and qualitative approaches, with a focus on quantitative techniques (e.g. statistics, R, and, econometrics).

1.3.2 Intended Learning Outcomes

By the end of the program, students will be able to:

1. distinguish among the interests and activities of private business organizations, governments, international organizations, civil society associations and non-profit organizations;
2. evaluate economic, political, and societal problems using economics and management theories and scientific reasoning-specifically: statistical, mathematical, case-study based, econometrical, and qualitative reasoning;
3. apply economic theories and analyses to issues of wide public and professional concern;
4. apply business and management theories to basic dimensions of the conduct of business across sectors;
5. articulate the relationships between business decisions, economic policies, and national and international public affairs;
6. identify the appropriate approach to deal with business and institutional actors depending on their interests;
7. identify the differences among national and regional perceptions of and approaches to economic reasoning;
8. apply the social and intercultural competencies needed to take on responsibility in diverse, international teams with competing and overlapping interests;
9. outline and discuss their arguments and those of others using a combination of economic, organizational and institutional analyses;
10. assess and interpret relevant information for policy analyses in selected micro- and macroeconomic topics;
11. describe the state of published knowledge in economics and management;
12. explain real-world situations and problems of organizations and industries combining key contemporary theories of economics and management with methods and insights of other disciplines
13. communicate economic and managerial analysis and solutions appropriately to their audience;
14. investigate economic and managerial problems and undertake scientific or applied research projects;

15. draw scientifically founded conclusions that consider social, professional, scientific, and ethical insights;
16. engage ethically with academic, professional and wider communities and actively contribute to a sustainable future, reflecting and respecting different views.

1.4 Career Options and Support

With its combination of economics and management, the program gives students solid labor-market qualifications for junior management positions with responsibilities in function-specific tasks and projects within areas of employment such as business development, sales and marketing, human resource management, organizational development, strategy and technology consulting, as well as for analyst positions in these fields or in specific industries. Our graduates have obtained internships and positions in a variety of institutions, including the World Bank, MIT, and the Harvard Kennedy School, and at companies such as Volkswagen, Deutsche Bank, Ernst & Young, Deutsche Börse, KPMG, Henkel, Daimler, LinkedIn, Microsoft, Uber, Vodafone, Zalando and Deloitte, as well as in various startups. A degree in GEM will also equip students with transferable skills that will allow them to move into other areas of employment with a variety of employers such as national and multi-national companies, governmental agencies, NGOs, international organizations, think tanks, special interest groups, and research institutions.

The GEM program has taken graduates onto a rich diversity of career paths. The academic rigor of the program prepares students for highly ranked graduate programs. GEM alumni have a strong track record with leading institutions around the world, such as the universities of Oxford, Cambridge, Edinburgh, St Gallen, Bonn, Munich (TUM) and Mannheim and graduate schools such as ESADE, Copenhagen Business School, BI Norwegian Business School, Hertie School of Governance, London Business School, and the London School of Economics.

Due to their experience of working and living with students from more than 100 countries on Constructor University's international campus, GEM graduates are well prepared to take on responsibility in intercultural work environments.

The Career Service Center (CSC) helps students in their career development. It provides students with high-quality training and coaching in CV creation, cover letter formulation, interview preparation, effective presenting, business etiquette, and employer research as well as in many other aspects, thus helping students identify and follow up on rewarding careers after graduating from Constructor University. Furthermore, the Alumni Office helps students establish a long-lasting and worldwide network which provides support when exploring job options in academia, industry, and elsewhere.

1.5 Admission Requirements

Admission to Constructor University is selective and based on a candidate's school and/or university achievements, recommendations, self-presentation, and performance on standardized tests. Students admitted to Constructor University demonstrate exceptional academic achievements, intellectual creativity, and the desire and motivation to make a difference in the world.

The following documents need to be submitted with the application:

- Recommendation Letter (optional)
- Official or certified copies of high school/university transcripts
- Educational History Form
- Standardized test results (SAT/ACT) if applicable

- Motivation statement
- ZeeMee electronic resume (optional)
- Language proficiency test results (TOEFL Score: 90, IELTS: Level 6.5 or equivalent)

Formal admission requirements are subject to higher education law and are outlined in the Admission and Enrollment Policy of Constructor University.

For more detailed information about the admission visit: https://constructor.university/admission-aid/application-information-undergraduate

1.6 More Information and contacts

For more information on the study program please contact the Study Program Coordinator:

Prof. Dr. Andreas Seebeck

Professor of Global Economics and Management

Email: aseebeck@constructor.university

or visit our program website: https://constructor.university/programs/undergraduate-education/global-economics-management

For more information on Student Services please visit: https://constructor.university/student-life/student-services

2 The Curricular Structure

2.1 General

The curricular structure provides multiple elements for enhancing employability, interdisciplinarity, and internationality. The unique CONSTRUCTOR Track, offered across all undergraduate study programs, provides comprehensive tailor-made modules designed to achieve and foster career competency. Additionally, a mandatory internship of at least two months after the second year of study and the possibility to study abroad for one semester give students the opportunity to gain insight into the professional world, apply their intercultural competences and reflect on their roles and ambitions for employment and in a globalized society.

All undergraduate programs at Constructor University are based on a coherently modularized structure, which provides students with an extensive and flexible choice of study plans to meet the educational aims of their major as well as minor study interests and complete their studies within the regular period.

The framework policies and procedures regulating undergraduate study programs at Constructor University can be found on the website (https://constructor.university/student-life/student-services/university-policies).

2.2 The Constructor University 4C Model

Constructor University offers study programs that comply with the regulations of the European Higher Education Area. All study programs are structured according to the European Credit Transfer System (ECTS), which facilitates credit transfer between academic institutions. The three-year undergraduate programs involve six semesters of study with a total of 180 ECTS credit points (CP). The undergraduate curricular structure follows an innovative and student-centered modularization scheme, the 4C Model. It groups the disciplinary content of the study program in three overarching themes, CHOICE-CORE-CAREER according to the year of study, while the university-wide CONSTRUCTOR Track is dedicated to multidisciplinary content dedicated to methods as well as intellectual skills and is integrated across all three years of study. The default module size is 5 CP, with smaller 2.5 CP modules being possible as justified exceptions, e.g., if the learning goals are more suitable for 2.5 CP and the overall student workload is balanced.

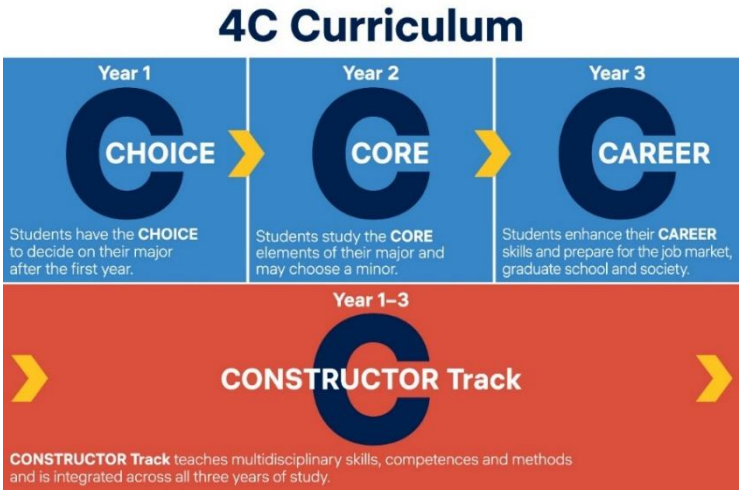

Figure 1: The Constructor University 4C-Model

2.2.1 Year 1 – CHOICE

The first study year is characterized by a university-specific offering of disciplinary education that builds on and expands upon the students' entrance qualifications. Students select introductory modules for a total of 45 CP from the CHOICE area of a variety of study programs, of which 15-45 CP will belong to their intended major. A unique feature of our curriculum structure allows students to select their major freely upon entering Constructor University. The team of Academic Advising Services offers curriculum counseling to all Bachelor students independently of their major, while Academic Advisors, in their capacity as contact persons from the faculty, support students individually in deciding on their major study program.

To pursue Global Economics and Management as a major, the following CHOICE modules at least 30 CP need to be taken as mandatory (m) modules:

- CHOICE Module: Microeconomics (m, 7.5 CP)
- CHOICE Module: Macroeconomics (m, 7.5 CP)
- CHOICE Module: Introduction to International Business (m, 7.5 CP)
- CHOICE Module: Introduction to Finance and Accounting (m, 7.5 CP)

These lecture-tutorial combinations provide the students with a general overview about basic concepts and theories in economics and business. In the associated tutorials, students have the opportunity to integrate the material taught in the lectures through discussions of related concepts, policy problems, or scientific studies, and through cases and exercises.

The remaining CHOICE modules (15 CP) can be selected in the first year of studies according to interest and/or with the aim to allow a change of major until the beginning of the second year, when the major choice becomes fixed.

Students can still change to another major at the beginning of their second year of studies, provided they have taken the corresponding mandatory CHOICE modules in their first year of studies. All students must participate in an entry advising session with their Academic Advisors to learn about their major change options and consult their Academic Advisor prior to changing their major.

Students that would like to retain a further option are strongly recommended to additionally register for the CHOICE modules of one of the following study programs in their first year:

- International Business Administration (IBA)
  CHOICE Module: Microeconomics (m, 7.5 CP)
  CHOICE Module: Macroeconomics (m, 7.5 CP)
  CHOICE Module: Introduction to International Business (m, 7.5 CP)
  CHOICE Module: Introduction to Finance and Accounting (m, 7.5 CP)

- Earth Sciences and Sustainable Management of Environmental Resources (ESSMER)
  CHOICE Module: Fundamentals of Earth Sciences (m, 7.5 CP)
  CHOICE Module: Environmental Systems and Global Change (m, 7.5 CP)
  CHOICE Module: Microeconomics (m, 7.5 CP)
  CHOICE Module: Macroeconomics (m, 7.5 CP)

- Industrial Engineering and Management (IEM)
  CHOICE Module: General Industrial Engineering (m, 7.5 CP)
  CHOICE Module: General Logistics (m, 7.5 CP)

CHOICE Module: Introduction to International Business (m, 7.5 CP)
CHOICE Module: Introduction to Finance and Accounting (m, 7.5 CP)

- Integrated Social and Cognitive Psychology (ISCP)
  CHOICE Module: Essentials of Cognitive Psychology (7.5 CP)
  CHOICE Module: Essentials of Social Psychology (7.5 CP)

- International Relations: Politics and History (IRPH)
  CHOICE Module: Introduction to International Relations Theory (7.5 CP)
  CHOICE Module: Introduction to Modern European History (7.5 CP)

2.2.2 Year 2 – CORE

In their second year, students take a total of 45 CP from a selection of in-depth, discipline-specific CORE modules. Building on the introductory CHOICE modules and applying the methods and skills acquired so far (see 2.3.1), these modules aim to expand the students' critical understanding of the key theories, principles, and methods in their major for the current state of knowledge and best practices.

To pursue Global Economics and Management as a major, at least 30 CP from the following mandatory elective (me) CORE modules need to be taken:

- CORE Module: Public Economics and Policy (me, 7.5 CP)
- CORE Module: Environmental and Resource Economics (me, 7.5 CP)
- CORE Module: Comparing Economic Systems (me, 7.5 CP)
- CORE Module: International Economics (me, 7.5 CP)
- CORE Module: Marketing (me, 7.5 CP)
- CORE Module: Investments and Capital Markets (me, 7.5 CP)

These modules offer a combination of seminar and tutorial. Each module builds on the contents of the first-year modules and delve into its respective topic through a mix of lecture inputs, paper discussions, and interactive group work. In the second year of studies, examinations are increasingly oriented towards essays and presentations.

The remaining 15 CP can be selected according to interest and/or with the aim of pursuing a minor in a second field of studies, or students complement their studies by taking all of the above listed mandatory elective CORE modules.

GEM students can take CORE modules (or more advanced Specialization modules) from a second discipline, which allows them to incorporate a minor study track into their undergraduate education, within the 180 CP required for a bachelor's degree. The educational aims of a minor are to broaden the students' knowledge and skills, support the critical reflection of statements in complex contexts, foster an interdisciplinary approach to problem-solving, and to develop an individual academic and professional profile in line with students' strengths and interests. This extra qualification will be highlighted in the transcript.

The Academic Advising Coordinator, Academic Advisor, and the Study Program Chair of the minor study program support students in the realization of their minor selection; the consultation with the Academic Advisor is mandatory when choosing a minor.

As a rule, this requires GEM students to:

- select two CHOICE modules (15 CP credits) from the desired minor program in the first year and
- substitute two of the mandatory elective GEM CORE modules (15 CP credits) in the second year with the default minor CORE modules of the minor study program.

The requirements for each specific minor are described in the handbook of the study program offering the minor (see Chapter 3.2) and are marked in the respective Study and Examination Plans. For an overview of accessible minors, please check the Major/Minor Combination Matrix which is published at the beginning of each academic year.

Note: Students pursuing GEM as a major cannot pursue International Business Administration (IBA) as a minor; students must declare whether they are following either GEM or IBA as a major at the beginning of the second year of studies.

2.2.3 Year 3 – CAREER

During their third year, students prepare for and make decisions about their career path after graduation. To explore available choices and to gain professional experience, students undertake a mandatory summer internship. The third year of studies allows GEM students to take Specialization modules within their discipline, but also focuses on the responsibility of students beyond their discipline (see CONSTRUCTOR Track).

The fifth semester also opens a mobility window for a diverse range of study abroad options. Finally, the sixth semester is dedicated to fostering the students' research experience by involving them in an extended Bachelor thesis project.

2.2.3.1 Internship / Start-up and Career Skills Module

As a core element of Constructor University's employability approach students are required to engage in a mandatory two-month internship of 15 CP that will usually be completed during the summer between the second and third years of study. This gives students the opportunity to gain first-hand practical experience in a professional environment, apply their knowledge and understanding in a professional context, reflect on the relevance of their major to employment and society, reflect on their own role in employment and society, and find a professional orientation. The internship can also establish valuable contacts for the students' Bachelor's thesis project, for the selection of a Master program graduate school or further employment after graduation. This module is complemented by career advising and several career skills workshops throughout all six semesters that prepare students for the transition from student life to professional life. As an alternative to the full-time internship, students interested in setting up their own company can apply for a start-up option to focus on developing of their business plans.

For further information, please contact the Career Service Center (CSC) (https://constructor.university/student-life/career-services).

2.2.3.2 Specialization Modules

In the third year of their studies, students take 15 CP from major-specific or major-related, advanced Specialization Modules to consolidate their knowledge and to be exposed to state-of-the-art research in the areas of their interest. This curricular component is offered as a portfolio of modules, from which

students can make free selections during their fifth and sixth semester. The default Specialization Module size is 5 CP, with smaller 2.5 CP modules being possible as justified exceptions.

To pursue Global Economics and Management as a major, at least 15 CP from the following mandatory elective Specialization Modules need to be taken:

- GEM Specialization: Advanced Econometrics (me, 5 CP)
- GEM Specialization: Managing Public and Nonprofit Organizations (me, 5 CP)
- GEM Specialization: Information Economics (me, 5 CP)
- IBA Specialization: Lean Management (me, 5 CP)
- IBA Specialization: Managerial Accounting (me, 5 CP)
- IBA Specialization: Contemporary Topics in Marketing (me, 5 CP)
- IBA Specialization: Blockchain Technology and Applications (me, 5 CP)
- MDDA Specialization: Financial Data Analytics (me, 5 CP)

2.2.3.3 Study Abroad

Students have the opportunity to study abroad for a semester to extend their knowledge and abilities, broaden their horizons and reflect on their values and behavior in a different context as well as on their role in a global society. For a semester abroad (usually the 5th semester), modules related to the major with a workload equivalent to 22.5 CP must be completed. Modules recognized as study abroad CP need to be pre-approved according to Constructor University study abroad procedures. Several exchange programs allow students to directly enroll at prestigious partner institutions worldwide. Constructor University's participation in Erasmus+, the European Union's exchange program, provides an exchange semester at a number of European universities that include Erasmus study abroad funding.

For further information, please contact the International Office (https://constructor.university/student-life/study-abroad/international-office).

GEM students that wish to pursue a study abroad in their fifth semester are required to select their modules at the study abroad partners such that they can be used to substitute between 10-15 CP of major-specific Specialization modules and between 5-15 CP of modules equivalent to the non-disciplinary New Skills modules (see CONSTRUCTOR Track). In their sixth semester, according to the study plan, returning study-abroad students complete the Bachelor Thesis/Seminar module (see next section), they take any missing Specialization modules to reach the required 15 CP in this area, and they take any missing New Skills modules to reach the required 15 CP in this area.

2.2.3.4 Bachelor Thesis/Seminar Module

This module is a mandatory graduation requirement for all undergraduate students. It consists of two module components in the major study program guided by a Constructor faculty member: the Bachelor Thesis (12 CP) and a Seminar (3 CP). The title of the thesis will appear on the students' transcripts.

Within this module, students apply the knowledge skills, and methods they have acquired in their major discipline to become acquainted with actual research topics, ranging from the identification of suitable (short-term) research projects, preparatory literature searches, the realization of discipline-specific research, and the documentation, discussion, and interpretation of the results.

With their Bachelor Thesis students demonstrate mastery of the contents and methods of their major-specific research field. Furthermore, students show the ability to analyze and solve a well-defined problem with scientific approaches, a critical reflection of the status quo in scientific literature, and the original development of their own ideas. With the permission of a Constructor Faculty Supervisor, the Bachelor Thesis can also have an interdisciplinary nature. In the seminar, students present and discuss their theses in a course environment and reflect on their theoretical or experimental approach and conduct. They learn to present their chosen research topics concisely and comprehensively in front of an audience and to explain their methods, solutions, and results to both specialists and non-specialists.

2.3 The CONSTRUCTOR Track

The CONSTRUCTOR Track is another important feature of Constructor University's educational model. The Constructor Track runs orthogonal to the disciplinary CHOICE, CORE, and CAREER modules across all study years and is an integral part of all undergraduate study programs. It provides an intellectual tool kit for lifelong learning and encourages the use of diverse methodologies to approach cross-disciplinary problems. The CONSTRUCTOR track contains Methods, New Skills and German Language and Humanities modules.

2.3.1 Methods Modules

Methods such as mathematics, statistics, programming, data handling, presentation skills, academic writing, and scientific and experimental skills are offered to all students as part of the Methods and Skills area in their curriculum. The modules that are specifically assigned to each study programs equip students with transferable academic skills. They convey and practice specific methods that are indispensable for each students' chosen study program. Students are required to take 20 CP in the Methods and Skills area. The size of all Methods and Skills modules is 5 CP.

To pursue GEM as a major, the following Methods modules (20 CP) need to be taken as mandatory modules:

- Methods Module: Applied Calculus (m, 5 CP)
- Methods Module: Applied Statistics with R (m, 5 CP)
- Methods Module: Qualitative Research Methods (m, 5 CP)
- Methods Module: Econometrics (m, 5 CP)

2.3.2 New Skills Modules

This part of the curriculum constitutes an intellectual and conceptual tool kit that cultivates the capacity for a particular set of intellectual dispositions including curiosity, imagination, critical thought, and transferability. It nurtures a range of individual and societal capacities, such as self-reflection, argumentation and communication. Finally, it introduces students to the normative aspects of inquiry and research, including the norms governing sourcing, sharing, withholding materials and research results as well as others governing the responsibilities of expertise as well as the professional point of view

All students are required to take the following modules in their second year:

- New Skills Module: Logic (m, 2.5 CP)
- New Skills Module: Causation and Correlation (m, 2.5 CP)

These modules will be offered with two different perspectives of which the students can choose. The module perspectives are independent modules which examine the topic from different point of views. Please see the module description for more details.

In the third year, students take three 5 CP modules that build upon previous modules in the track and are partially constituted by modules that are more closely linked to each student's disciplinary field of study. The following module is mandatory for all students:

- New Skills Module: Argumentation, Data Visualization and Communication (m, 5 CP)

This module will also be offered with two different perspectives of which the students can choose.

In their fifth semester, students may choose between:

- New Skills Module: Linear Model/Matrices (me, 5 CP) and
- New Skills Module: Complex Problem Solving (me, 5 CP).

The sixth semester also contains the choice between two modules, namely:

- New Skills Module: Agency, Leadership and Accountability (me, 5 CP) and
- New Skills Module: Community Impact Project (me, 5 CP).

Students who study abroad during the fifth semester and are not substituting the mandatory "Argumentation, Data Visualization and Communication" module, are required to take this module during their sixth semester. Students who remain on campus are free to take the Argumentation, Data Visualization and Communication module in person in either the fifth or sixth semester as they prefer.

2.3.3 German Language and Humanities Modules

German language abilities foster students' intercultural awareness and enhance their employability in their host country. They are also beneficial for securing mandatory internships (between the 2nd and 3rd year) in German companies and academic institutions. Constructor University supports its students in acquiring basic as well as advanced German skills in the first year of the CONSTRUCTOR Track. Non-native speakers of German are encouraged to take two German modules (me, 2.5 CP each), but are not obliged to do so. Native speakers and other students not taking advantage of this offering take alternative modules in Humanities in each of the first two semesters:

- Humanities Module: Introduction to Philosophical Ethics (me, 2.5 CP)
- Humanities Module: Introduction to the Philosophy of Science (me, 2.5 CP)
- Humanities Module: Introduction to Visual Culture (me, 2.5 CP)

3 Global Economics and Management as a Minor

A minor in GEM will meet the expectations of prospective students with a strong interest in the impact of globalization on economic dynamics, organizations and society. Economics studies how individuals, households, firms and governments make decisions regarding the production, distribution, acquisition and allocation of scarce resources. The Management discipline examines the design and administration of firms, nonprofits, and public organizations, as well as the consequences of managerial actions and decisions for individuals, society and economies.

3.1 Qualification Aims

The purpose of a minor in GEM is to enable graduates to take an active role in shaping future economic and social processes. The GEM program therefore combines the disciplines of Economics and Management Studies. Students come to understand how economies and economic agents operate and coordinate their interactions, both economically and managerially. Students taking a minor in GEM discover the important mechanisms connecting globalized economic dynamics, business interests, and managerial action to prepare them for future responsibilities in an increasingly interconnected world.

3.1.1 Intended Learning Outcomes

With a minor in GEM, students will be able to

1. discuss economic, political and societal problems using fundamentals of economics and management theories and scientific reasoning;
2. apply economic theories and analyses to issues of wide public and professional concern;
3. apply business and management theories to basic dimensions of business conducts;
4. articulate the relationships between business decisions, economic policies, and national and international public affairs;
5. identify the differences among national and regional perceptions of and approaches to economic reasoning;
6. assess and interpret relevant information for policy analyses in selected micro- and macroeconomics topics.

3.2 Module Requirements

A minor in GEM requires 30 CP. The default option to obtain a minor in GEM is marked in the Study and Examination Plan. It includes the first-year unit “General Economics” and the second-year unit “Economic Policy Challenges” with the following CHOICE and CORE modules:

- CHOICE Module: Microeconomics (m, 7.5 CP)
- CHOICE Module: Macroeconomics (m, 7.5 CP)
- CORE Module: Public Economics and Policy (me, 7.5 CP)
- CORE Module: Environmental and Resource Economics (me, 7.5 CP)

If scheduling and prerequisites allow, substitutions of the default CORE modules with the following CORE modules is possible:

- CORE Module: Comparing Economic Systems (me, 7.5 CP)
- CORE Module: International Economics (me, 7.5 CP)

Upon the consultation with the Academic Advisor and the GEM Study Program Coordinator, individual CORE modules from the default minor can be replaced also by other advanced modules (CORE or Specialization) from the GEM major.

3.3 Degree

After successful completion the minor in Global Economics and Management will be listed on the final transcript under PROGRAM OF STUDY and BA/BSc – [name of the major] as "(Minor: Global Economics and Management)".

4 Global Economics and Management Undergraduate Program Regulations

4.1 Scope of these Regulations

The regulations in this handbook are valid for all students who entered the Global Economics and Management undergraduate program at Constructor University in Fall 2024. In case of a conflict between the regulations in this handbook and the general Policies for Bachelor Studies, the latter applies (see https://constructor.university/student-life/student-services/university-policies).

In exceptional cases, certain necessary deviations from the regulations of this study handbook might occur during the course of study (e.g., change of the semester sequence, assessment type, or the teaching mode of courses).

In general, Constructor University reserves therefore the right to change or modify the regulations of the program handbook according to relevant policies and processes also after its publication at any time and in its sole discretion.

4.2 Degree

Upon successful completion of the study program, students are awarded a Bachelor of Arts (BA) degree in Global Economics and Management.

4.3 Graduation Requirements

In order to graduate, students need to obtain 180 credit points. In addition, the following graduation requirements apply:

Students need to complete all mandatory components of the program as indicated in Chapter 6 of this handbook.

5 Schematic Study Plan for GEM

Figure 2 shows schematically the sequence and types of modules required for the study program. A more detailed description, including the assessment types, is given in the Study and Examination Plans in the following section.

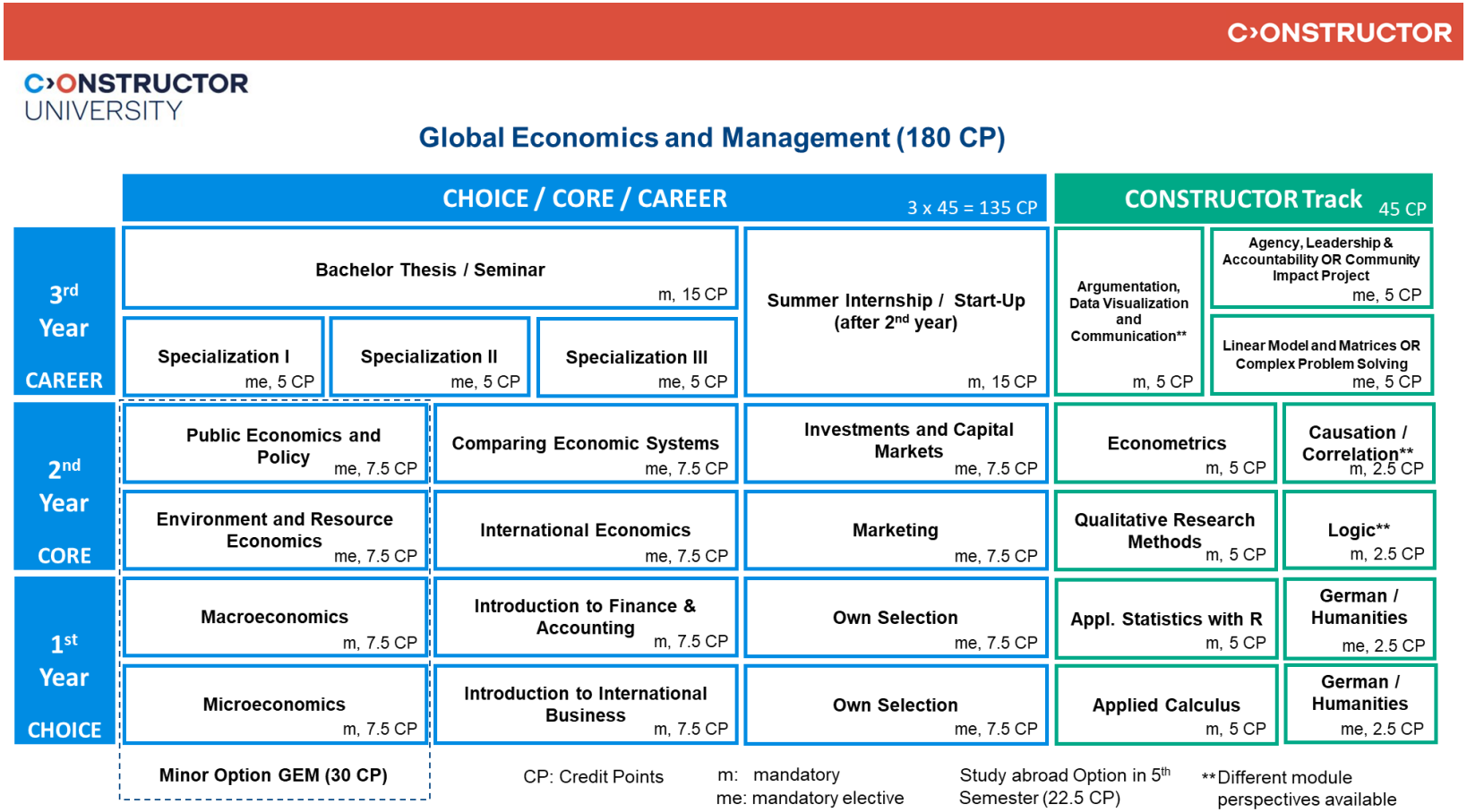

Figure 2: Schematic Study Plan for GEM

6 Study and Examination Plan

Global Economics and Management (GEM)

Matriculation Fall 2024

	Program-Specific Modules	Type	Assessment	Period	Status[1]	Sem.	CP
Year 1 - CHOICE							**45**
Take the mandatory CHOICE module listed below, this is a requirement for the Global Economics and Management program.							
	Unit: General Economics (Default minor)						**15**
CH-310	**Module: Microeconomics**				**m**	**1**	**7.5**
CH-310-A	Microeconomics Theory and Policy	Lecture	Written examination	Examination period			5
CH-310-B	Microeconomics Tutorial	Tutorial					2.5
CH-311	**Module: Macroeconomics**				**m**	**2**	**7.5**
CH-311-A	Macroeconomics Theory and Policy	Lecture	Written examination	Examination period			5
CH-311-B	Macroeconomics Tutorial	Tutorial					2.5
	Unit: General Management						**15**
CH-300	**Module: Introduction to International Business**				**m**	**1**	**7.5**
CH-300-A	Introduction to International Business	Lecture	Written examination	Examination period			5
CH-300-B	Introduction to International Business Seminar	Seminar					2.5
CH-301	**Module: Introduction to Finance and Accounting**				**m**	**2**	**7.5**
CH-301-A	Introduction to Finance	Lecture	Written examiniation	Examination period			2.5
CH-301-B	Introduction to Accounting	Lecture					2.5
CH-301-C	Finance and Accounting Tutorial	Tutorial					2.5
	Unit: CHOICE (own selection)					**1/2**	**15**
Take two further CHOICE modules from those offered for all other study programs.[2]							
Year 2 - CORE							**45**
Take all CORE modules listed below or replace 15 CP with suitable CORE modules from other study programs[2]							
	Unit: Economic Policy Challenges (Default minor)						**15**
CO-624	**Module: Public Economics and Policy**				**me**	**4**	**7.5**
CO-624-A	Public Economics and Policy	Seminar	Written examination	Examination period			5
CO-624-B	Public Economics and Policy - Tutorial	Tutorial					2.5
CO-621	**Module: Environmental and Resource Economics**				**me**	**3**	**7.5**
CO-621-A	Environmental and Resource Economics	Seminar	Written examination	Examination period			5
CO-621-B	Environmental and Eesource Economics Tutorial	Tutorial					2.5
	Unit: Economic Institutions						**15**
CO-622	**Module: Comparing Economic Systems**				**me**	**3**	**7.5**
CO-622-A	Comparing Economic Systems	Seminar	Term paper	Examination period			5
CO-622-B	Comparing Economic Systems Tutorial	Tutorial					2.5
CO-623	**Module: International Economics**				**me**	**4**	**7.5**
CO-623-A	International Economics	Seminar	Written examination	Examination period			5
CO-623-B	International Economics Tutorial	Tutorial					2.5
	Unit: Managing Diversity						**15**
CO-604	**Module: Marketing**				**me**	**3**	**7.5**
CO-604-A	Marketing	Lecture	Presentation	Examination period			5
CO-604-B	Marketing seminar	Seminar					2.5
CO-625	**Module: Investments and Capital Markets**				**me**	**4**	**7.5**
CO-625-A	Investments and Capital Markets	Lecture	Written examination	Examination period			5
CO-625-B	Investments and Capital Markets - Tutorial	Tutorial					2.5

	CONSTRUCTOR Track Modules (General Education)	Type	Assessment	Period	Status[1]	Sem.	CP
							15
	Unit: Methods / Skills						**10**
CTMS-MAT-08	**Module: Applied Calculus**				**m**	**1**	**5**
CTMS-08	Applied Calculus	Lecture	Written examination	Examination period			
CTMS-MET-03	**Module: Applied Statistics with R**				**m**	**2**	**5**
CTMS-03	Applied Statistics with R	Lecture & Lab	Written examination	Examination period			
	Unit: German Language and Humanities (choose one module for each sememster)						**5**
	German is default language and open to Non-German speakers (on campus and online).[3]						
CTLA-	**Module: Language 1**				**me**	**1**	**2.5**
CTLA-	Language 1	Seminar	Various	Various			
CTLA-	**Module: Language 2**				**me**	**2**	**2.5**
CTLA-	Language 2	Seminar	Various	Various			
CTHU-HUM-00	**Humanities Module: Introduction to Philosophical Ethics**				**me**	**2**	**2.5**
CTHU-001	Introduction into Philosophical Ethics	Lecture (online)	Written examination	Examination period			
CTHU-HUM-00	**Humanities Module: Introduction to the Philosophy of Science**				**me**	**1**	**2.5**
CTHU-002	Introduction to the Philosophy of Science	Lecture (online)	Written examination	Examination period			
CTHU-HUM-00	**Humanities Module: Introduction to Visual Culture**				**me**	**2**	**2.5**
CTHU-003	Introduction to Visual Culture	Lecture (online)	Written examination	Examination period			
							15
	Unit: Methods / Skills						**10**
CTMS-MET-04	**Module: Qualitative Research Methods**				**m**	**3**	**5**
CTMS-04	Qualitative Research Methods	Seminar	Portfolio	During Semester			
CTMS-MET-05	**Module: Econometrics**				**m**	**4**	**5**
CTMS-05	Econometrics	Seminar	Written examination	Examination period			
	Unit: New Skills						**5**
Choose one of the two modules							
CTNS-NSK- 01	**Module: Logic (perspective I)**				**me**	**3**	**2.5**
CTNS-01	Logic (perspective I)	Lecture (online)	Written examination	Examination period			
CTNS-NSK-02	**Module: Logic (perspective II)**				**me**		**2.5**
CTNS-02	Logic (perspective II)	Lecture (online)	Written examination	Examination period			
Choose one of the two modules							
CTNS-NSK-03	**Module: Causation and Correlation (perspective I)**				**me**	**4**	**2.5**
CTNS-03	Causation and Correlation (perspective I)	Lecture (online)	Written examination	Examination period			
CTNS-NSK-04	**Module: Causation and Correlation (perspective II)**				**me**	**4**	**2.5**
CTNS-04	Causation and Correlation (perspective II)	Lecture (online)	Written examination	Examination period			
Choose one of the two modules							

Year 3 - CAREER							**45**
CA-INT-900	**Module: Internship / Startup and Career Skills**				**m**	**4/5**	**15**
CA-INT-900-0	Internship / Startup and Career Skills	Internship	Project Report	During the 5th semester			
CA-GEM-800	**Module: Thesis / Seminar GEM**				**m**	**6**	**15**
CA-GEM-800-T	Bachelor Thesis GEM	Thesis	Thesis	15th of May			12
CA-GEM-800-S	Thesis Seminar GEM	Seminar	Presentation	During the semester			3
	Unit: Specialization GEM				**m**	**5/6**	**15**
Take a total of 15 CP of specialization modules							
CA-S-GEM-801	Advanced Econometrics	Seminar	Written Examination	Examination Period	me		5
CA-S-GEM-802	Managing Public and Nonprofit Organizations	Seminar	Presentation	During the semester	me		5
CA-S-GEM-803	Information Economics	Seminar	Term paper	Examination Period	me		5
CA-S-IBA-xxx	Specialization elective (from IBA)[2]	Various	Various	Various	me		5/6
CA-S-MDDA-xxx	Specialization elective (from MDDA)[2]	Various	Various	Various	me		5/6

	Unit: New Skills						**10**
Choose one of the two modules							
CTNS-NSK-05	**Module: Linear Model and Matrices**				**me**	**5**	**5**
CTNS-05	Linear Model and Matrices	Seminar (online)	Written Examination	Examination period			
CTNS-NSK-06	**Module: Complex Problem Solving**				**me**	**5**	**5**
CTNS-06	Complex Problem Solving	Lecture (online)	Written Examination	Examination period			
Choose one of the two modules							
CTNS-NSK-07	**Module: Argumentation, Data Visualization and Communication (perspective I)**				**me**	**5/6**	**5**
CTNS-07	Argumentation, Data Visualization and Communication (perspective I)	Lecture (online)	Written Examination	Examination period		**5**	
CTNS-NSK-08	**Module: Argumentation, Data Visualization and Communication (perspective II)**				**me**	**5/6**	**5**
CTNS-08	Argumentation, Data Visualization and Communication (perspective II)	Lecture (online)	Written Examination	Examination period		**6**	
Choose one of the two modules							
CTNS-NSK-09	**Module: Agency, Leadership, and Accountability**				**me**	**6**	**5**
CTNS-09	Agency, Leadership, and Accountability	Lecture (online)	Written Examination	Examination period			
CTNS-CIP-10	**Module: Community Impact Project**				**me**	**5/6**	**5**
CTNS-10	Community Impact Project	Project	Project Assessment	During the Semester			

Total CP	**180**

[1] Status (m = mandatory, me = mandatory elective)

[2] For a full listing of all CHOICE / CORE / CAREER / Constructor Track units / modules please consult the study program handbooks and/or the **CampusNet online catalogue**.

3 German native speakers will have alternatives to the language courses (in the field of Humanities).

7 Global Economics and Management Modules

7.1 Microeconomics

<table>
<tr><td colspan="3">Module Name
Microeconomics</td><td>Module Code
CH-310</td><td>Level (type)
Year 1 (CHOICE)</td><td>CP
7.5</td></tr>
<tr><td colspan="6">Module Components</td></tr>
<tr><td>Number</td><td colspan="3">Name</td><td>Type</td><td>CP</td></tr>
<tr><td>CH-310-A</td><td colspan="3">Microeconomics Theory and Policy</td><td>Lecture</td><td>5</td></tr>
<tr><td>CH-310-B</td><td colspan="3">Microeconomics - Tutorial</td><td>Tutorial</td><td>2.5</td></tr>
<tr><td>Module Coordinator
Prof. Dr. Colin Vance</td><td colspan="3">Program Affiliation
• Global Economics and Management (GEM)</td><td colspan="2">Mandatory Status
Mandatory for ESSMER, GEM, IBA and minor in GEM</td></tr>
<tr><td colspan="3" rowspan="2">Entry Requirements
Pre-requisites: ☒ None
Co-requisites: ☒ None
Knowledge, Abilities, or Skills: Logical reasoning, High school mathematics</td><td>Frequency
Annually
(Fall)</td><td colspan="2">Forms of Learning and Teaching
• Lecture (35 hours)
• Seminar (17.5 hours)
• Private Study (135 hours)</td></tr>
<tr><td>Duration
1 semester</td><td colspan="2">Workload
187.5 hours</td></tr>
<tr><td colspan="6">Recommendations for Preparation
To prepare for this module, students are recommended to read the article “Research on teaching economics to undergraduates,” published in the Journal of Economic Literature in 2015. The article will allow students to get a first-hand look at the challenges of teaching economics from the viewpoint of those who teach it.</td></tr>
<tr><td colspan="6">Content and Educational Aims
The study of economics is concerned with the allocation of scarce resources and the associated implications for efficiency, equity, and human welfare. This module introduces the field of microeconomics, focusing on the role of markets in facilitating exchanges between different sectors of the economy such as workers, consumers, firms, and government institutions. Topics addressed include consumer theory, the cost structures and behavior of firms in various industries, competition, monopoly, and government regulation. The module applies theoretical concepts to contemporary policy questions, such as when government intervention is justified to correct market imperfections.

This module aims at transmitting fundamental knowledge of economics at the level of economic agents. A command of microeconomics constitutes the basis for undergraduate studies in the fields of economics and management and helps make sense of economic behaviors in many situations, including professional settings. With its focus on questions of welfare and the policy implications of microeconomic theories, this module also enables students to understand public affairs from an economic perspective at the micro level and promotes their capacity to differentiate among and explain the concepts taught in class. Textbook-based lectures ensure the transmission of the necessary knowledge. The accompanying, interactive tutorials further promote the students’ capacity to describe and give examples of the concepts taught in class.</td></tr>
</table>

Intended Learning Outcomes

By the end of this module, students will be able to

1. explain how economic concepts such as opportunity costs and the gains from trade can be applied to a range of themes of relevance to human welfare;
2. use graphical depictions to derive insights into how markets function;
3. distinguish between equity and efficiency when evaluating the outcomes of economic policies;
4. explain and differentiate among fundamental microeconomic models, such as that demonstrating the gains from trade, using graphs as visual aids;
5. explain the policy implications of microeconomic theories.

Indicative Literature

Hayek, F. A. (1945). The use of knowledge in society. American Economic Review, 35(4): 519-530.

King, M. L., Jr. (1963). Letter from a Birmingham jail.

Thaler, R. H. (2016). Behavioral economics: Past, present, and future. American Economic Review, 106(7): 1577-1600.

Usability and Relationship to other Modules

- This module transmits fundamental knowledge of microeconomics that is necessary to the second-year modules "Public Economics and Policy", "Environmental and Resource Economics", "Comparing Economic Systems" and "International Economics". This module further benefits from the contents taught in its accompanying "Macroeconomics" as the combination of the two offers a comprehensive view of economic questions from the interaction of economic agents to the aggregated level.

Examination Type: Module Examination

Assessment Type: Written examination — Duration: 120 minutes
Scope: All intended learning outcomes of the module — Weight: 100%

Completion: To pass this module, the examination has to be passed with at least 45%.

7.2 Macroeconomics

<table>
<tr><td colspan="3">Module Name
Macroeconomics</td><td>Module Code
CH-311</td><td>Level (type)
Year 1 (CHOICE)</td><td>CP
7.5</td></tr>
<tr><td colspan="6">Module Components</td></tr>
<tr><td>Number</td><td colspan="3">Name</td><td>Type</td><td>CP</td></tr>
<tr><td>CH-311-A</td><td colspan="3">Macroeconomics Theory and Policy</td><td>Lecture</td><td>5</td></tr>
<tr><td>CH-311-B</td><td colspan="3">Macroeconomics -Tutorial</td><td>Tutorial</td><td>2.5</td></tr>
<tr><td>Module Coordinator
Prof. Dr. Colin Vance</td><td colspan="3">Program Affiliation
• Global Economics and Management (GEM)</td><td colspan="2">Mandatory Status
Mandatory for ESSMER, GEM, IBA and minor in GEM</td></tr>
<tr><td colspan="3">Entry Requirements
Pre-requisites
☒ Microeconomics

Co-requisites
☒ None

Knowledge, Abilities, or Skills
Logical reasoning
High school mathematics</td><td>Frequency
Annually
(Spring)

Duration
1 semester</td><td colspan="2">Forms of Learning and Teaching
• Lecture (35 hours)
• Tutorial (17.5 hours)
• Private Study (135 hours)

Workload
187.5 hours</td></tr>
<tr><td colspan="6">Recommendations for Preparation
None.</td></tr>
<tr><td colspan="6">Content and Educational Aims
The study of economics is concerned with the allocation of scarce resources and the associated implications for efficiency, equity, and human welfare. The subdiscipline of macroeconomics investigates the workings of the overall economy, focusing on how shifts in aggregate demand and supply affect variables such as employment, gross domestic product, inflation, and the balance of trade. This module applies theoretical concepts from macroeconomics to contemporary policy questions, such as when, why and how governments intervene in the economy. The module will distinguish fiscal and monetary policies, and what these government interventions mean for various markets and economic actors. The lectures cover the material students need to know to take and pass the module examination. In the tutorials, the students further integrate the material taught in the lectures via discussions of related concepts, policy problems, scientific studies, and exercises.

A command of macroeconomics constitutes the basis for undergraduate studies in the fields of economics and management, further preparing students for graduate study in these fields. Beyond these academic qualifications, students will be equipped with analytical tools that and help make sense of the economic conditions that affect both their private and professional lives. With its coverage of market regulation and the policy implications of macroeconomic theories, this module also enables students to understand public affairs from the perspective of whole economies. Textbook-based lectures ensure the transmission of the necessary knowledge. The accompanying, interactive tutorials further promote the students' capacity to differentiate and explain the concepts taught in class.</td></tr>
</table>

Intended Learning Outcomes

By the end of this module, students will be able to

1. express and discuss ways to analyze the performance of national economies through key indicators such as GDP growth, unemployment, inflation, government deficit and trade imbalances;
2. explain and differentiate the goals and effectiveness of government interventions to combat economic crises in the form of monetary and fiscal policies;
3. describe how supply side measures such as improvements in infrastructure, education, and research can improve long-term growth and the international competitiveness of national economies;
4. assess the distributional consequences of economic development and economic policy decisions;
5. explain the policy implications of macroeconomic theories

Indicative Literature

Goodwin, N., Harris, J., Rajkarnikar, P. J., Roach, B. Torras, M. (2019). Macroeconomics in context. London: Routledge.

To give students historical perspective:

Snowdown, B., Vane, H. R. (2005). Modern macroeconomics. Its origins, development and current state. Cheltenham: Edward Elgar.

Usability and Relationship to other Modules

- This module transmits fundamental knowledge of macroeconomics that is necessary to the second-year modules “Public Economics and Policy”, “Environmental and Resource Economics”, “Comparing Economic Systems” and “International Economics”. This module further benefits from the contents taught in its accompanying module “Microeconomics” as the combination of the two offers a comprehensive view of economic questions from the interaction of economic agents to the aggregated level.

Examination Type: Module Examination

Assessment Type: Written examination

Duration: 120 minutes
Weight: 100%

Scope: All intended learning outcomes of the module

Completion: To pass this module, the examination has to be passed with at least 45%.

7.3 Introduction to International Business

<table>
<tr><td colspan="3">Module Name
Introduction to International Business</td><td>Module Code
CH-300</td><td>Level (type)
Year 1 (CHOICE)</td><td>CP
7.5</td></tr>
<tr><td colspan="6">Module Components

Number | Name | Type | CP
CH-300-A | Introduction to International Business | Lecture | 5
CH-300-B | Introduction to International Business - Seminar | Seminar | 2.5</td></tr>
<tr><td colspan="2">Module Coordinator

Prof. Dr. Christoph Lattemann</td><td colspan="2">Program Affiliation

• International Business Administration (IBA)</td><td colspan="2">Mandatory Status

Mandatory for GEM, IBA, IEM, MDDA and minor EIM</td></tr>
<tr><td colspan="3">Entry Requirements

Pre-requisites: ☒ None
Co-requisites: ☒ None
Knowledge, Abilities, or Skills: None</td><td>Frequency

Annually (Fall)</td><td colspan="2">Forms of Learning and Teaching
• Lecture (35 hours)
• Seminar (17.5 hours)
• Private studies on cases (50 hours)
• Private studies on content (85 hours)</td></tr>
<tr><td colspan="3"></td><td>Duration
1 semester</td><td colspan="2">Workload
187.5 hours</td></tr>
<tr><td colspan="6">Recommendations for Preparation

None.</td></tr>
<tr><td colspan="6">Content and Educational Aims

This module provides the basics needed for making informed and effective business decisions in today's global economy. It focuses on the domains of business such as international strategy and organizational structure, selecting and managing entry modes, developing and marketing products internationally and managing international operations. Issues of globalization, cross-cultural businesses, politics and law in business, economic systems and development, international trade, and international financial markets will also be covered. Upon completing the module, students will know how to use a number of international business analytical tools, and have experience with case study analysis: including, PEST, CAGE, International Market Selection and Modes of Entry. Global corporate social responsibility and sustainability issues will also be discussed.</td></tr>
<tr><td colspan="6">Intended Learning Outcomes

By the end of this module, students will be able to
1. understand and describe the process of globalization and how it affects markets and production e.g. identify the two forces causing globalization to increase, identify the types of companies that participate in international business, describe the global business environment and identify its four main elements;
2. describe culture and explain the significance of both national culture and subcultures, identify the components of culture and the impact on business, describe the two main frameworks used to classify cultures and explain their practical use;
3. describe each main type of political system. Identify the origins of political risk and how managers can reduce its effects. List the main types of legal systems and explain how they differ. Describe the major legal and ethical issues facing international companies;
4. describe what is meant by a centrally planned economy and explain why its use is declining. Identify the main characteristics of a mixed economy and explain the emphasis on privatization. Describe the different ways to measure a nation’s level of development;</td></tr>
</table>

5. discuss international trade and trade patterns. Explain absolute advantage and comparative advantage and identify their differences. Explain the factor proportions and international product life cycle theories as well as trade and national competitive advantage theories;
6. describe the political, economic, and cultural motives behind governmental intervention in trade. List and explain the methods governments use to promote and restrict international trade;
7. define regional economic integration and identify its five levels. Discuss the benefits and drawbacks associated with regional economic integration;
8. discuss international capital market, international bond, international equity, and Eurocurrency markets. Discuss the four primary functions of the foreign exchange market. Explain how currencies are quoted and the different rates given;
9. explain how exchange rates influence the activities of domestic and international companies. Identify the factors that help determine exchange rates and their impact on business;
10. identify international strategies and the corporate-level strategies that companies use;
11. discuss the important issues that influence the choice of organizational structure;
12. explain why and how companies use exporting, importing, and countertrade. Explain the various means of financing export and import activities. Describe the different contractual entry modes that are available to companies. Discuss the important strategic factors in selecting an entry mode;
13. explain the impact globalization is having on international marketing activities. Understand the various dimensions for developing international product, promotional, pricing and distribution strategies (4P's marketing mix);
14. use concepts, tools and frameworks and apply them in the international business context. Develop and improve your analytical and critical thinking skills by applying them to contemporary international business issues. Improve communication skills like reading, writing, speaking, and listening. Prepare and deliver oral presentations as well as written works either prepared individually or as a team. Improve your research skills by analyzing real business situations, identifying problems, evaluating and discussing options and prepare recommendations. These recommendations need to be fact-based, undertaken qualitative and quantitative analyses.

Indicative Literature

Peng, M., Meyer K. (2019). International Business, 3 ed, Boston: Cengage Learning EMEA.

Usability and Relationship to other Modules

Examination Type: Module Examination

Assessment Type: Written examination — Duration: 120 minutes
Weight: 100%

Scope: all intended learning outcomes
Module achievement: Preparation of case studies is prerequisite to attend the written examination.

Completion: To pass this module, the examination has to be passed with at least 45%.

7.4 Introduction to Finance and Accounting

<table>
<tr><td colspan="2">Module Name
Introduction to Finance and Accounting</td><td>Module Code
CH-301</td><td>Level (type)
Year 1 (CHOICE)</td><td>CP
7.5</td></tr>
<tr><td colspan="5">Module Components

Number | Name | Type | CP
CH-301-A | Introduction to Finance | Lecture | 2.5
CH-301-B | Introduction to Accounting | Lecture | 2.5
CH-301-C | Finance and Accounting Tutorial | Tutorial | 2.5</td></tr>
<tr><td>Module Coordinator

Prof. Dr. Andreas Seebeck</td><td colspan="2">Program Affiliation

• International Business Administration (IBA)</td><td colspan="2">Mandatory Status

Mandatory for GEM, IBA, IEM, MDDA and minor EIM</td></tr>
<tr><td colspan="3">Entry Requirements

Pre-requisites | Co-requisites | Knowledge, Abilities, or Skills
☒ Introduction to International Business | ☒ none | None.</td><td>Frequency

Annually (Spring)

Duration
1 semester</td><td>Forms of Learning and Teaching

• Lecture (35 hours)
• Tutorial (17.5 hours)
• Private Study (135 hours)

Workload
187.5 hours</td></tr>
<tr><td colspan="5">Recommendations for Preparation

None</td></tr>
<tr><td colspan="5">Content and Educational Aims

This module introduces students to the basics of finance and financial accounting.

The module is split into three sub-parts.

The first part focuses on finance and investment and will provide students with the basics of corporate finance and investments. It offers an overview of the different sources of finance from private and public sources, and it introduces several important analytical tools and techniques from corporate finance.

The second part focuses on financial accounting. It outlines the framework of accounting including its nature, purposes, and the context. In addition, it covers the basic concepts, conventions, and principles of accounting as well as the accounting equation. Moreover, the recognition and measurement principles are taught. Finally, the module covers the preparation and analysis of financial statements. This part uses the International Financial Reporting Standards as reference.

The third part of the module is designed as a tutorial. In this tutorial students repeat, apply, and practice the techniques from both finance and accounting lectures. Students work on exercises individually and in small groups.</td></tr>
</table>

Intended Learning Outcomes

By the end of this module, students will be able to

1. define the basic types of financial management decisions and the role of the financial manager
2. explain the goal of financial management
3. compute the external financing needed to fund a firm's growth and name the determinants of a firm's growth
4. determine the future value of an investment made today and the present value of cash to be received at a future date
5. define important bond features, types of bonds, and bond ratings
6. outline the impact of inflation on interest rates
7. apply the Present Value (PV), Net Present Value (NPV), Payback rule, Internal Rate of Return (IRR), and the Profitability Index (PI)
8. apply the concept of scenario and sensitivity analysis, calculate the tax shield, accounting break-even point and degree of operating leverage
9. identify and describe the major functions of financial accounting and financial reporting
10. explain the relationship between financial statement elements
11. describe the roles and desirable attributes of financial reporting standards
12. demonstrate knowledge and understanding of the elements of the balance sheet, income statement, cash flow statement, and statement of shareholders' equity
13. describe, explain, and classify cash flow items

Indicative Literature

Phillips, F., Libby,R., Libby P. (2015). Fundamentals of Financial Accounting, 5th Edition. New York: McGraw-Hill Education.

Ross, S.A., Westerfield, R. and Jordan, B.D., 2019. Fundamentals of corporate finance. Tata McGraw-Hill Education.

Usability and Relationship to other Modules

- Builds on the module "Introduction to International Business"
- The module prepares students for the CORE modules in the second and third study year

Examination Type: Module Examination

Assessment Type: Written examination

Duration: 120 minutes
Weight: 100%

Scope: All intended learning outcomes of the module.

Completion: To pass this module, the examination has to be passed with at least 45%.

7.5 Public Economics and Policy

<table>
<tr><td colspan="3">Module Name

Public Economics and Policy</td><td>Module Code

CO-624</td><td>Level (type)

Year 2 (CORE)</td><td>CP

7.5</td></tr>
<tr><td colspan="6">Module Components

Number | Name | Type | CP
CO-624-A | Public Economics and Policy | Seminar | 5
CO-624-B | Public Economics and Policy - Tutorial | Tutorial | 2.5</td></tr>
<tr><td>Module Coordinator

Prof. Dr. Fabian Dehos</td><td colspan="3">Program Affiliation

• Global Economics and Management (GEM)</td><td colspan="2">Mandatory Status

Mandatory elective for GEM, IBA, IRPH, Minor in GEM</td></tr>
<tr><td colspan="3">Entry Requirements

Pre-requisites | Co-requisites | Knowledge, Abilities, or Skills

☒ Microeconomics and Macroeconomics | ☒ None</td><td>Frequency

Annually

(Spring)

Duration

1 semester</td><td colspan="2">Forms of Learning and Teaching

• Seminar (35 hours)
• Tutorial (17.5 hours)
• Independent study (135 hours)

Workload

187.5 hours</td></tr>
<tr><td colspan="6">Recommendations for Preparation
The 3rd Chapter “Public policy for fairness and efficiency” of the open-access book CORE Team. (2019). Economy, society, and public policy, provides a good starting point introducing how two primary objectives of public policy, efficiency and fairness, interact.</td></tr>
<tr><td colspan="6">Content and Educational Aims

This module combines knowledge from first-year courses and integrates insights from the social sciences, employing microeconomic tools to examine the impact of public policy on the allocation of resources and the distribution of income in the economy. The primary focus of this module is on the role of the government in ensuring a functioning market economy, with an emphasis on equity and efficiency. The course addresses market failures as a basis for public intervention, evaluates how government policies can enhance market outcomes, and examines normative concepts that justify political action.
Textbook-based lectures ensure the transmission of the necessary knowledge during the seminar. In the accompanying interactive tutorials, students can practice and review the material covered in the seminar through supplementary questions, while also developing their ability to apply key concepts and theories.
The module aims at transmitting fundamental knowledge of the role of the government from an economic perspective, offering a comprehensive overview on the interplay between economic theory, government action, and real-world challenges. The insights gained from this course can be applied to and extended across several fields of economics, including development economics, urban economics, fiscal policy, labor economics, and health economics. Understanding the underlying mechanisms and concepts constitutes an important basis for undergraduate studies in the fields of economics, offering them a wide range of applications that align with their diverse career aspirations.</td></tr>
</table>

Intended Learning Outcomes

By the end of this module, students will be able to

1. Explain the role of government in the economy.
2. Describe how the objectives of efficiency and fairness interact.
3. Explain how normative concepts can justify political action.
4. Assess critically the effects of public policies on inequality and social welfare.
5. Describe how government interventions can address market failures analytically derive the impact of government policies (subsidies and taxes) on consumer decisions.
6. Recognize the interdisciplinary nature of the module, with the ability to transfer key concepts and theories to a range of related fields of economics.

Indicative Literature

- Acocella, N. (1998). The foundations of economic policy: values and techniques. Cambridge University Press.
- CORE Team. (2019). Economy, society, and public policy. Oxford University Press.
- Gruber, J. (2022). Public finance and public policy (7th ed.). Macmillan Learning.
- Selected chapters form: Mankiw, N. Gregory. 2023. Principles of Economics. 10th ed. Boston: Cengage Learning.

Usability and Relationship to other Modules

- - One of two default 2nd-year Core modules for a minor in GEM (a minor in GEM is feasible only with the modules “Public Economics and Policy” and “Environment and Resources”).
  - This module builds on the knowledge acquired in the first-year modules “Microeconomics” and “Macroeconomics” and expands students’ understanding of these two disciplines by focusing on the role of the government. The course complements the module "Environmental and Resource Economics" by additional microeconomic tools and encourages students to engage with socially relevant issues, such as inequality, which can also be explored in greater depth in a future bachelor thesis.

Examination Type: Module Examination

Assessment Type: Written Examination — Length: 120 mins
Weight: 100%

Scope: All intended learning outcomes of the module

Completion: To pass this module, the examination has to be passed with at least 45%.

7.6 Investments and Capital Markets

<table>
<tr><td colspan="2">Module Name

Investments and Capital Markets</td><td>Module Code

CO-625</td><td>Level (type)

Year 2 (CORE)</td><td>CP

7.5</td></tr>
<tr><td colspan="5">Module Components

Number | Name | Type | CP
CO-625-A | Investments and Capital Markets | Lecture | 5
CO-625-B | Investments and Capital Markets - Tutorial | Tutorial | 2.5</td></tr>
<tr><td>Module Coordinator

Prof. Dr. Lennart Ante</td><td colspan="2">Program Affiliation

• Global Economics and Management (GEM)</td><td colspan="2">Mandatory Status

Mandatory elective for GEM, IBA,</td></tr>
<tr><td colspan="2">Entry Requirements

Pre-requisites: ☒ Introduction to Finance and Accounting
Co-requisites: ☒ None
Knowledge, Abilities, or Skills</td><td>Frequency

Annually

(Spring)

Duration

1 semester</td><td colspan="2">Forms of Learning and Teaching

• Lecture (35 hours)
• Tutorial (17.5 hours)
• Independent study (135 hours)

Workload

187.5 hours</td></tr>
<tr><td colspan="5">Recommendations for Preparation</td></tr>
<tr><td colspan="5">Content and Educational Aims

This module provides a comprehensive introduction to the principles of investments and the tools needed to make informed financial decisions in financial markets. Students will gain a thorough understanding of the key concepts underpinning investment theory and practice, including portfolio management, asset pricing, market efficiency and risk-return trade-offs.
The module covers the valuation of financial instruments such as stocks, bonds, and derivatives, and examines the role of diversification in managing investment risk. In addition to these core topics, the module incorporates short introductions on contemporary themes in financial markets and investment strategies, such as behavioral finance (e.g., the behavior of individual investors), sustainability trends (e.g., ESG, sustainable finance) or technological advancements (e.g., crypto assets, AI).
A combination of lectures and applied exercises will allow students to explore both the theoretical foundations and practical applications of investment principles. By engaging with real-world scenarios, students will develop the critical thinking and analytical skills necessary to evaluate financial opportunities, optimize portfolio performance, and adapt to the challenges of a rapidly changing financial environment. Upon completion, students will possess the knowledge and skills required to confidently navigate modern investment decision-making.</td></tr>
</table>

Intended Learning Outcomes

By the end of this module, students will be able to

1. Identify and describe key concepts and principles of investment theory, including risk-return tradeoffs, portfolio diversification, and asset valuation techniques.
2. Explain the role of financial instruments such as stocks, bonds, and derivatives within investment strategies and financial markets.
3. Utilize basic investment tools and frameworks to analyze financial opportunities and construct diversified portfolios.
4. Assess how economic trends, sustainability concerns, and technological advancements affect investments and financial markets.
5. Evaluate different investment strategies in light of market conditions and investor goals, identifying trade-offs and potential risks.
6. Utilize analytical skills and apply relevant tools as required in investments and capital markets.

Indicative Literature

- Bodie, Zvi, Alex Kane, and Alan J. Marcus. Investments. 12th Edition. McGraw-Hill/Irwin, 2021.
- Barber, B. M., & Odean, T. (2013). The behavior of individual investors. In Handbook of the Economics of Finance (Vol. 2, pp. 1533-1570). Elsevier.

Usability and Relationship to other Modules

- Builds on the module "Introduction to Finance and Accounting"
- Prepares students for specialization modules in the third study year

Examination Type: Module Examination

Assessment Type: Written Examination — Length: 120 mins
Weight: 100%

Scope: All intended learning outcomes of the module (1-6)

Completion: To pass this module, the examination has to be passed with at least 45%.

7.7 Environmental and Resource Economics

<table>
<tr><td colspan="3">Module Name

Environmental and Resource Economics</td><td>Module Code

CO-621</td><td>Level (type)

Year 2 (CORE)</td><td>CP

7.5</td></tr>
<tr><td colspan="6">Module Components

Number | Name | Type | CP
CO-621-A | Environmental and Resource Economics | Seminar | 5
CO-621-B | Environmental and Resource Economics - Tutorial | Tutorial | 2.5</td></tr>
<tr><td>Module Coordinator

Prof. Dr. Colin Vance</td><td colspan="3">Program Affiliation

• Global Economics and Management (GEM)</td><td colspan="2">Mandatory Status

Mandatory elective for GEM</td></tr>
<tr><td colspan="3">Entry Requirements

Pre-requisites | Co-requisites | Knowledge, Abilities, or Skills
☒ Microeconomics and Macroeconomics | ☒ None | Logical and causality-based reasoning
Basic knowledge in micro- and macroeconomics</td><td>Frequency

Annually

(Fall)

Duration

1 semester</td><td colspan="2">Forms of Learning and Teaching

• Seminar (35 hours)
• Tutorial (17,5 hours)
• Private Study (135 hours)

Workload

187.5 hours</td></tr>
<tr><td colspan="6">Recommendations for Preparation

To prepare for this module, students are recommended to read the article “How do economists really think about the environment?” published in Nature in 1998.</td></tr>
<tr><td colspan="6">Content and Educational Aims

This module covers the application of theoretical and empirical economics to the analysis of environmental and resource management issues. Specific topics include global climate change, energy use, transportation, and the extraction of exhaustible and non-exhaustible resources. Cross-cutting these topics is an emphasis on how economic analysis can contribute to contemporary policy debates, such as about the strengths and weaknesses of regulatory- and market-based policy instruments for reducing CO2 emissions. We also examine the implications for industry of national and international efforts to protect the environment. In the tutorials, students have the opportunity to review the material taught in the seminar and further train their understanding of these concepts and theories in group discussions of concepts and case study problems.

This module aims at transmitting fundamental knowledge of environmental dynamics from an economics perspective. Understanding the underlying mechanisms and economic dimensions of environmental issues constitutes an important basis for undergraduate studies in the fields of economics and the management of sustainability and helps students make sense of economic behaviors in many situations, including professional settings. With its interest in questions of resource exhaustibility and in the impact of economic behavior on the environment, this module helps students to understand public affairs from an environmental perspective and promotes their capacity to anticipate the consequences of economic and managerial decisions, including their own.</td></tr>
</table>

Intended Learning Outcomes

By the end of this module, students will be able to

1. name and discuss key theoretical frameworks for understanding environmental economics;
2. differentiate and discriminate among empirical evidence on economy-environment linkages;
3. apply theoretical and empirical knowledge to judge the merits of environmental policies, in particularly, the pros and cons of market-based versus regulatory approaches;
4. calculate the net present value of alternative measures to protect the environment.

Indicative Literature

Tietenberg, T., Lewis, L., (2019). Environmental economics: The essentials. Routledge.

Fullerton, D., Stavins. R. N. (1998). How do economists really think about the environment? Nature, 395: 433-434.

Usability and Relationship to other Modules

- One of two default 2nd-year Core modules for a minor in GEM (a minor in GEM is feasible only with the modules "Public Economics and Policy and Environment and Resources" (default), or with "International Economics and Comparing Economic Systems"
- This module builds on the knowledge acquired in the first-year modules "Microeconomics" and "Macroeconomics" and expands students' understandings of these two disciplines by focusing on the linkages between economy and the environment both an economic agent and a policy perspective. This module benefits from the contents taught in its accompanying module "Public Economics and Policy" as the combination of the two modules further places of environmental sustainability issues into the perspective of economic growth and inequality in international trade, and vice versa. This module provides knowledge that is required for the third-year modules "Managing Public and Nonprofit Organizations", "Advanced Econometrics" and "Information Economics".

Examination Type: Module Examination

Assessment Type: Written examination

Duration: 120 minutes
Weight: 100%

Scope: All intended learning outcomes of the module

Completion: To pass this module, the examination has to be passed with at least 45%.

7.8 Comparing Economic Systems

<table>
<tr><td colspan="3">Module Name

Comparing Economic Systems</td><td>Module Code

CO-622</td><td>Level (type)

Year 2 (CORE)</td><td>CP

7.5</td></tr>
<tr><td colspan="6">Module Components

Number | Name | Type | CP
CO-622-A | Comparing Economic Systems | Seminar | 5
CO-622-B | Comparing Economic Systems - Tutorial | Tutorial | 2.5</td></tr>
<tr><td>Module Coordinator

Prof. Dr. Tobias ten Brink</td><td colspan="3">Program Affiliation

• Global Economics and Management (GEM)</td><td colspan="2">Mandatory Status

Mandatory elective for GEM and IRPH</td></tr>
<tr><td colspan="3">Entry Requirements

Pre-requisites | Co-requisites | Knowledge, Abilities, or Skills
☒ Microeconomics and Macroeconomics | ☒ None | Writing skills
Basic knowledge in micro- and macroeconomics</td><td>Frequency

Annually

(Fall)

Duration

1 semester</td><td colspan="2">Forms of Learning and Teaching

• Seminar (35 hours)
• Tutorial (17,5 hours)
• Private Study (135 hours)

Workload

187.5 hours</td></tr>
<tr><td colspan="6">Recommendations for Preparation
Students prepare best for this module by reading Clift, Ben (2014): Comparative Political Economy. States, Markets and Global Capitalism, Palgrave.</td></tr>
<tr><td colspan="6">Content and Educational Aims

In the last two decades Germany has been called the“Sick Man of Europe” and a “European Powerhouse”. These are only two examples of the lively debate about the different performances levels of national economies. Since the demise of centrally planned economies the focus of such discussions has largely been on “Varieties of Capitalism”, a comparative analysis of liberal and coordinated market economies in the OECD world. This module introduces key theories of comparative political economy and the many significant differences apparent in the evolution of capitalist systems. The module helps students to understand the interplay between economic, political, and socio-cultural aspects in shaping the governmental and non-governmental institutions of a modern economy. Case studies provide insights into a wide variety of economic actors and institutions across time and space. In the seminar, textbook readings and other academic readings ensure the transmission of the knowledge students need in order to write a successful end-of-term paper. In the accompanying tutorial, students have the opportunity: (i) to review the material taught in the seminar, and (ii) to develop and discuss paper topics and outlines.

This module aims at transmitting fundamental knowledge on economic systems from a comparative social science perspective. Understanding the underlying institutions of economic systems constitutes an important basis for undergraduate studies in the fields of economics and management. With its interest in the diversity of capitalisms and related institutions, this module helps students appreciate public and economic affairs from the perspective of political economy and promotes their capacity to anticipatethe consequences of economic and managerial decisions, including their own. This module also promotes the students’ capacity to write a scientific paper.</td></tr>
</table>

Intended Learning Outcomes

By the end of this module, students will be able to

1. explain and compare among the key topics and themes in the field of comparative political economy;
2. analyze the interplay of economic, political and socio-cultural institutions and actors and how these shape the development of modern economies;
3. apply theoretical perspectives of comparative political economy to empirical cases, including to non-Western countries;
4. construct well-supported arguments by designing an independent research paper.

Indicative Literature

Clift, B.(2014). Comparative political economy. States, markets and global capitalism, Palgrave.

Fulcher, J. (2004). Capitalism: A very short introduction. Oxford University Press.

Hall, P. A., Soskice, D. (eds.) (2001). Varieties of capitalism: The institutional foundations of comparative advantage. Oxford University Press.

Nölke, A., ten Brink, T., Claar, S., May, C. (2020). State-permeated capitalism in large emerging economies. Routledge.

Usability and Relationship to other Modules

- A minor in GEM is feasible only with the modules "Public Economics and Policy" and "Environment and Resources" (default), or with "International Economics" and "Comparing Economic Systems"
- This module builds on the knowledge acquired in the first-year modules "Microeconomics" and "Macroeconomics" and expands students' understandings of these two disciplines by focusing on classical and contemporary work underlying the assumptions of economic systems and their diversity in forms across the globe as well as their political dimension. This module benefits from the contents taught in its accompanying module "International Economics" as the combination of the two modules places the study of the tenets of capitalism into the perspective of international trade, and vice versa. This module provides knowledge required for the third-year module "Managing Public and Nonprofit Organizations".

Examination Type: Module Examination

Assessment Type: Term Paper

Length: 2.500 - 4000 words
Weight: 100%

Scope: All intended learning outcomes of the module.

Completion: To pass this module, the examination has to be passed with at least 45%.

7.9 International Economics

<table>
<tr><td colspan="3">Module Name

International Economics</td><td>Module Code

CO-623</td><td>Level (type)

Year 2 (CORE)</td><td>CP

7.5</td></tr>
<tr><td colspan="6">Module Components</td></tr>
<tr><td>Number</td><td colspan="3">Name</td><td>Type</td><td>CP</td></tr>
<tr><td>CO-623-A</td><td colspan="3">International Economics</td><td>Seminar</td><td>5</td></tr>
<tr><td>CO-623-B</td><td colspan="3">International Economics - Tutorial</td><td>Tutorial</td><td>2.5</td></tr>
<tr><td>Module Coordinator

Prof. Dr. Fabian Dehos</td><td colspan="3">Program Affiliation

• Global Economics and Management (GEM)</td><td colspan="2">Mandatory Status

Mandatory elective for GEM

Mandatory elective for minor in GEM</td></tr>
<tr><td colspan="3">Entry Requirements

Pre-requisites

☒ Microeconomics and Macroeconomics

Co-requisites

☒ None

Knowledge, Abilities, or Skills

Notions in mathematics
Basic knowledge in micro and macroeconomics</td><td>Frequency

Annually

(Spring)

Duration

1 semester</td><td colspan="2">Forms of Learning and Teaching

• Seminar (35 hours)
• Tutorial (17.5 hours)
• Private Study (135 hours)

Workload

187.5 hours</td></tr>
<tr><td colspan="6">Recommendations for Preparation

Students should review their notes and material in micro- and macroeconomics. A few weeks prior to the course, students are encouraged to keep track of the most recent developments in international trade policy and finance in the news.</td></tr>
<tr><td colspan="6">Content and Educational Aims

This module examines the main concepts and methods of international economics. Its objective is to introduce students to different aspects of the international economy, including the dynamics and dimensions of economic globalization and related institutions, international trade theory and trade policy, and international capital movements and related issues. In the seminar, textbook-based lectures ensure the transmission of the necessary knowledge. The accompanying, interactive tutorials offer students the opportunity to review the material taught in the seminar and to train their capacity to differentiate among and explain the main concepts as a preparation for the final exam.

This module aims at transmitting fundamental knowledge of international trade from an economics perspective. Understanding the underlying dynamics and policy implications of international trade constitutes an important basis for undergraduate studies in the fields of economics and management and helps students make sense of economic behaviors in many situations, including professional settings. With its interest in the implications of international trade, this module helps students to appreciate public and economic affairs from the perspective of global interdependence and promotes their capacity to anticipating the consequences of economic and business decisions, including their own, depending on the regions in which they operate.</td></tr>
</table>

Intended Learning Outcomes

By the end of this module, students will be able to

1. label and describe the economic causes of trans-border economic activities;
2. discuss the economic effects of trans-border activities on national economies and actors;
3. apply their knowledge from Microeconomics to international trade topics;
4. apply their knowledge from Macroeconomics to international macroeconomic policy issues;
5. discuss the political aspects of international economic dynamics.

Indicative Literature

Krugman, P., Obstfeld. M. (2018). International economics: Theory and policy - International edition. London: Pearson.

King, P., King, S. (2008). International economics, globalization, and policy: A reader. New York: McGraw–Hill Irwin.

Usability and Relationship to other Modules

- A minor in GEM is feasible only with the modules "Public Economics and Development" and "Environment and Resources" (default), or with "International Economics and Comparing Economic Systems"
- This module builds on the knowledge acquired in the first-year modules "Microeconomics" and "Macroeconomics" and expands students' understandings of these two disciplines by focusing on dynamics of international trade and related institutions.
- This module benefits from the contents taught in its accompanying module "Comparing Political Systems" as the combination of the two modules places the study of international trade in the perspective of political economy, and vice versa. This module provides knowledge that is required for the third-year modules "Information Economics", "Advanced Econometrics" and "Managing Public and Nonprofit Organizations".

Examination Type: Module Examination

Assessment Type: Written examination

Duration: 120 minutes
Weight: 100%

Scope: All intended learning outcomes of the module

Completion: To pass this module, the examination has to be passed with at least 45%.

7.10 Marketing

Module Name	**Module Code**	**Level (type)**	**CP**
Marketing	CO-604	Year 2 (CORE)	7.5

Module Components

Number	Name	Type	CP
CO-604-A	Marketing	Lecture	5
CO-604-B	Marketing - Seminar	Seminar	2.5

Module Coordinator	**Program Affiliation**	**Mandatory Status**
Dr. PingPing Meckel	• International Business Administration (IBA)	Mandatory elective for GEM and IBA

Entry Requirements			**Frequency**	**Forms of Learning and Teaching**
Pre-requisites	Co-requisites	Knowledge, Abilities, or Skills	Annually (Fall)	• Lecture (35 hours) • Seminar (17.5 hours) • Private Studies (135 hours)
☒ Introduction to International Business ☒Introduction to Finance ☒Finance Accounting ☒Microeconomics ☒Macroeconomics	☒ None	Academic writing skills Interest in creative thinking	**Duration** 1 semester	**Workload** 187.5 hours

Recommendations for Preparation

- This module is based on the knowledge students acquired in the CHOICE modules during the first year of studies.

Content and Educational Aims

The marketing concept is one of the most vital yet one of the most often misunderstood concepts in business management. Identifying target customers and their needs and developing products, services and brands designed to fulfill these needs is the major prerequisite for a successful business endeavor. Without being able to create relevant value for a well-defined group of target customers, a company will not operate successfully in the long run.

This is an integrative and applications-oriented module in marketing planning and strategy. With a strong focus on customer-orientated marketing, the module spans across to main topics. This includes the marketing environment, consumer behavior, market segmentation and positioning.

The main objective of this course is to provide students with a sound understanding of the basic marketing concepts and how they are applied in practice. Students will be able to analyze markets, competitors and customers and to define relevant markets and market segments. The lecture part of this module conveys the relevant concepts and theories on marketing management in an interactive manner. In the seminar part, students will apply this knowledge to real world challenges in marketing.

Intended Learning Outcomes

By the end of this module, students will be able to

1. identify, explain, and solve critical marketing challenges such as the impact of demographic change on consumer segments or the changing influence of market participants in social media;
2. develop a sound understanding of the mechanisms behind the marketing of branded goods and services;

3. connect theoretical knowledge and practical tools (e.g. online surveys) to explain and evaluate marketing strategies;
4. combine entrepreneurial spirit with marketing knowledge when creating and testing their marketing concepts;
5. utilize analytical skills and apply relevant tools as required in the discipline.

Indicative Literature

- Keegan, W.J. & Green, M. C. (2020). Global Marketing. 10th ed. Harlow: Pearson Education Limited. https://ebookcentral.proquest.com/lib/constructor-university/detail.action?docID=5892732.
- Kotler, P. et al. (2024). Principles of Marketing, Global Edition. 19th ed. Harlow: Pearson Education Limited. https://ebookcentral.proquest.com/lib/constructor-university/detail.action?docID=7222242.
- Richardson, N. (2024). Sustainable Marketing Planning. 2nd ed. Oxon: Taylor & Francis Group. https://ebookcentral.proquest.com/lib/constructor-university/detail.action?docID=31160888.

Usability and Relationship to other Modules

- This module prepares students for the Bachelor Thesis focusing on topics in marketing

Examination Type: Module Examination

Assessment Type: Presentation (including script) Length: 30 min

Weight: 100%

Scope: All intended learning outcomes of the module

Completion: To pass this module, the examination has to be passed with at least 45%.

7.11 Advanced Econometrics

<table>
<tr><td colspan="3">Module Name
Advanced Econometrics</td><td>Module Code
CA-S-GEM-801</td><td>Level (type)
Year 3 (Specialization)</td><td>CP
5</td></tr>
<tr><td colspan="6">Module Components
Number | Name | Type | CP
CA-GEM-801 | Advanced Econometrics | Seminar | 5</td></tr>
<tr><td>Module Coordinator
Prof. Dr. Colin Vance</td><td colspan="3">Program Affiliation
• Global Economics and Management (GEM)</td><td colspan="2">Mandatory Status
Mandatory elective for GEM, IBA and MDDA</td></tr>
<tr><td colspan="3">Entry Requirements
Pre-requisites | Co-requisites | Knowledge, Abilities, or Skills
☒ Econometrics | ☒ None | Notions of substantive versus statistical significance
Basic knowledge of econometrics
Academic writing skills</td><td>Frequency
Annually
(Fall)

Duration
1 semester</td><td colspan="2">Forms of Learning and Teaching
• Seminar (35 hours)
• Private Study (90 hours)

Workload
125 hours</td></tr>
<tr><td colspan="6">Recommendations for Preparation
Students prepare best for this module by reading Edward Leamer's seminal article "Let's take the con out of Econometrics," published in the American Economic Review in 1983. The article covers many of the key issues that econometricians still grapple with today, such as whether randomization is essential.</td></tr>
<tr><td colspan="6">Content and Educational Aims
The goal of this module is to build on the knowledge acquired in the "Econometrics" module, covering select advanced concepts of regression analysis as it applies to empirical social science research. The prime learning objective is to understand different approaches of secondary data analysis, where and how to apply particular econometric estimators, and their limitations. Particular emphasis will be placed on identifying exogenous sources of variation and methods for identifying causal relationships between variables. The class will also cover some of the opportunities and pitfalls associated with the analysis of "big data", drawing on current examples and available data. Textbook-based lectures ensure the transmission of the necessary knowledge. Exercises in class further promote the students' capacity to differentiate and debate the merits of alternative econometric techniques for testing particular hypotheses.

This module aims at consolidating students' command of econometrics and related statistical techniques. A command of econometrics constitutes an important fundament for undergraduate studies in the fields of economics and helps students to critically appraise scientific statements about causality in many situations, including professional settings. This</td></tr>
</table>

module helps students to assess and criticize econometric findings in academic papers and promotes their capacity to differentiate between bias and statistical precision in interpreting their own econometric results.

Intended Learning Outcomes

By the end of this module, students will be able to

1. Identify the econometric method appropriate to specific data types.
2. Implement the method using R-software and interpret the results.
3. Design an empirical research project based on a research question, using an appropriate estimation strategy and secondary data to derive results and draw conclusions.
4. Articulate model results in terms that a lay person can understand.
5. Discriminate between the notions of “economic significance” and “statistical significance.

Indicative Literature

Angrist, J. D., Pischke, J. S. (2014). Mastering metrics: The path from cause to effect. Princeton University Press.

Antonakis, J., Bendahan, S., Jacquart, P. Lalive, R. (2010). On making causal claims: A review and recommendations. The Leadership Quarterly, 21(6): 1086-1120.

Usability and Relationship to other Modules

- This module builds on the second-year methods module “Econometrics”, as well as on models and topics from the first-year modules “Microeconomics” and “Macroeconomics” and from the second-year modules “Environmental and Resource Economics” and “ Public Economics and Policy ”. The module expands students’ understandings of econometrics beyond the introductiory level towards advanced techniques and applications.

Examination Type: Module Examination

Assessment Type: Written Examination — Length: 120 mins
Weight: 100%

Scope: All intended learning outcomes of the module (1-5)

Completion: To pass this module, the examination has to be passed with at least 45%.

7.12 Managing Public and Nonprofit Organizations

<table>
<tr><td colspan="2">Module Name

Managing Public and Nonprofit Organizations</td><td>Module Code

CA-S-GEM-802</td><td colspan="2">Level (type)

Year 3
(Specialization)</td><td>CP

5</td></tr>
<tr><td colspan="6">Module Components

Number | Name | Type | CP
CA-GEM-802 | Managing Public and Nonprofit Organizations | Seminar | 5</td></tr>
<tr><td>Module Coordinator

Prof. Dr. Andreas Seebeck</td><td colspan="3">Program Affiliation

• Global Economics and Management (GEM)</td><td colspan="2">Mandatory Status

Mandatory elective for GEM and IBA and IRPH</td></tr>
<tr><td colspan="2">Entry Requirements

Pre-requisites

☒ Introduction to International Business & Introduction to Finance & Accounting</td><td>Co-requisites

☒ None</td><td>Knowledge, Abilities, or Skills

None.</td><td>Frequency

Annually

(Spring)

Duration

1 semester</td><td>Forms of Learning and Teaching

• Seminar (35 hours)
• Private study (90 hours)

Workload

125 hours</td></tr>
<tr><td colspan="6">Recommendations for Preparation

Students should read the paper “If apples were oranges: the public/nonprofit/business nexus in Peter Drucker’s work” by Guy and Hitchcock, published in 2000 in the Journal of Management History (vol. 6, issue 1).</td></tr>
<tr><td colspan="6">Content and Educational Aims

This module transmits state-of-the-art knowledge on management theories of organizations in the public and nonprofit sectors. Specifically, the module helps students distinguishing sectoral differences more clearly, as well as the challenges that arise at the interplay of sectors, for example when business firms contract with government, or when governments outsource service provision to nonprofit organizations in the face of policy problems than cannot be solved by markets or governments alone. A particular focus is therefore put on (i) contrasting topics of organization, strategic management and marketing, and their applicability to nonprofit and public organizations (e.g., income generation, purpose, public service motivation, or decision-making), and on (ii) deciphering the cross-sectoral implications of institutional change in society and markets.

With its didactic focus on presenting and communication skills as conveyors of knowledge, this module provides our students with a solid preparation to their future professional responsibilities. Finally, understanding dynamics in cross-</td></tr>
</table>

sector settings further enables students to become responsible managers with an eye for the consequences of their decisions for the broader organizational fields they will work in.

Intended Learning Outcomes

By the end of this module, students will be able to

1. differentiate among the interests and main challenges of the three sectors at play in societies and markets;
2. label and discuss the fundamental distinctive dimensions of public and nonprofit organizations;
3. articulate the managerial challenges of managing public organizations and nonprofits compared to private firms;
4. infer solutions to cross-sector problems in real case situations;
5. explain the notion of institutional change from the perspectives of economics, management and organization theory
6. practice field research and present the results as a way to plan for and communicate solutions to problems typical of public or nonprofit organizations.

Indicative Literature

Anheier, H. K. (2014). Nonprofit organizations. Theory, management, policy. London: Routledge.

Rainey, H. G. (2014). Understanding and managing public organizations, fifth ed. San Francisco: Jossey Bass.

Usability and Relationship to other Modules

- This module builds on models and topics from the first–year modules "Introduction to International Business" and "Introduction to Finance and Accounting" and all second-year GEM modules. The purpose is to widen the application scope of the general management theories and concepts taught in the program and to stimulate interest in career paths that reach beyond the corporate world and business sector.

Examination Type: Module Examination

Assessment Type: Presentation

Duration: 30 minutes
Weight: 100%

Scope: All intended learning outcomes of the module

Completion: To pass this module, the examination has to be passed with at least 45%.

7.13 Information Economics

<table>
<tr><td colspan="2">Module Name

Information Economics</td><td>Module Code

CA-S-GEM-803</td><td>Level (type)

Year 3 (Specialization)</td><td>CP

5</td></tr>
<tr><td colspan="5">Module Components

Number | Name | Type | CP
CA-GEM-803 | Information Economics | Seminar | 5</td></tr>
<tr><td>Module Coordinator

Prof. Dr. Gert Brunekreeft</td><td colspan="2">Program Affiliation

• Global Economics and Management (GEM)</td><td colspan="2">Mandatory Status

Mandatory elective for GEM and IBA</td></tr>
<tr><td colspan="2">Entry Requirements

Pre-requisites

☒ Microeconomics & Macroeconomics

Co-requisites

☒ None

Knowledge, Abilities, or Skills

Writing skills
Logical and causality-based reasoning</td><td>Frequency

Annually

(Spring)

Duration

1 semester</td><td colspan="2">Forms of Learning and Teaching

• Seminar (35 hours)
• Private Study (90 hours)

Workload

125 hours</td></tr>
<tr><td colspan="5">Recommendations for Preparation

Students prepare best for this module by reviewing their notes and material from first-year modules in Microeconomics and Macroeconomics.</td></tr>
<tr><td colspan="5">Content and Educational Aims

This module relies on applied microeconomics and policy analysis in the field of information economics. The module aims to transmit skills in the application of theory to analyze real-world cases. The topics to be covered are the microeconomics of information, competition policy, economics of regulation, network externalities, and the economics of standards, including new technological developments. Case studies will focus on network industries like energy markets, telecommunications, and internet. The module introduces the concepts and theories students need to know and work with in order to submit a successful paper at the end of the term. The students further integrate the subject matter taught in the seminar in group discussions of concepts and case study problems.</td></tr>
<tr><td colspan="5">Intended Learning Outcomes

Upon completion of this module, students will be able to

1. distinguish among the key theoretical dimensions of information economics;
2. apply microeconomics to analyze real-world cases in information economics;
3. appraise examples of economic policies in information economics;
4. assess and discuss key arguments in current debates on information;
5. reflect on what constitutes a clear concise piece of academic writing.</td></tr>
</table>

Indicative Literature

Varian, H.R. (2010). Intermediate microeconomics – a modern approach, 8th Edition. Norton & Company.

Cabral, L. M. B. (2002). Chapter 17: Networks and Standards, in: Introduction to industrial organization. Cambridge MA: The MIT Press.

Usability and Relationship to other Modules

- This module builds on models and topics from the first-year modules "Microeconomics" and "Macroeconomics" and from the second-year modules "Environmental and Resource Economics" and "International Economics". The module expands students' understanding of these disciplines towards an in-depth exploration of the economic analysis and implications of networks and related industries and technologies.

Examination Type: Module Examination

Assessment Type: Term paper

Length: 2.500-3.000 words
Weight: 100%

Scope: All intended learning outcomes of the module

Completion: To pass this module, the examination has to be passed with at least 45%.

7.14 Lean Management

<table>
<tr><td colspan="3">Module Name
Lean Management</td><td>Module Code
CA-S-IBA-801</td><td>Level (type)
Year 3 (CAREER-Specialization)</td><td>CP
5</td></tr>
<tr><td colspan="6">Module Components

Number | Name | Type | CP
CA-IBA-801 | Lean Management | Lecture | 5</td></tr>
<tr><td>Module Coordinator

Prof. Dr.-Ing. Steffen Christoph Eickemeyer</td><td colspan="3">Program Affiliation

• International Business Administration (IBA)</td><td colspan="2">Mandatory Status

Mandatory elective for GEM and IBA</td></tr>
<tr><td colspan="3">Entry Requirements

Pre-requisites | Co-requisites | Knowledge, Abilities, or Skills
☒ Introduction to International Business & Introduction to Finance & Accounting | ☒ None | None.</td><td>Frequency

Annually (Fall)

Duration

1 semester</td><td colspan="2">Forms of Learning and Teaching

• Lecture (35 hours)
• Private Study (90 hours)

Workload

125 hours</td></tr>
<tr><td colspan="6">Recommendations for Preparation

Before the first session, students should familiarize themselves with Sanjay Bhasin (2015), Lean Management Beyond Manufacturing, A Holistic Approach. Springer; McAfee, A. & Brynjolfsson, E. (2012), “Big Data: The Management Revolution,” Harvard Business Review, 1-9; Ustundag, A. & Cevikcan, E. (2017) Industry 4.0: Managing The Digital Transformation. Springer; Winkelhake, U.(2018) The Digital Transformation of the Automotive Industry. Springer.</td></tr>
<tr><td colspan="6">Content and Educational Aims
The module engages with lean production and lean management. Articles are used to highlight issues scientists and managers are confronted with in practice and theory. Special emphasis is given to developing an understanding of how companies, especially production companies, are formed and shaped by ideas and concepts.
Furthermore, this module examines the nature of organizations in a changing context and applies theories and strategies for managing change in a business environment. The module also engages in key issues affecting business life, focusing on production analysis. Topics include change management and time management. The target is to develop an understanding of the phenomenon of change and the factors that facilitate and hinder it.
The lecture should familiarize students with the “lean philosophy.” Students learn the success factors of lean management, lean organization, and lean office culture. They should be able to understand and apply the underlying methods. In addition, they deal critically with the application limits of lean management.
The course also stimulates students’ interest in exploring these topics further, for continued research and thesis work. The overall objective is to provide students with an explicit lean management-based mindset and a set of conceptual, analytical, and practical tools with which to come to terms with related contemporary topics such as industry 4.0, so that students should be able to challenge and improve existing practices and theories.</td></tr>
<tr><td colspan="6">Intended Learning Outcomes
By the end of this module, students will be able to

1. illustrate an understanding of contemporary topics in lean management relating to theories, models, research methods and industrial applications;</td></tr>
</table>

2. analyze published journal articles in the field of lean management and apply these theories to real-world cases;
3. use the basics of production management and lean office culture;
4. choose and use the right lean principles;
5. develop a sensibility for the phenomenon of change and the factors that facilitate or hinder it;
6. discuss strategies for managing change in an industrial environment;
7. explain tips and tricks for application and implementation;
8. practice industry-relevant behavior in their careers.

Indicative Literature

Bhasin, S. (2015). Lean management beyond manufacturing. New York: Springer.

Charron, R. et al. (2014). The lean management systems handbook. New York: Productivity Press.

Jones, E. (2014). Quality management for organizations using lean six sigma techniques. Boca Raton: CRC press.

Nicholas, J. (2018). Lean production for competitive advantage: a comprehensive guide to lean methodologies and management practices. New York: Productivity Press.

Paksoy, T., Weber, G.-H., Huber, S. (2019). Lean and Green Supply Chain Management. Berlin: Springer.

Yasuhiro, M., Yoshiteru, M. (ed.) (2015). Lean management of global supply chain. Singapore: World Scientific.

Usability and Relationship to other Modules

Examination Type: Module Examination

Assessment Type: Presentation

Duration: 40 minutes
Weight: 100%

Scope: All intended learning outcomes of the module

Completion: To pass this module, the examination has to be passed with at least 45%.

7.15 Managerial Accounting

<table>
<tr><td colspan="3">Module Name
Managerial Accounting</td><td>Module Code
CA-S-IBA-802</td><td>Level (type)
Year 3 (CAREER-Specialization)</td><td>CP
5</td></tr>
<tr><td colspan="6">Module Components</td></tr>
<tr><td>Number</td><td colspan="3">Name</td><td>Type</td><td>CP</td></tr>
<tr><td>CA-IBA-802</td><td colspan="3">Managerial Accounting</td><td>Lecture</td><td>5</td></tr>
<tr><td colspan="2">Module Coordinator
Prof. Dr. Andreas Seebeck</td><td colspan="2">Program Affiliation
• International Business Administration (IBA)</td><td colspan="2">Mandatory Status
Mandatory elective for GEM and IBA</td></tr>
<tr><td colspan="3">Entry Requirements
Pre-requisites: ☒ Introduction to Finance& Accounting
Co-requisites: ☒ None
Knowledge, Abilities, or Skills: None</td><td>Frequency
Annually (Fall)</td><td colspan="2">Forms of Learning and Teaching
• Lecture (35 hours)
• Private Studies (90 hours)</td></tr>
<tr><td colspan="3"></td><td>Duration
1 semester</td><td colspan="2">Workload
125 hours</td></tr>
<tr><td colspan="6">Recommendations for Preparation
Students are expected to refresh their knowledge obtained from the module “Introduction to Finance and Accounting”.</td></tr>
<tr><td colspan="6">Content and Educational Aims
The module aims to provide an overview and understanding of frontline topics in managerial accounting. The purpose is also to deepen students’ understanding and stimulate their interest in exploring these topics further. The overall objective is to provide students with an explicit set of conceptual, analytical, and practical tools with which to come to terms with contemporary accounting issues, thus enabling them to challenge and improve existing practices and theories.
The module covers a set of accounting topics that (a) are important in contemporary businesses, from both a theoretical and practical point of view, and (b) have not received extensive coverage in previous modules.</td></tr>
<tr><td colspan="6">Intended Learning Outcomes
By the end of this module, students will be able to
1. understand cost classifications used for assigning costs to cost objects and preparing financial statements
2. prepare income statements using the traditional and contribution formats illustrate an understanding of contemporary topics in accounting relating to theories, models, and research methods, such as the differences between national accounting principles and their implications for international firms;
3. apply overhead cost to jobs using a predetermined overhead rateanalyze published journal articles in the field of accounting;
4. compute the total cost and the unit product cost of a job
5. understand the flow of costs in a job-order costing system and prepare appropriate journal entries and T-accounts to record costs
6. discuss contemporary accounting phenomena and practices as outlined in academic and professional publications;
7. understand the basic approach in activity-based costing and how it differs from conventional costing</td></tr>
</table>

8. apply contemporary accounting practices to real-world challenges.
9. assign costs to units and prepare a cost reconciliation report using the weighted-average method
10. explain how changes in activity affect contribution margin and net operating income
11. determine the break-even point, the level of sales needed to achieve a desired target profit, and the margin of safety and explain their significance
12. prepare different types of budgets
13. compute different performance measures

Indicative Literature

Garrison, R., Noreen E. and Brewer P. (2020). Managerial Accounting, 17th Ed. New York: MacGraw-Hill.

Usability and Relationship to other Modules

Examination Type: Module Examination

Assessment Type: Written Examination Duration: 120 mins

Weight: 100%

Scope: All intended learning outcomes of the module (1-13)

Completion: To pass this module, the examination has to be passed with at least 45%.

7.16 Blockchain Technology and Applications

<table>
<tr><td colspan="3">Module Name
Blockchain Technology and Applications</td><td>Module Code
CA-S-IBA-805</td><td>Level (type)
Year 3 (CAREER-Specialization)</td><td>CP
5</td></tr>
<tr><td colspan="6">Module Components

Number | Name | Type | CP
CA-IBA-805 | Blockchain Technology and Applications | Lecture | 5</td></tr>
<tr><td>Module Coordinator
Prof. Dr. Lennart Ante</td><td colspan="3">Program Affiliation

• International Business Administration (IBA)</td><td colspan="2">Mandatory Status

Mandatory elective for GEM and IBA</td></tr>
<tr><td>Entry Requirements

Pre-requisites

☒ none</td><td>Co-requisites

☒ none</td><td>Knowledge, Abilities, or Skills
• Basic understanding of digital technologies and business management</td><td>Frequency

Annually (Spring)

Duration

1 semester</td><td colspan="2">Forms of Learning and Teaching

• Lecture (35 hours)
• Private study (90 hours)

Workload

125 hours</td></tr>
<tr><td colspan="6">Recommendations for Preparation

Students are encouraged to familiarize themselves with fundamental blockchain concepts by exploring online resources.</td></tr>
<tr><td colspan="6">Content and Educational Aims

This module introduces blockchain technology and its wide-ranging applications across business and society. It provides a thorough overview of foundational concepts, including the structure and operation of distributed ledgers, the mechanisms of decentralization, and the role of cryptographic security in ensuring data integrity. The course also covers consensus protocols such as Proof of Work and Proof of Stake, along with advanced topics like smart contracts, tokenization, and interoperability. By integrating theoretical knowledge with case studies and examples, the module contextualizes how blockchain technology is reshaping industries such as finance, healthcare, and supply chain management.

Students will engage deeply with blockchain use cases, including cryptocurrencies, non-fungible tokens (NFTs), or decentralized finance (DeFi). Through practical activities, they will learn to set up wallets, create and deploy tokens, and interact with decentralized applications (dApps). These hands-on sessions are designed to provide a functional understanding of blockchain tools, while discussions on challenges such as security, scalability and energy consumption encourage critical thinking about its broader implications. The module also explores emerging innovations like the integration of blockchain with artificial intelligence.

The course aims to develop practical and theoretical skills that are relevant to job opportunities in the blockchain sector and beyond.</td></tr>
<tr><td colspan="6">Intended Learning Outcomes

Upon completion of this module, students will be able to:
1. explain the core concepts, architecture, and principles of blockchain technology;
2. analyze the economic, business and societal implications of blockchain applications;
3. apply blockchain tools, including digital wallets, tokenization, and transaction verification;
4. evaluate the potential and limitations of blockchain applications;
5. propose blockchain-based solutions to address business and societal challenges, while considering the practical and contextual constraints of their implementation.</td></tr>
</table>

Indicative Literature

Nakamoto, S. (2008). Bitcoin: A Peer-to-Peer Electronic Cash System.

Antonopoulos, A. M. (2017). Mastering Bitcoin: Unlocking Digital Cryptocurrencies. O'Reilly Media.

Steinmetz, F., Ante, L. & Fiedler, I. (2020). Blockchain and the digital economy: The socio-economic impact of blockchain technology. Agenda Publishing. https://doi.org/10.2307/j.ctv16qjxg0

Usability and Relationship to other Modules

- This module provides foundational knowledge and hands-on experience in blockchain technology, preparing students for advanced topics in digital transformation, fintech, and entrepreneurship.

Examination Type: Module Examination

Assessment Component: Term paper — Duration/Length: 2500 words
Weight: 100%

Scope: All intended learning outcomes of the module

Completion: To pass this module, the examination has to be passed with at least 45%.

7.17 Current Topics in Business and Economics

<table>
<tr><td colspan="3">Module Name
Current Topics in Business and Economics</td><td>Module Code
CA-S-GEM-804</td><td>Level (type)
Year 3 (Specialization)</td><td>CP
5</td></tr>
<tr><td colspan="6">Module Components

Number | Name | Type | CP
CA-GEM-804 | Current Topics in Business and Economics | Seminar | 5</td></tr>
<tr><td>Module Coordinator
Prof. Dr. Andreas Seebeck</td><td colspan="3">Program Affiliation

• Global Economics and Management (GEM)
•</td><td colspan="2">Mandatory Status

Mandatory elective for GEM and IBA</td></tr>
<tr><td>Entry Requirements

Pre-requisites

☒Microeconomics
☒Macroeconomics
☒ Introduction to International Business
☒Introduction to Finance and Accounting</td><td>Co-requisites

☒ none</td><td>Knowledge, Abilities, or Skills</td><td>Frequency

Annually (Fall)

Duration

1 semester</td><td colspan="2">Forms of Learning and Teaching

• Lecture (35 hours)
• Independent study (90 hours)

Workload

125 hours</td></tr>
<tr><td colspan="6">Recommendations for Preparation

- Staying informed about global and regional economic developments, trends, and challenges through reputable sources such as: Financial Times, The Economist, Harvard Business Review, OECD and IMF reports.

- Analyze and critically evaluate current topics in business and economics</td></tr>
<tr><td colspan="6">Content and Educational Aims

This module addresses contemporary and dynamic issues in business and economics that arise due to their relevance in a specific context, novelty, or temporary nature. It offers students the opportunity to engage with cutting-edge topics and trends that are not yet part of the regular curriculum but are highly significant for understanding current developments in the field.
The module includes courses and events that:
- Respond to current (temporary) developments in business and economics.
- Feature guest lectures delivered by distinguished experts and practitioners.
- Address innovative topics that have yet to be formally integrated into the study program.
- Are offered at irregular intervals, depending on demand and faculty capacity.
- Depend on external funding or the availability of departmental resources.
This structure ensures a dynamic learning experience that aligns with real-world developments, offering students exposure to fresh perspectives and unique content.</td></tr>
</table>

Intended Learning Outcomes

Upon completion of this module, students will be able to:

1. Analyze and critically evaluate current topics in business and economics.
2. Apply contemporary theories, practices, and tools to real-world scenarios.
3. Engage with industry experts and researchers to gain practical insights.
4. Understand the dynamic nature of business and economic challenges.
5. Adapt to emerging trends and themes not yet formalized in standard academic programs.

Indicative Literature

The relevance and use of the indicative literature may vary depending on the specific focus and orientation of the module's content, which can be more research- or practice-oriented.

Usability and Relationship to other Modules

This module builds on the knowledge acquired in the first- and second-year modules. Also, skills such as critical thinking, data analysis, and academic research developed in earlier modules will be essential for analyzing contemporary business and economic issues. The module encourages students to integrate concepts from economics, management, finance, and related disciplines. This interdisciplinary approach reflects the nature of current business and economic challenges, which often span multiple fields of study.

Examination Type: Module Examination

Assessment Component: Portfolio Assessment (Individual Assignments, Group Assignments) Weight: 100%

Scope: All intended learning outcomes of the module (1-5)

Completion: To pass this module, the examination has to be passed with at least 45%.

7.18 Financial Data Analytics

<table>
<tr><td colspan="3">Module Name
Financial Data Analytics</td><td colspan="2">Module Code
CA-S-MDDA-801</td><td>Level (type)
Year 3
(Specialization)</td><td>CP
5</td></tr>
<tr><td colspan="7">Module Components
Number | Name | Type | CP
CA-MDDA-801 | Financial Data Analytics | Seminar | 5</td></tr>
<tr><td>Module Coordinator

Prof. Dr. Andreas Seebeck</td><td colspan="4">Program Affiliation

• Management, Decisions and Data Analytics (MDDA)</td><td colspan="2">Mandatory Status

Mandatory elective for GEM, IBA and MDDA</td></tr>
<tr><td colspan="4">Entry Requirements

Pre-requisites | Co-requisites | Knowledge, Abilities, or Skills
☒ Introduction to Finance & Accounting | ☒ none | Basic Concepts of Accounting and Finance</td><td>Frequency

Annually (Fall)

Duration

1 semester</td><td colspan="2">Forms of Learning and Teaching

• Seminar (35 hours)
• Private Studies (90 hours)

Workload

125 hours</td></tr>
<tr><td colspan="7">Recommendations for Preparation

Students are expected to refresh their knowledge obtained from the module “Introduction to Finance and Accounting”. Particularly, they should be able to create and explain the income statement, balance sheet, and statement of cash flows. Moreover, they should be able to perform time value of money calculations.</td></tr>
<tr><td colspan="7">Content and Educational Aims

The course aims to allow participants to analyze financial and non-financial disclosure of corporations from around the world and to show the links between accounting statements, valuation methods and investment analysis.

Students will learn to extract information from structured and unstructured financial statements. For instance, they will learn how to use the SEC EDGAR website and other databases for financial statement analysis purposes. Next, they will gain experience in analyzing financial data using modern data and text mining approaches and statistical methods. Throughout the course, students will gain hands-on experience in the use of data and text mining approaches to analyze real world financial problems.

Finally, students will gain an understanding of the limitations of financial statement analysis and the methods for evaluating the quality of financial statements.</td></tr>
<tr><td colspan="7">Intended Learning Outcomes

By the end of this module, students will be able to

1. calculate and use accounting ratios
2. extract decision-relevant information from quantitative and qualitative disclosure
3. conduct an analysis of corporate strategy and link this to the company's financial performance.
4. identify and apply the tools of financial statement analysis, including appropriate technology
5. integrate and apply finance and accounting concepts for valuation analysis, including appropriate technology
6. apply a set of diagnostics to assess the quality of the accounting in financial statements</td></tr>
<tr><td colspan="7">Indicative Literature

Subramanyam, K. R. (2014). Financial statement analysis. Không nhà xuất bản.</td></tr>
</table>

Yam, P., Cheung, K. C., Fan, K., & Chen, Y. (2023). Financial Data Analytics with Machine Learning, Optimization and Statistics. United Kingdom: Wiley.

Ou, J. A., & Penman, S. H. (1989). Financial statement analysis and the prediction of stock returns. Journal of Accounting and Economics, 11(4), 295-329.

Usability and Relationship to other Modules

Examination Type: Module Examination

Assessment Type: Term paper

Length: 2500 words
Weight: 100%

Scope: All intended learning outcomes of the module.

Completion: To pass this module, the assessment has to be passed with at least 45%.

7.19 Contemporary Topics in Marketing

<table>
<tr><td colspan="3">Module Name
Contemporary Topics in Marketing</td><td>Module Code
CA-S-IBA-803</td><td>Level (type)
Year 3 (Specialization)</td><td>CP
5</td></tr>
<tr><td colspan="6">Module Components
Number | Name | Type | CP
CA-IBA-803 | Contemporary Topics in Marketing | Seminar | 5</td></tr>
<tr><td>Module Coordinator

Dr. PingPing Meckel</td><td colspan="3">Program Affiliation

• International Business Administration (IBA)</td><td colspan="2">Mandatory Status

Mandatory elective for GEM, IBA and MDDA</td></tr>
<tr><td colspan="3">Entry Requirements

Pre-requisites

☒ Introduction to International Business & Introduction to Finance & Accounting

Co-requisites

☒ None

Knowledge, Abilities, or Skills

Basic Concepts of Marketing</td><td>Frequency

Annually (Spring)

Duration

1 semester</td><td colspan="2">Forms of Learning and Teaching

• Seminar (35 hours)
• Private Studies (90 hours)

Workload

125 hours</td></tr>
<tr><td colspan="6">Recommendations for Preparation

It is recommended that students chose the “Marketing” module in their second year to gain in-depth knowledge of basic marketing concepts prior to this specialization. Students should at least familiarize themselves with basic marketing concepts as outlined in the syllabus of the “Marketing” module.</td></tr>
<tr><td colspan="6">Content and Educational Aims

The module aims to provide an overview and understanding of frontline topics in marketing. The purpose is also to stimulate interest in a further exploration of these topics, for continued research and thesis work. The overall objective is to provide students with an explicit marketing-based mindset and a set of conceptual, analytical, and practical tools with which to come to terms with contemporary marketing issues, thus enabling them to challenge and improve existing practices and theories.

The module covers a set of marketing topics that (a) are important in contemporary marketing, from both a theoretical and practical point of view, and (b) have not received extensive coverage in previous marketing-related modules.</td></tr>
<tr><td colspan="6">Intended Learning Outcomes

By the end of this module, students will be able to

1. illustrate an understanding of contemporary topics in marketing relating to theories, models, research methods and empirical phenomena;
2. analyze and assess published journal articles in the field of marketing;
3. discuss contemporary marketing phenomena and practices;
4. design an adequate empirical research approach for an analysis of a contemporary topic in marketing.</td></tr>
<tr><td colspan="6">Indicative Literature Hanlon, A. (2019). Digital Marketing - Strategic Planning & Integration. Thousand Oakes: Sage.

Hanlon, A. (2019). Digital Marketing - Strategic Planning & Integration. Thousand Oakes: Sage.</td></tr>
</table>

Usability and Relationship to other Modules

Examination Type: Module Examination

Assessment Type: Term paper

Length: 2500 words
Weight: 100%

Scope: All intended learning outcomes of the module

Completion: To pass this module, the examination has to be passed with at least 45%.

7.18 Internship / Startup and Career Skills

<table>
<tr><td colspan="2">Module Name
Internship / Startup and Career Skills</td><td>Module Code
CA-INT-900</td><td>Level (type)
Year 3
(CAREER)</td><td>CP
15</td></tr>
<tr><td colspan="5">Module Components

Number | Name | Type | CP
CA-INT-900-0 | Internship | Internship | 15</td></tr>
<tr><td>Module Coordinator

Clémentine Senicourt & Dr. Tanja Woebs (CSC Organization); SPC / Faculty Startup Coordinator (Academic responsibility)</td><td colspan="2">Program Affiliation

• CAREER module for undergraduate study programs</td><td colspan="2">Mandatory Status

Mandatory for all undergraduate study programs except IEM</td></tr>
<tr><td colspan="3">Entry Requirements

Pre-requisites: ☒ at least 15 CP from CORE modules in the major
Co-requisites: ☒ None
Knowledge, Abilities, or Skills:
• Information provided on CSC pages (see below)
• Major specific knowledge and skills</td><td>Frequency

Annually (Spring/Fall)

Duration
1 semester</td><td>Forms of Learning and Teaching

• Internship/Start-up
• Internship event
• Seminars, info-sessions, workshops and career events
• Self-study, readings, online tutorials

Workload

375 Hours consisting of:
• Internship (308 hours)
• Workshops (33 hours)
• Internship Event (2 hours)
• Self-study (32 hours)</td></tr>
<tr><td colspan="5">Recommendations for Preparation

• Please see the section “Knowledge Center” at JobTeaser Career Center for information on Career Skills seminar and workshop offers and for online tutorials on the job market preparation and the application process. For more information, please see https://constructor.university/student-life/career-services
• Participating in the internship events of earlier classes</td></tr>
<tr><td colspan="5">Content and Educational Aims

The aims of the internship module are reflection, application, orientation, and development: for students to reflect on their interests, knowledge, skills, their role in society, the relevance of their major subject to society, to apply these skills and this knowledge in real life whilst getting practical experience, to find a professional orientation, and to develop their personality and in their career. This module supports the programs’ aims of preparing students for gainful, qualified employment and the development of their personality.</td></tr>
</table>

The full-time internship must be related to the students' major area of study and extends lasts a minimum of two consecutive months, normally scheduled just before the 5th semester, with the internship event and submission of the internship report in the 5th semester. Upon approval by the SPC and SCS, the internship may take place at other times, such as before teaching starts in the 3rd semester or after teaching finishes in the 6th semester. The Study Program Coordinator or their faculty delegate approves the intended internship a priori by reviewing the tasks in either the Internship Contract or Internship Confirmation from the respective internship institution or company. Further regulations as set out in the Policies for Bachelor Studies apply.

Students will be gradually prepared for the internship in semesters 1 to 4 through a series of mandatory information sessions, seminars, and career events.
The purpose of the Career Services Information Sessions is to provide all students with basic facts about the job market in general, and especially in Germany and the EU, and services provided by the Student Career Support.
In the Career Skills Seminars, students will learn how to engage in the internship/job search, how to create a competitive application (CV, Cover Letter, etc.), and how to successfully conduct themselves at job interviews and/or assessment centers. In addition to these mandatory sections, students can customize their skill set regarding application challenges and their intended career path in elective seminars.
Finally, during the Career Events organized by the Career Service Center(e.g. the annual Constructor Career Fair and single employer events on and off campus), students will have the opportunity to apply their acquired job market skills in an actual internship/job search situation and to gain their desired internship in a high-quality environment and with excellent employers.

As an alternative to the full-time internship, students can apply for the StartUp Option. Following the same schedule as the full-time internship, the StartUp Option allows students who are particularly interested in founding their own company to focus on the development of their business plan over a period of two consecutive months. Participation in the StartUp Option depends on a successful presentation of the student's initial StartUp idea. This presentation will be held at the beginning of the 4th semester. A jury of faculty members will judge the student's potential to realize their idea and approve the participation of the students. The StartUp Option is supervised by the Faculty StartUp Coordinator. At the end of StartUp Option, students submit their business plan. Further regulations as outlined in the Policies for Bachelor Studies apply.

The concluding Internship Event will be conducted within each study program (or a cluster of related study programs) and will formally conclude the module by providing students the opportunity to present on their internships and reflect on the lessons learned within their major area of study. The purpose of this event is not only to self-reflect on the whole internship process, but also to create a professional network within the academic community, especially by entering the Alumni Network after graduation. It is recommended that all three classes (years) of the same major are present at this event to enable networking between older and younger students and to create an educational environment for younger students to observe the "lessons learned" from the diverse internships of their elder fellow students.

Intended Learning Outcomes

By the end of this module, students will be able to

1. describe the scope and the functions of the employment market and personal career development;
2. apply professional, personal, and career-related skills for the modern labor market, including self-organization, initiative and responsibility, communication, intercultural sensitivity, team and leadership skills, etc.;
3. independently manage their own career orientation processes by identifying personal interests, selecting appropriate internship locations or start-up opportunities, conducting interviews, succeeding at pitches or assessment centers, negotiating related employment, managing their funding or support conditions (such as salary, contract, funding, supplies, work space, etc.);
4. apply specialist skills and knowledge acquired during their studies to solve problems in a professional environment and reflect on their relevance in employment and society;
5. justify professional decisions based on theoretical knowledge and academic methods;
6. reflect on their professional conduct in the context of the expectations of and consequences for employers and their society;
7. reflect on and set their own targets for the further development of their knowledge, skills, interests, and values;
8. establish and expand their contacts with potential employers or business partners, and possibly other students and alumni, to build their own professional network to create employment opportunities in the future;
9. discuss observations and reflections in a professional network.

Indicative Literature

Not specified

Usability and Relationship to other Modules

- This module applies skills and knowledge acquired in previous modules to a professional environment and provides an opportunity to reflect on their relevance in employment and society. It may lead to thesis topics.

Examination Type: Module Examination

Assessment Type: Project Report	Length: approx. 3.500 words
Scope: All intended learning outcomes	Weight: 100%

7.19 Bachelor Thesis and Seminar

<table>
<tr><td colspan="3">Module Name
Bachelor Thesis and Seminar GEM</td><td>Module Code
CA-GEM-800</td><td>Level (type)
Year 3 (CAREER)</td><td>CP
15</td></tr>
<tr><td colspan="6">Module Components

Number | Name | Type | CP
CA-GEM-800-T | Bachelor Thesis GEM | Thesis | 12
CA-GEM-800-S | Research Seminar GEM | Seminar | 3</td></tr>
<tr><td colspan="2">Module Coordinator
Prof. Dr. Andreas Seebeck</td><td colspan="2">Program Affiliation
• Global Economics and Management (GEM)</td><td colspan="2">Mandatory Status
Mandatory for GEM</td></tr>
<tr><td colspan="3" rowspan="2">Entry Requirements

Pre-requisites: ☒ Students must have taken and successfully passed a total of at least 30 CP from advanced modules, and of those, at least 20 CP from advanced modules in the major.

Co-requisites: ☒ None

Knowledge, Abilities, or Skills:
• Writing skills</td><td>Frequency
Annually</td><td colspan="2">Forms of Learning and Teaching
• Seminar (17,5 hours)
• Supervision (3.5 hours)
• Own research and writing (354 hours)</td></tr>
<tr><td>Duration
14-week lecture period</td><td colspan="2">Workload
375 hours</td></tr>
<tr><td colspan="6">Recommendations for Preparation</td></tr>
</table>

Content and Educational Aims

In this module, students conduct in-depth research on a specific topic related to the GEM major. The topic may either be part of the supervisor's ongoing research or be suggested by the student her/himself, but supervisors hold the right to specify the topics ultimately. Data sources can be primary or secondary and can include online datasets, interviews, direct observations, or self-conducted surveys. Students will be evaluated on the breadth and quality of their research. The thesis must be submitted to a supervisor by the end of the examination period. The accompanying research seminar shows students how to narrow down a topic into a meaningful and manageable piece of research. Students will receive advice and learn how to structure their argumentation, their methodological approach, as well as on the presentation and visualization of their results. Moreover, students will acquire proficiency in techniques of localizing and utilizing academic output (monographs, edited volumes, journal articles, etc.) for their own research work. Ethical academic conduct and the various academic standard requirements in citation, referencing, and data documentation will be discussed in further detail.

In this module, students practice academic research and writing independently, a necessary first step towards graduate studies in any field. Understanding the making of science by practicing it, further enables students to become responsible managers and citizens with a critical eye for the logical reasoning, data collection and analysis underlying scientific findings and discussions of topics that are of public and/or professional interest to them.

Intended Learning Outcomes

On completion of this module, students will be able to

1. independently plan and organize advanced learning processes;
2. design and implement appropriate research methods taking full account of the range of alternative techniques and approaches;
3. collect, assess and interpret relevant information;
4. draw scientifically founded conclusions that consider social, scientific and ethical insights;
5. apply their knowledge and understanding to a context of their choice;
6. develop, formulate and advance solutions to problems and arguments in their subject area, and defend these through argument;
7. discuss information, ideas, problems and solutions with specialists and non-specialists

Usability and Relationship to other Modules

- This module builds on all previous modules of the program. Students apply the knowledge, skills and competencies they acquired and practiced during their studies, including research methods and the ability to acquire additional skills independently as and if required.

Examination Type: Module Component Examinations

Module Component 1: Thesis
Assessment type: Thesis

Scope: All intended learning outcomes, mainly 1-6.

Weight: 80%
Length: approx. 6.000 – 8.000 words (15 – 25 pages), excluding front and back matter.

Module Component 2: Seminar
Assessment type: Presentation

Duration: approx. 15 to 30 minutes
Weight: 20%

Scope: The presentation focuses mainly on ILOs 6 and 7, but by nature of these ILOs it also touches on the others.

Completion: To pass this module, both module component examinations have to be passed with at least 45%.

Two separate assessments are justified by the size of this module and the fact that the justification of solutions to problems and arguments (ILO 6) and discussion (ILO 7) should at least have verbal elements. The weights of the types of assessments are commensurate with the sizes of the respective module components.

8 CONSTRUCTOR Track Modules

8.1 Methods Modules

8.1.1 Applied Calculus

<table>
<tr><td colspan="3">Module Name
Applied Calculus</td><td>Module Code
CTMS-MAT-08</td><td>Level (type)
Year 1 (Methods)</td><td>CP
5</td></tr>
<tr><td colspan="6">Module Components

Number | Name | Type |
CTMS-08 | Applied Calculus | Lecture | 5</td></tr>
<tr><td colspan="2">Module Coordinator

N.N.</td><td colspan="2">Program Affiliation

• CONSTRUCTOR Track Area</td><td colspan="2">Mandatory Status

Mandatory for GEM, IBA, IEM and MDDA</td></tr>
<tr><td colspan="3">Entry Requirements

Pre-requisites: ☒ None
Co-requisites: ☒ None
Knowledge, Abilities, or Skills: Knowledge of Mathematics at high school level (Functions, graphs of functions, linear and polynomial functions, logarithms and exponential function, basic trigonometric functions, elementary methods for solving systems of linear and nonlinear equations)
Some familiarity with elementary calculus (limits, derivatives) is helpful, but not required.</td><td>Frequency

Annually (Fall)

Duration

1 semester</td><td colspan="2">Forms of Learning and Teaching

• Lectures (35 hours)
• Private study (90 hours)

Workload

125 hours</td></tr>
<tr><td colspan="6">Recommendations for Preparation

None.</td></tr>
<tr><td colspan="6">Content and Educational Aims

This module is an introduction to Calculus for students in life sciences, applied engineering, humanities and social science majors. It gives a broad overview of the methods of Calculus, putting more emphasis on applications, rather than on mathematical rigor. Most of the concepts and methods are backed up by examples from chemistry, biology, economics and/or other sciences. In this module students enhance both their quantitative problem-solving skills as well as their conceptual understanding of mathematical methods.

The lecture comprises the following topics:
• Brief review of elementary functions and their graphs
• Intuitive understanding of limits; horizontal and vertical asymptotes
• Derivatives and their computation
• Applications of derivatives (interpretation of derivatives, their units, local linear approximation, error propagation, optimization problems)
• Brief introduction to functions of several variables, partial derivatives, local minima and maxima
• Integrals and their computation</td></tr>
</table>

- Applications of integrals (accumulated change, average value, applications in probability: density functions and cumulative distribution functions)
- Brief introduction to differential equations.

Intended Learning Outcomes

By the end of the module, students will be able to

1. apply the fundamental concepts of Calculus in structured situations;
2. command the methods described in the content section of this module description to the extent that they can solve standard text-book problems reliably and with confidence;
3. explain importance of the methods of Calculus in problems arising from applications;
4. understand the methods of Calculus, used in other modules, as well as in scientific literature.

Indicative Literature

D. Hughes-Hallett, A. Gleason, P. Lock, D. Flath, et al. (2010/2013). Applied Calculus, 4th or 5th edition. Hoboken: Wiley.

Usability and Relationship to other Modules

- The module serves as preparation for the 2nd year IEM CORE module Operations Research.
- This serves as preparation for the 1st year GEM and IBA modules Microeconomics, Macroeconomics and Introduction to Finance and Accounting
- A mathematically rigorous treatment of Calculus is provided in the module “Analysis I”.
- The first year modules Calculus and Elements of Linear Algebra I+II can be used in place of the modules Applied Calculus and Finite Mathematics, respectively, to satisfy the graduation requirements in majors in which they are mandatory.

Examination Type: Module Examination

Assessment type: Written examination — Duration: 120 min, Weight: 100%

Scope: All intended learning outcomes of this module

Completion: To pass this module, the examination has to be passed with at least 45%.

8.1.2 Applied Statistics with R

Module Name	**Module Code**	**Level (type)**	**CP**
Applied Statistics with R	CTMS-MET-03	Year 1 (Methods)	5

Module Components

Number	Name	Type	CP
CTMS-03	Applied Statistics with R	Lecture & Lab	5

Module Coordinator	**Program Affiliation**	**Mandatory Status**
Prof. Dr. Adalbert F.X. Wilhelm	• CONSTRUCTOR Track Area	Mandatory for ESSMER, GEM, IEM, ISCP and MDDA Mandatory elective for IBA and IRPH

Entry Requirements			**Frequency**	**Forms of Learning and Teaching**
Pre-requisites	Co-requisites	Knowledge, Abilities, or Skills	Annually (Spring)	• Lecture (17.5 hours) • Lab (17.5 hours) • Homework and self-study (90 hours)
☒ None	☒ None	none	**Duration**	**Workload**
			1 semester	125 hours

Recommendations for Preparation

Get acquainted to statistical thinking by watching online videos for introductory probability and statistics as well as paying attention whenever arguments are backed up by empirical data.

Content and Educational Aims

We live in a world full of data and more and more decisions are taken based on a comprehensive analysis of data. A central method of data analysis is the use of models describing the relationship between a set of predictor variables and a response. This module provides a thorough introduction to quantitative data analysis covering graphical representations, numerical summary statistics, correlation, and regression models. The module also introduces the fundamental concepts of statistical inference. Students learn about the different data types, how to best visualize them and how to draw conclusions from the graphical representations. Students will learn in this module the ideas and techniques of regression models within the generalized linear model framework involving multiple predictors and co-variates. Students will learn how to become an intelligent user of statistical techniques from a prosumers perspective to assess the quality of presented statistical results and to produce high-quality analyses by themselves. By using illustrative examples from economics, engineering, and the natural and social sciences students will gain the relevant background knowledge for their specific major as well as an interdisciplinary glimpse of other research fields. The general objective of the module is to enable students to become skilled statistical modelers who are well versed in the various assumptions, limitations, and controversies of statistical models and their application. Regular exercises and practical sessions will corroborate the students' proficiency with the statistical software R.

Intended Learning Outcomes

By the end of this module, students will be able to

1. apply basic techniques in statistical modeling and quantitative research methods
2. describe fundamental statistical concepts, procedures, their assumptions and statistical fallacies
3. explain the potential of using quantitative methods in all fields of applications;
4. express informed skepticism of the limitations of statistical reasoning;
5. interpret statistical modeling results in scientific publications;
6. perform basic and intermediate-level statistical analyses of data, using R.

Indicative Literature

Michael J. Crawley (2013). The R Book, Second Edition. Hoboken: John Wiley & Sons.

Peter Daalgard (2008). Introductory Statistics with R. Berlin: Springer.

John Maindonald, W. John Braun (2010). Data Analysis and Graphics Using R – an Example-Based Approach, Third Edition, Cambridge Series. In Statistical and Probabilistic Mathematics. Cambridge: Cambridge University Press.

Christopher Gandrud (2015). Reproducible Research with R and RStudio, Second Edition. The R Series, Chapman & Hall/CRC Press.

Randall E. Schumacker (2014). Learning Statistics Using R. Thousand Oaks: Sage.

Charles Wheelan (2013). Naked Statistics: Stripping the Dread from The Data. New York: W.W. Norton & Company.

Usability and Relationship to other Modules

- Quantitative analytical skills are used and needed in many modules of all study programs.
- This module introduces students to R in preparation for the 2nd year mandatory method module on econometrics and 3rd year GEM module on advanced econometrics; the statistics skills prepare students for all 2nd and 3rd year GEM modules and the thesis.

Examination Type: Module Examination

Type: Written examination — Duration: 120 min
Weight: 100%

During the examination students use the software R as an auxiliary resource approved by the Instructor of Record.

Scope: All intended learning outcomes of the module.

Completion: To pass this module, the examination has to be passed with at least 45%.

8.1.3 Qualitative Research Methods

<table>
<tr><td colspan="3">Module Name

Qualitative Research Methods</td><td>Module Code

CTMS-MET-04</td><td>Level (type)

Year 2 (Methods)</td><td>CP

5</td></tr>
<tr><td colspan="6">Module Components

Number | Name | Type | CP
CTMS-04 | Qualitative Research Methods | Seminar | 5</td></tr>
<tr><td colspan="2">Module Coordinator

N.N.</td><td colspan="2">Program Affiliation

• CONSTRUCTOR Track Area</td><td colspan="2">Mandatory Status

Mandatory for GEM, IBA, IRPH and ISCP</td></tr>
<tr><td colspan="3">Entry Requirements

Pre-requisites
☒ None

Co-requisites
☒ None

Knowledge, Abilities, or Skills
none</td><td>Frequency

Annually

(Fall)

Duration

1 semester</td><td colspan="2">Forms of Learning and Teaching

• In-class contact time (35 hours)
• Private study (90 hours)

Workload

125 hours</td></tr>
<tr><td colspan="6">Recommendations for Preparation</td></tr>
<tr><td colspan="6">Content and Educational Aims

Qualitative researchers explore the structure of everyday life and the meaning that events, other persons and their actions hold for us. To do so, they take an in-depth look at a few selected cases, such as organizations, campaigns, or people. We will look at the rationale and constructivist and interpretivist principles underlying qualitative research and from there move on to specific designs (such as grounded theory or ethnography), design principles (such as purposive strategies for selecting cases), and research methods. The focus of the module will be on learning about and trying out methods for collecting and analyzing qualitative data. Among methods for collecting qualitative data, relevant topics include semi-structured and narrative interviews, focus groups, observation, working with documents and with visual elements. Methods for analyzing qualitative data include, for example, coding, qualitative content analysis, discourse analysis, visual analysis, semiotics or iconography.
The module has a strong hands-on component. It is held in part as a seminar and in part as a lab where students apply the methods to data from their own fields of study. During the lab sessions, students are required to participate in and report on activities involving the application and testing of selected methods. For assessment and grading, students will carry out their own small research project, in which they bring to bear different methods to a topic of their choice. It is a seminar, which incorporates a hands-on component, enabling students to not only learn about different methods, but also apply them to various concrete research scenarios. The portfolio assessment for this module consists of six homework assignments, each dealing with one of the phases of the qualitative research process: preparation for the study, case selection and research design, data collection, data analysis, evaluation of the research, and reflection on the research process.</td></tr>
</table>

Intended Learning Outcomes

By the end of this module, students will be able to

1. explain the principles underlying qualitative research;
2. apply basic qualitative approaches and designs;
3. identify and address ethical issues arising in qualitative research;
4. apply strategies for purposefully selecting participants and cases;
5. apply methods for collecting qualitative data;
6. apply methods for analyzing qualitative data;
7. know what to look for in evaluating qualitative research.

Indicative Literature

- Flick, U. (2018) (ed.). The SAGE handbook of qualitative data collection. Los Angeles, CA: Sage.
- Flick, U. (2019). Introduction to qualitative research. 6th edition. London etc.: Sage.
- Patton, M.Q. (2015). Qualitative evaluation and research methods. 4th edition. Thousand Oaks etc.: Sage.

Rose, G. (2016). Visual methodologies. 4th edition. London: Sage.

Usability and Relationship to other Modules

-

Examination Type: Module Examination

Assessment Type: Portfolio assessment (6 homework assignments and reflection)
Note that the portfolio assessment can only be repeated once.

Weight: 100%

Scope: All intended learning outcomes of the module.
Completion: To pass this module, the examination has to be passed with at least 45%

8.1.4 Econometrics

<table>
<tr><td colspan="3">Module Name
Econometrics</td><td>Module Code
CTMS-MET-05</td><td>Level (type)
Year 2 (Methods)</td><td>CP
5</td></tr>
<tr><td colspan="6">Module Components

Number | Name | Type | CP
CTMS-05 | Econometrics | Seminar | 5</td></tr>
<tr><td colspan="2">Module Coordinator
Prof. Dr. Fabian Dehos</td><td colspan="2">Program Affiliation
• CONSTRUCTOR Track Area</td><td colspan="2">Mandatory Status
Mandatory for GEM and MDDA
Mandatory elective for IBA</td></tr>
<tr><td colspan="3">Entry Requirements
Pre-requisites
☒ Applied statistics with R
Co-requisites
☒ None
Knowledge, Abilities, or Skills
Knowledge of the ordinary least-squares regression model.
Ability to estimate regression models using R software.
Skills in conducting statistical inference tests.</td><td>Frequency
Annually
(Spring)

Duration
1 semester</td><td colspan="2">Forms of Learning and Teaching
• Seminar (35 hours)
• Private study (90 hours)

Workload
125 hours</td></tr>
<tr><td colspan="6">Recommendations for Preparation

An accessible overview of regression analysis can be found in Sykes, A.O. (1993). An Introduction to Regression Analysis. Coase-Sandor Institute for Law & Economics, Univ. of Chicago Working Paper No. 20. https://chicagounbound.uchicago.edu/law_and_economics/51/. Students are also encouraged to read: Ziliak, Stephen T. (2008). Retrospectives: Guinnessometrics: The Economic Foundation of “Student’s” t. Journal of Economic Perspectives 22(4): 199-216.</td></tr>
<tr><td colspan="6">Content and Educational Aims

This module focuses on the application of econometric methods to the analysis of secondary data. Specifically, the goal is to expose students to some of the issues and challenges typically confronted by econometricians when analyzing empirical data in the realms of social science research, business and finance. Emphasis will be placed on the intuition underlying various commonly applied econometric techniques and on the steps needed to implement them. The module expands on the knowledge acquired in statistics and intensifies discussions of multiple regression analysis. The general objective is to become familiar with contemporary methods that are used in econometric and business analyses and to become a critical reader of case studies. In this regard, a clear distinction will be drawn along two dimensions: between questions of statistical significance versus those of economic or social significance; and between correlation and causation. The module takes a practical approach that covers how to estimate econometric models using R software. Sessions will often include computer applications to foster understanding of the discussed topics.</td></tr>
</table>

Intended Learning Outcomes

By the end of this module, students will be able to

1. explain the mechanics and assumptions underpinning the Ordinary Least Squares (OLS) regression model;
2. estimate an OLS model on secondary data using R-software;
3. interpret the coefficient estimates from an OLS model with respect to their sign and magnitude;
4. conduct one- and two-sided tests of the statistical significance of coefficients.

Indicative Literature

Abadie, A. & Cattaneo, M.D. (2018). Econometric methods for program evaluation. Annual Review of Economics, 10, 465-503.

Angrist, J.D. & Pischke, J.S. (2014). Mastering'metrics: The path from cause to effect. Princeton University Press.

Kabacoff, R. (2015). R in action: Data analysis and graphics with R. Chapter 8. Manning Publications Co.

Wooldridge, J. M. (2015). Introductory econometrics: A modern approach. 6th edition. Cambridge Learning.

Ziliak, Stephen T. (2008). Guinnessometrics: The economic foundation of "student's". Journal of Economic Perspectives 22(4), 199-216.

Usability and Relationship to other Modules

- This module builds on models and topics from the first-year modules "Microeconomics" and "Macroeconomics" and from the second-year modules "Environmental and Resource Economics" and "Public Economics and Policy"
- This module introduces students to R in preparation for the 2nd year mandatory method module on econometrics and 3rd year GEM module on advanced econometrics; the statistics skills prepare students for all 2nd and 3rd year GEM modules and the thesis
- This module prepares students in IBA for the analysis of data in the 2nd year modules International Strategic Management and Marketing and the 3rd year module Contemporary Topics in Marketing and the thesis

Examination Type: Module Examination

Assessment type: Written examination

Duration: 120 min
Weight: 100%

Scope: All intended learning outcomes of the module.

Completion: To pass this module, the examination has to be passed with at least 45%.

8.2 New Skills

8.2.1 Logic (perspective I)

<table>
<tr><td colspan="2">Module Name
Logic (perspective I)</td><td>Module Code
CTNS-NSK-01</td><td>Level (type)
Year 2
(New Skills)</td><td>CP
2.5</td></tr>
<tr><td colspan="5">Module Components</td></tr>
<tr><td>Number</td><td colspan="2">Name</td><td>Type</td><td>CP</td></tr>
<tr><td>CTNS-01</td><td colspan="2">Logic (perspective I)</td><td>Lecture (online)</td><td>2.5</td></tr>
<tr><td>Module Coordinator
Prof. Dr. Jules Coleman</td><td colspan="2">Program Affiliation
• CONSTRUCTOR Track Area</td><td colspan="2">Mandatory Status
Mandatory elective for all UG students (one perspective must be chosen)</td></tr>
<tr><td colspan="2">Entry Requirements
Pre-requisites
☒ none
Co-requisites
☒ none
Knowledge, Abilities, or Skills</td><td>Frequency
Annually
(Fall)</td><td colspan="2">Forms of Learning and Teaching
Online lecture (17.5h)
Private study (45h)</td></tr>
<tr><td colspan="2"></td><td>Duration
1 semester</td><td colspan="2">Workload
62.5 hours</td></tr>
<tr><td colspan="5">Recommendations for Preparation</td></tr>
<tr><td colspan="5">Content and Educational Aims
Suppose a friend asks you to help solve a complicated problem? Where do you begin? Arguably, the first and most difficult task you face is to figure out what the heart of the problem actually is. In doing that you will look for structural similarities between the problem posed and other problems that arise in different fields that others may have addressed successfully. Those similarities may point you to a pathway for resolving the problem you have been asked to solve. But it is not enough to look for structural similarities. Sometimes relying on similarities may even be misleading. Once you've settled tentatively on what you take to be the heart of the matter, you will naturally look for materials, whether evidence or arguments, that you believe is relevant to its potential solution. But the evidence you investigate of course depends on your formulation of the problem, and your formulation of the problem likely depends on the tools you have available – including potential sources of evidence and argumentation. You cannot ignore this interactivity, but you can't allow yourself to be hamstrung entirely by it. But there is more. The problem itself may be too big to be manageable all at once, so you will have to explore whether it can be broken into manageable parts and if the information you have bears on all or only some of those parts. And later you will face the problem of whether the solutions to the particular sub problems can be put together coherently to solve the entire problem taken as a whole.

What you are doing is what we call engaging in computational thinking. There are several elements of computational thinking illustrated above. These include: Decomposition (breaking the larger problem down into smaller ones); Pattern recognition (identifying structural similarities); Abstraction (ignoring irrelevant particulars of the problem): and Creating Algorithms), problem-solving formulas.

But even more basic to what you are doing is the process of drawing inferences from the material you have. After all, how else are you going to create a problem-solving formula, if you draw incorrect inferences about what information has</td></tr>
</table>

shown and what, if anything follows logically from it. What you must do is apply the rules of logic to the information to draw inferences that are warranted.

We distinguish between informal and formal systems of logic, both of which are designed to indicate fallacies as well as warranted inferences. If I argue for a conclusion by appealing to my physical ability to coerce you, I prove nothing about the truth of what I claim. If anything, by doing so I display my lack of confidence in my argument. Or if the best I can do is berate you for your skepticism, I have done little more than offer an ad hominem instead of an argument. Our focus will be on formal systems of logic, since they are at the heart of both scientific argumentation and computer developed algorithms. There are in fact many different kinds of logic and all figure to varying degrees in scientific inquiry. There are inductive types of logic, which purport to formalize the relationship between premises that if true offer evidence on behalf of a conclusion and the conclusion and are represented as claims about the extent to which the conclusion is confirmed by the premises. There are deductive types of logic, which introduce a different relationship between premise and conclusion. These variations of logic consist in rules that if followed entail that if the premises are true then the conclusion too must be true.

There are also modal types of logic which are applied specifically to the concepts of necessity and possibility, and thus to the relationship among sentences that include either or both those terms. And there is also what are called deontic logic, a modification of logic that purport to show that there are rules of inference that allow us to infer what we ought to do from facts about the circumstances in which we find ourselves. In the natural and social sciences most of the emphasis has been placed on inductive logic, whereas in math it is placed on deductive logic, and in modern physics there is an increasing interest in the concepts of possibility and necessity and thus in modal logic. The humanities, especially normative discussions in philosophy and literature are the province of deontic logic.

This module will also take students through the central aspects of computational thinking, as it is related to logic; it will introduce the central concepts in each, their relationship to one another and begin to provide the conceptual apparatus and practical skills for scientific inquiry and research.

Intended Learning Outcomes

Students acquire transferable and key skills in this module.

By the end of this module, the students will be able to

1. apply the various principles of logic and expand them to computational thinking.
2. understand the way in which logical processes in humans and in computers are similar and different at the same time.
3. apply the basic rules of first-order deductive logic and employ them rules in the context of creating a scientific or social scientific study and argument.
4. employ those rules in the context of creating a scientific or social scientific study and argument.

Indicative Literature

Frege, Gottlob (1879), Begriffsschrift, eine der arithmetischen nachgebildete Formelsprache des reinen Denkens [Translation: A Formal Language for Pure Thought Modeled on that of Arithmetic],Halle an der Salle: Verlag von Louis Nebert.

Gödel, Kurt (1986), Russels mathematische Logik. In: Alfred North Whitehead, Bertrand Russell: Principia Mathematica. Vorwort, S. V–XXXIV. Suhrkamp.

Leeds, Stephen. "George Boolos and Richard Jeffrey. Computability and logic. Cambridge University Press, New York and London1974, x+ 262 pp." The Journal of Symbolic Logic 42.4 (1977): 585-586.

Kubica, Jeremy. Computational fairy tales. Jeremy Kubica, 2012.

McCarthy, Timothy. "Richard Jeffrey. Formal logic: Its scope and limits. of XXXVIII 646. McGraw-Hill Book Company, New York etc. 1981, xvi+ 198 pp." The Journal of Symbolic Logic 49.4 (1984): 1408-1409.

Usability and Relationship to other Modules

Examination Type: Module Examination

Assessment Type: Written Examination — Duration/Length: 60 min
Weight: 100%

Scope: All intended learning outcomes of the module.

Completion: To pass this module, the examination has to be passed with at least 45%.

8.2.2 Logic (perspective II)

<table>
<tr><td colspan="2">Module Name
Logic (perspective II)</td><td>Module Code
CTNS-NSK-02</td><td>Level (type)
Year 2
(New Skills)</td><td>CP
2.5</td></tr>
<tr><td colspan="5">Module Components
Number | Name | Type | CP
CTNS-02 | Logic (perspective II) | Lecture (online) | 2.5</td></tr>
<tr><td>Module Coordinator
NN</td><td colspan="2">Program Affiliation
• CONSTRUCTOR Track Area</td><td colspan="2">Mandatory Status
Mandatory elective for all UG students (one perspective must be chosen)</td></tr>
<tr><td colspan="2">Entry Requirements
Pre-requisites
☒ none
Co-requisites
☒ none
Knowledge, Abilities, or Skills</td><td>Frequency
Annually
(Fall)</td><td colspan="2">Forms of Learning and Teaching
Online lecture (17.5h)
Private study (45h)</td></tr>
<tr><td colspan="2"></td><td>Duration
1 semester</td><td colspan="2">Workload
62.5 hours</td></tr>
<tr><td colspan="5">Recommendations for Preparation</td></tr>
<tr><td colspan="5">Content and Educational Aims
The focus of this module is on formal systems of logic, since they are at the heart of both scientific argumentation and computer developed algorithms. There are in fact many kinds of logic and all figure to varying degrees in scientific inquiry. There are inductive types of logic, which purport to formalize the relationship between premises that if true offer evidence on behalf of a conclusion and the conclusion and are represented as claims about the extent to which the conclusion is confirmed by the premises. There are deductive types of logic, which introduce a different relationship between premise and conclusion. These variations of logic consist in rules that if followed entail that if the premises are true then the conclusion too must be true.
This module introduces logics that go beyond traditional deductive propositional logic and predicate logic and as such it is aimed at students who are already familiar with basics of traditional formal logic. The aim of the module is to provide an overview of alternative logics and to develop a sensitivity that there are many different logics that can provide effective tools for solving problems in specific application domains.
The module first reviews the principles of a traditional logic and then introduces many-valued logics that distinguish more than two truth values, for example true, false, and unknown. Fuzzy logic extends traditional logic by replacing truth values with real numbers in the range 0 to 1 that are expressing how strong the believe into a proposition is. Modal logics introduce modal operators expressing whether a proposition is necessary or possible. Temporal logics deal with propositions that are qualified by time. Once can view temporal logics as a form of modal logics where propositions are</td></tr>
</table>

qualified by time constraints. Interval temporal logic provides a way to reason about time intervals in which propositions are true.

The module will also investigate the application of logic frameworks to specific classes of problems. For example, a special subset of predicate logic, based on so-called Horn clauses, forms the basis of logic programming languages such as Prolog. Description logics, which are usually decidable logics, are used to model relationships and they have applications in the semantic web, which enables search engines to reason about resources present on the Internet.

Intended Learning Outcomes

Students acquire transferable and key skills in this module.

By the end of this module, the students will be able to

1. apply the various principles of logic
2. explain practical relevance of non-standard logic
3. describe how many-valued logic extends basic predicate logic
4. apply basic rules of fuzzy logic to calculate partial truth values
5. sketch basic rules of temporal logic
6. implement predicates in a logic programming language
7. prove some simple non-standard logic theorems

Indicative Literature

Bergmann, Merry. “An Introduction to Many-Valued and Fuzzy Logic: Semantics, Algebras, and Derivation Systems”, Cambridge University Press, April 2008.

Sterling, Leon S., Ehud Y. Shapiro, Ehud Y. "The Art of Prolog", 2nd edition, MIT Press, March 1994.

Fisher, Michael. “An Introduction to Practical Formal Methods Using Temporal Logic”, Wiley, Juli 2011.

Baader, Franz. "The Description Logic Handbook: Theory Implementation and Applications", Cambridge University Press, 2nd edition, May 2010.

Usability and Relationship to other Modules

Examination Type: ModuleExamination

Assessment Type: Written Examination

Duration/Length: 60 min
Weight: 100%

Scope: All intended learning outcomes of the module.

Completion: To pass this module, the examination has to be passed with at least 45%.

8.2.3 Causation and Correlation (perspective I)

<table>
<tr><td colspan="3">Module Name
Causation and Correlation (perspective I)</td><td>Module Code
CTNS-NSK-03</td><td>Level (type)
Year 2
(New Skills)</td><td>CP
2.5</td></tr>
<tr><td colspan="6">Module Components</td></tr>
<tr><td>Number</td><td colspan="3">Name</td><td>Type</td><td>CP</td></tr>
<tr><td>CTNS-03</td><td colspan="3">Causation and Correlation (perspective I)</td><td>Lecture (online)</td><td>2.5</td></tr>
<tr><td colspan="2">Module Coordinator
Prof. Dr. Jules Coleman</td><td colspan="2">Program Affiliation
• CONSTURCTOR Track Area</td><td colspan="2">Mandatory Status
Mandatory elective for all UG students (one perspective must be chosen)</td></tr>
<tr><td colspan="3">Entry Requirements
Pre-requisites
☒ none
Co-requisites
☒ none
Knowledge, Abilities, or Skills</td><td>Frequency
Annually
(Spring)</td><td colspan="2">Forms of Learning and Teaching
Online lecture (17.5h)
Private study (45h)</td></tr>
<tr><td colspan="3"></td><td>Duration
1 semester</td><td colspan="2">Workload
62.5 hours</td></tr>
<tr><td colspan="6">Recommendations for Preparation</td></tr>
<tr><td colspan="6">Content and Educational Aims
In many ways, life is a journey. And also, as in other journeys, our success or failure depends not only on our personal traits and character, our physical and mental health, but also on the accuracy of our map. We need to know what the world we are navigating is actually like, the how, why and the what of what makes it work the way it does. The natural sciences provide the most important tool we have developed to learn how the world works and why it works the way it does. The social sciences provide the most advanced tools we have to learn how we and other human beings, similar in most ways, different in many others, act and react and what makes them do what they do. In order for our maps to be useful, they must be accurate and correctly reflect the way the natural and social worlds work and why they work as they do.

The natural sciences and social sciences are blessed with enormous amounts of data. In this way, history and the present are gifts to us. To understand how and why the world works the way it does requires that we are able to offer an explanation of it. The data supports a number of possible explanations of it. How are we to choose among potential explanations? Explanations, if sound, will enable us to make reliable predictions about what the future will be like, and also to identify many possibilities that may unfold in the future. But there are differences not just in the degree of confidence we have in our predictions, but in whether some of them are necessary future states or whether all of them are merely possibilities? Thus, there are three related activities at the core of scientific inquiry: understanding where we</td></tr>
</table>

are now and how we got here (historical); knowing what to expect going forward (prediction); and exploring how we can change the paths we are on (creativity).

At the heart of these activities are certain fundamental concepts, all of which are related to the scientific quest to uncover immutable and unchanging laws of nature. Laws of nature are thought to reflect a causal nexus between a previous event and a future one. There are also true statements that reflect universal or nearly universal connections between events past and present that are not laws of nature because the relationship they express is that of a correlation between events. A working thermostat accurately allows us to determine or even to predict the temperature in the room in which it is located, but it does not explain why the room has the temperature it has. What then is the core difference between causal relationships and correlations? At the same time, we all recognize that given where we are now there are many possible futures for each of us, and even had our lives gone just the slightest bit differently than they have, our present state could well have been very different than it is. The relationship between possible pathways between events that have not materialized but could have is expressed through the idea of counterfactual.

Creating accurate roadmaps, forming expectations we can rely on, making the world a more verdant and attractive place requires us to understand the concepts of causation, correlation, counterfactual explanation, prediction, necessity, possibility, law of nature and universal generalization. This course is designed precisely to provide the conceptual tools and intellectual skills to implement those concepts in our future readings and research and ultimately in our experimental investigations, and to employ those tools in various disciplines.

Intended Learning Outcomes

Students acquire transferable and key skills in this module.

By the end of this module, the students will be able to

1. formulate testable hypotheses that are designed to reveal causal connections and those designed to reveal interesting, important and useful correlations.
2. distinguish scientifically interesting correlations from unimportant ones.
3. apply critical thinking skills to evaluate information.
4. understand when and why inquiry into unrealized possibility is important and relevant.

Indicative Literature

Thomas S. Kuhn: The Structure of Scientific Revolutions, Nelson, fourth edition 2012;

Goodman, Nelson. Fact, fiction, and forecast. Harvard University Press, 1983;

Quine, Willard Van Orman, and Joseph Silbert Ullian. The web of belief. Vol. 2. New York: Random house, 1978.

Usability and Relationship to other Modules

Examination Type: Module Examination

Assessment Type: Written Examination

Duration/Length: 60 min
Weight: 100%

Scope: All intended learning outcomes of the module

Completion: To pass this module, the examination has to be passed with at least 45%.

8.2.4 Causation and Correlation (perspective II)

<table>
<tr><td colspan="3">Module Name
Causation and Correlation (perspective II)</td><td>Module Code
CTNS-NSK-04</td><td>Level (type)
Year 2
(New Skills)</td><td>CP
2.5</td></tr>
<tr><td colspan="6">Module Components</td></tr>
<tr><td>Number</td><td colspan="3">Name</td><td>Type</td><td>CP</td></tr>
<tr><td>CTNS-04</td><td colspan="3">Causation and Correlations (perspective II)</td><td>Lecture (online)</td><td>2.5</td></tr>
<tr><td colspan="2">Module Coordinator
Dr. Keivan Mallahi-Karai
Dr. Eoin Ryan Dr. Irina Chiaburu</td><td colspan="2">Program Affiliation
• CONSTRUCTOR Track Area</td><td colspan="2">Mandatory Status
Mandatory elective for all UG students (one perspective must be chosen)</td></tr>
<tr><td colspan="3" rowspan="2">Entry Requirements
Pre-requisites
☒ none
Co-requisites
☒ none
Knowledge, Abilities, or Skills
Basic probability theory</td><td>Frequency
Annually
(Spring)</td><td colspan="2">Forms of Learning and Teaching
Online lecture (17.5h)
Private study (45h)</td></tr>
<tr><td>Duration
1 semester</td><td colspan="2">Workload
62.5 hours</td></tr>
<tr><td colspan="6">Recommendations for Preparation</td></tr>
<tr><td colspan="6">Content and Educational Aims
Causality or causation is a surprisingly difficult concept to understand. David Hume famously noted that causality is a concept that our science and philosophy cannot do without, but it is equally a concept that our science and philosophy cannot describe. Since Hume, the problem of cause has not gone away, and sometimes seems to get even worse (e.g., quantum mechanics confusing previous notions of causality). Yet, ways of doing science that lessen our need to explicitly use causality have become very effective (e.g., huge developments in statistics). Nevertheless, it still seems that the concept of causality is at the core of explaining how the world works, across fields as diverse as physics, medicine, logistics, the law, sociology, and history – and ordinary daily life – through all of which, explanations and predictions in terms of cause and effect remain intuitively central.

Causality remains a thorny problem but, in recent decades, significant progress has occurred, particularly in work by or inspired by Judea Pearl. This work incorporates many 20th century developments, including statistical methods – but with a reemphasis on finding the why, or the cause, behind statistical correlations –, progress in understanding the logic, semantics and metaphysics of conditionals and counterfactuals, developments based on insights from the likes of philosopher Hans Reichenbach or biological statistician Sewall Wright into causal precedence and path analysis, and much more. The result is a new toolkit to identify causes and build causal explanations. Yet even as we get better at identifying causes, this raises new (or old) questions about causality, including metaphysical questions about the nature of causes (and effects, events, objects, etc), but also questions about what we really use causality for (understanding the world as it is or just to glean predictive control of specific outcomes), about how causality is used differently in different fields and</td></tr>
</table>

activities (is cause in physics the same as that in history?), and about how other crucial concepts relate to our concept of cause (space and time seem to be related to causality, but so do concepts of legal and moral responsibility).

This course will introduce students to the mathematical formalism derived from Pearl's work, based on directed acyclic graphs and probability theory. Building upon previous work by Reichenbach and Wright, Pearl defines a "a calculus of interventions" of "do-calculus" for talking about interventions and their relation to causation and counterfactuals. This model has been applied in various areas ranging from econometrics to statistics, where acquiring knowledge about causality is of great importance.

At the same time, the course will not forget some of the metaphysical and epistemological issues around cause, so that students can better critically evaluate putative causal explanations in their full context. Abstractly, such issues involve some of the same philosophical questions Hume already asked, but more practically, it is important to see how metaphysical and epistemological debates surrounding the notion of cause affect scientific practice, and equally if not more importantly, how scientific practice pushes the limits of theory. This course will look at various ways in which empirical data can be transformed into explanations and theories, including the variance approach to causality (characteristic of the positivistic quantitative paradigm), and the process theory of causality (associated with qualitative methodology). Examples and case studies will be relevant for students of the social sciences but also students of the natural/physical world as well.

Intended Learning Outcomes

Students acquire transferable and key skills in this module.

By the end of this module, the students will be able to

1. have a clear understanding of the history of causal thinking.
2. form a critical understanding of the key debates and controversies surrounding the idea of causality.
3. recognize and apply probabilistic causal models.
4. explain how understanding of causality differs among different disciplines.
5. demonstrate how theoretical thinking about causality has shaped scientific practices.

Indicative Literature

Paul, L. A. and Ned Hall. Causation: A User's Guide. Oxford University Press 2013.

Pearl, Judea. Causality: Models, Reasoning and Inference. Cambridge University Press 2009

Pearl, Judea, Glymour Madelyn and Jewell, Nicolas. Causal Inference in Statistics: A Primer. Wiley 2016

llari, Phyllis McKay and Federica Russo. Causality: Philosophical Theory Meets Scientific Practice. Oxford University Press 2014.

Usability and Relationship to other Modules

Examination Type: Module Examination

Assessment: Written examination

Duration/Length: 60 min
Weight: 100 %

Scope: All intended learning outcomes of the module
Completion: To pass this module, the examination has to be passed with at least 45%.

8.2.5 Linear Model and Matrices

Module Name			**Module Code**	**Level (type)**	**CP**
Linear Model and Matrices			CTNS-NSK-05	Year 3 (New Skills)	5
Module Components					
Number	Name			Type	CP
CTNS-05	Linear model and matrices			Seminar	5
Module Coordinator Prof. Dr. Marc-Thorsten Hütt	**Program Affiliation** • CONSTRUCTOR Track Area			**Mandatory Status** Mandatory elective	
Entry Requirements Pre-requisites ☒ Logic ☒ Causation & Correlation	Co-requisites ☒ none	Knowledge, Abilities, or Skills	**Frequency** Annually (Fall)	**Forms of Learning and Teaching** Online lecture (35h) Private Study (90h)	
			Duration 1 Semester	**Workload** 125 hours	
Recommendations for Preparation					

Content and Educational Aims

There are no universal 'right skills'. But the notion of linear models and the avenue to matrices and their properties can be useful in diverse disciplines to implement a quantitative, computational approach. Some of the most popular data and systems analysis strategies are built upon this framework. Examples include principal component analysis (PCA), the optimization techniques used in Operations Research (OR), the assessment of stable and unstable states in nonlinear dynamical systems, as well as aspects of machine learning.

Here we introduce the toolbox of linear models and matrix-based methods embedded in a wide range of transdisciplinary applications (part 1). We describe its foundation in linear algebra (part 2) and the range of tools and methods derived from this conceptual framework (part 3). At the end of the course, we outline applications to graph theory and machine learning (part 4). Matrices can be useful representations of networks and of system of linear equations. They are also the core object of linear stability analysis, an approach used in nonlinear dynamics. Throughout the course, examples from neuroscience, social sciences, medicine, biology, physics, chemistry, and other fields are used to illustrate these methods.

A strong emphasis of the course is on the sensible usage of linear approaches in a nonlinear world. We will critically reflect the advantages as well as the disadvantages and limitations of this method. Guiding questions are: How appropriate is a linear approximation of a nonlinear system? What do you really learn from PCA? How reliable are the optimal states obtained via linear programming (LP) techniques?

This debate is embedded in a broader context: How does the choice of a mathematical technique confine your view on the system at hand? How, on the other hand, does it increase your capabilities of analyzing the system (due to software

available for this technique, the ability to compare with findings from other fields built upon the same technique and the volume of knowledge about this technique)?

In the end, students will have a clearer understanding of linear models and matrix approaches in their own discipline, but they will also see the full transdisciplinarity of this topic. They will make better decisions in their choice of data analysis methods and become mindful of the challenges when going from a linear to a nonlinear thinking.

Intended Learning Outcomes

Upon completion of this module, students will be able to

1. apply the concept of linear modeling in their own discipline
2. distinguish between linear and nonlinear interpretation strategies and understand the range of applicability of linear models
3. make use of data analysis / data interpretation strategies from other disciplines, which are derived from linear algebra
4. be aware of the ties that linear models have to machine learning and network theory

Note that these four ILOs can be loosely associated with the four parts of the course indicated above

Indicative Literature

Part 1:

material from Linear Algebra for Everyone, Gilbert Strang, Wellesley-Cambridge Press, 2020

Part 2:

material from Introduction to Linear Algebra (5th Edition), Gilbert Strang, Cambridge University Press, 2021

Part 3:

Mainzer, Klaus. "Introduction: from linear to nonlinear thinking." Thinking in Complexity: The Computational Dynamics of Matter, Mind and Mankind (2007): 1-16.

material from Mathematics of Big Data: Spreadsheets, Databases, Matrices, and Graphs, Jeremy Kepner, Hayden Jananthan, The MIT Press, 2018

material from Introduction to Linear Algebra (5th Edition), Gilbert Strang, Cambridge University Press, 2021

Part 4:

material from Linear Algebra and Learning from Data, Gilbert Strang, Wellesley-Cambridge Press, 2019

Usability and Relationship to other Modules

Examination Type: Module Examination

Assessment: Written examination — Duration/Length: 120 min
Weight: 100 %

Scope: All intended learning outcomes of the module

Completion: To pass this module, the examination has to be passed with at least 45%.

8.2.6 Complex Problem Solving

<table>
<tr><td colspan="3">Module Name
Complex Problem Solving</td><td>Module Code
CTNS-NSK-06</td><td>Level (type)
Year 3
(New Skills)</td><td>CP
5</td></tr>
<tr><td colspan="6">Module Components</td></tr>
<tr><td>Number</td><td colspan="3">Name</td><td>Type</td><td>CP</td></tr>
<tr><td>CTNS-06</td><td colspan="3">Complex Problem Solving</td><td>Lecture (online)</td><td>5</td></tr>
<tr><td>Module Coordinator
Prof. Dr. Marco Verweij</td><td colspan="3">Program Affiliation
• CONSTRUCTOR Track Area</td><td colspan="2">Mandatory Status
Mandatory elective</td></tr>
<tr><td colspan="3">Entry Requirements
Pre-requisites
☒Logic
☒Causation & Correlation

Co-requisites
☒ none

Knowledge, Abilities, or Skills
Being able to read primary academic literature
Willingness to engage in teamwork</td><td>Frequency
Annually
(Fall)

Duration
1 semester</td><td colspan="2">Forms of Learning and Teaching
Online Lectures (35h)
Private Study (90h)

Workload
125 hours</td></tr>
<tr><td colspan="6">Recommendations for Preparation
Please read: Camillus, J. (2008). Strategy as a wicked problem. Harvard Business Review 86: 99-106; Rogers, P. J. (2008). Using programme theory to evaluate complicated and complex aspects of interventions. Evaluation, 14, 29–48.</td></tr>
<tr><td colspan="6">Content and Educational Aims
Complex problems are, by definition, non-linear and/or emergent. Some fifty years ago, scholars such as Herbert Simon began to argue that societies around the world had developed an impressive array of tools with which to solve simple and even complicated problems, but still needed to develop methods with which to address the rapidly increasing number of complex issues. Since then, a variety of such methods has emerged. These include ‘serious games’ developed in computer science, ‘multisector systems analysis’ applied in civil and environmental engineering, ‘robust decision-making’ proposed by the RAND Corporation, ‘design thinking’ developed in engineering and business studies, ‘structured problem solving’ used by McKinsey & Co., ‘real-time technology assessment’ advocated in science and technology studies, and ‘deliberative decision-making’ emanating from political science.

In this course, students first learn to distinguish between simple, complicated and complex problems. They also become familiar with the ways in which a particular issue can sometimes shift from one category into another. In addition, the participants learn to apply several tools for resolving complex problems. Finally, the students are introduced to the various ways in which natural and social scientists can help stakeholders resolve complex problems. Throughout the course examples and applications will be used. When possible, guest lectures will be offered by experts on a particular tool for tackling complex issues. For the written, take-home exam, students will have to select a specific complex problem, analyse it and come up with a recommendation – in addition to answering several questions about the material learned.</td></tr>
</table>

Intended Learning Outcomes

Upon completion of this module, students will be able to

1. identify a complex problem;
2. develop an acceptable recommendation for resolving complex problems.
3. understand the roles that natural and social scientists can play in helping stakeholders resolve complex problems;

Indicative Literature

Chia, A. (2019). Distilling the essence of the McKinsey way: The problem-solving cycle. Management Teaching Review 4(4): 350-377.

Den Haan, J., van der Voort, M.C., Baart, F., Berends, K.D., van den Berg, M.C., Straatsma, M.W., Geenen, A.J.P., & Hulscher, S.J.M.H. (2020). The virtual river game: Gaming using models to collaboratively explore river management complexity, Environmental Modelling & Software 134, 104855,

Folke, C., Carpenter, S., Elmqvist, T., Gunderson, L., Holling, C.S., & Walker, B. (2002). Resilience and sustainable development: Building adaptive capacity in a world of transformations. AMBIO: A Journal of the Human Environment 31(5): 437-440.

Ostrom, E. (2010). Beyond markets and states: Polycentric governance of complex economic systems. American Economic Review 100(3): 641-72.

Pielke, R. Jr. (2007). The honest broker: Making sense of science in policy and politics. Cambridge: Cambridge University Press.

Project Management Institute (2021). A guide to the project management body of knowledge (PMBOK® guide).

Schon, D. A., & Rein, M. (1994). Frame reflection: Toward the resolution of intractable policy controversies. New York: Basic Books.

Simon, H. A. (1973). The structure of ill structured problems. Artificial Intelligence 4(3-4): 181-201.

Verweij, M. & Thompson, M. (Eds.) (2006). Clumsy solutions for a complex world. London: Palgrave Macmillan.

Usability and Relationship to other Modules

Examination Type: Module Examination

Assessment Type: Written examination — Duration: 120 min
Weight: 100%

Scope: All intended learning outcomes of the module.
Completion: To pass this module, the examination has to be passed with at least 45%.

8.2.7 Argumentation, Data Visualization and Communication (perspective I)

<table>
<tr><td colspan="3">Module Name
Argumentation, Data Visualization and Communication (perspective I)</td><td>Module Code
CTNS-NSK-07</td><td>Level (type)
Year 3
(New Skills)</td><td>CP
5</td></tr>
<tr><td colspan="6">Module Components</td></tr>
<tr><td>Number</td><td colspan="3">Name</td><td>Type</td><td>CP</td></tr>
<tr><td>CTNS-07</td><td colspan="3">Argumentation, Data Visualization and Communication (perspective I)</td><td>Lecture (online)</td><td>5</td></tr>
<tr><td>Module Coordinator
Prof. Dr. Jules Coleman,
Prof Dr. Arvid Kappas</td><td colspan="3">Program Affiliation
• CONSTRUCTOR Track Area</td><td colspan="2">Mandatory Status
Mandatory elective for all UG students (one perspective must be chosen)</td></tr>
<tr><td colspan="3" rowspan="2">Entry Requirements
Pre-requisites
☒ Logic
☒ Causation & Correlation
Co-requisites
☒ none
Knowledge, Abilities, or Skills</td><td>Frequency
Annually
(Fall)</td><td colspan="2">Forms of Learning and Teaching
Online Lectures (35h)
Private Study (90h)</td></tr>
<tr><td>Duration
1 semester</td><td colspan="2">Workload
125h</td></tr>
<tr><td colspan="6">Recommendations for Preparation</td></tr>
</table>

Content and Educational Aims

One must be careful not to confuse argumentation with being argumentative. The latter is an unattractive personal attribute, whereas the former is a requirement of publicly holding a belief, asserting the truth of a proposition, the plausibility of a hypothesis, or a judgment of the value of a person or an asset. It is an essential component of public discourse. Public discourse is governed by norms and one of those norms is that those who assert the truth of a proposition or the validity of an argument or the responsibility of another for wrongdoing open themselves up to good faith requests to defend their claims. In its most general meaning, argumentation is the requirement that one offer evidence in support of the claims they make, as well as in defense of the judgments and assessments they reach. There are different modalities of argumentation associated with different contexts and disciplines. Legal arguments have a structure of their own as do assessments of medical conditions and moral character. In each case, there are differences in the kind of evidence that is thought relevant and, more importantly, in the standards of assessment for whether a case has been successfully made. Different modalities of argumentation require can call for different modes of reasoning. We not only offer reasons in defense of or in support of beliefs we have, judgments we make and hypotheses we offer, but we reason from evidence we collect to conclusions that are warranted by them.

Reasoning can be informal and sometimes even appear unstructured. When we recognize some reasoning as unstructured yet appropriate what we usually have in mind is that it is not linear. Most reasoning we are familiar with is linear in character. From A we infer B, and from A and B we infer C, which all together support our commitment to D. The same form of reasoning applies whether the evidence for A, B or C is direct or circumstantial. What changes in these cases is perhaps the weight we give to the evidence and thus the confidence we have in drawing inferences from it.

Especially in cases where reasoning can be supported by quantitative data, wherever quantitative data can be obtained either directly or by linear or nonlinear models, the visualization of the corresponding data can become key in both, reasoning and argumentation. A graphical representation can reduce the complexity of argumentation and is considered a must in effective scientific communication. Consequently, the course will also focus on smart and compelling ways for data visualization - in ways that go beyond what is typically taught in statistics or mathematics lectures. These tools are constantly developing, as a reflection of new software and changes in state of the presentation art. Which graph or bar chart to use best for which data, the use of colors to underline messages and arguments, but also the pitfalls when presenting data in a poor or even misleading manner. This will also help in readily identifying intentional mis-representation of data by others, the simplest to recognize being truncating the ordinate of a graph in order to exaggerate trends. This frequently leads to false arguments, which can then be readily countered.

There are other modalities of reasoning that are not linear however. Instead they are coherentist. We argue for the plausibility of a claim sometimes by showing that it fits in with a set of other claims for which we have independent support. The fit is itself the reason that is supposed to provide confidence or grounds for believing the contested claim.

Other times, the nature of reasoning involves establishing not just the fit but the mutual support individual items in the evidentiary set provide for one another. This is the familiar idea of a web of interconnected, mutually supportive beliefs. In some cases, the support is in all instances strong; in others it is uniformly weak, but the set is very large; in other cases, the support provided each bit of evidence for the other is mixed: sometimes strong, sometimes weak, and so on.

There are three fundamental ideas that we want to extract from this segment of the course. These are (1) that argumentation is itself a requirement of being a researcher who claims to have made findings of one sort or another; (2) that there are different forms of appropriate argumentation for different domains and circumstances; and (3) that there are different forms of reasoning on behalf of various claims or from various bits of evidence to conclusions: whether those conclusions are value judgments, political beliefs, or scientific conclusions. Our goal is to familiarize you with all three of these deep ideas and to help you gain facility with each.

Intended Learning Outcomes

Students acquire transferable and key skills in this module.

By the end of this module, the students will be able to

1. distinguish among different modalities of argument, e.g. legal arguments, vs. scientific ones.
2. construct arguments using tools of data visualization.
3. communicate conclusions and arguments concisely, clearly and convincingly.

Indicative Literature

- Tufte, E.R. (1985). The visual display of quantitative information. The Journal for Healthcare Quality (JHQ), 7(3), 15.
- Cairo, A (2012). The Functional Art: An introduction to information graphics and visualization. New Ridders.
- Knaflic, C.N. (2015). Storytelling with data: A data visualization guide for business professionals. John Wiley & Sons.

Usability and Relationship to other Modules

Examination Type: Module Examination

Assessment Type: Written Examination

Duration/Length: 120 (min)
Weight: 100%

Scope: All intended learning outcomes of the module

Completion: To pass this module, the examination has to be passed with at least 45%.

8.2.8 Argumentation, Data Visualization and Communication (perspective II)

<table>
<tr><td colspan="3">Module Name
Argumentation, Data Visualization and Communication (perspective II)</td><td>Module Code
CTNS-NSK-08</td><td>Level (type)
Year 3
(New Skills)</td><td>CP
5</td></tr>
<tr><td colspan="6">Module Components</td></tr>
<tr><td>Number</td><td colspan="3">Name</td><td>Type</td><td>CP</td></tr>
<tr><td>CTNS-08</td><td colspan="3">Argumentation, Data Visualization and Communication (perspective II)</td><td>Lecture (online)</td><td>5</td></tr>
<tr><td>Module Coordinator

Prof. Dr. Jules Coleman,
Prof Dr. Arvid Kappas</td><td colspan="3">Program Affiliation

• CONSTRUCTOR Track Area</td><td colspan="2">Mandatory Status

Mandatory elective for all UG students (one perspective must be chosen)</td></tr>
<tr><td colspan="3" rowspan="2">Entry Requirements

Pre-requisites

☒Logic

☒Causation & Correlation

Co-requisites

☒ none

Knowledge, Abilities, or Skills

Ability and openness to engage in interactions media literacy, critical thinking and a proficient handling of data sources; own research in academic literature</td><td>Frequency

Annually (Spring)</td><td colspan="2">Forms of Learning and Teaching

• Online Lecture (35 hours)
• Tutorial of the lecture (10 hours)
• Private study for the lecture (80 hours)</td></tr>
<tr><td>Duration

1 semester</td><td colspan="2">Workload

125 hours</td></tr>
<tr><td colspan="6">Recommendations for Preparation</td></tr>
<tr><td colspan="6">Content and Educational Aims
Humans are a social species and interaction is crucial throughout the entire life span. While much of human communication involves language, there is a complex multichannel system of nonverbal communication that enriches linguistic content, provides context, and is also involved in structuring dynamic interaction. Interactants achieve goals by encoding information that is interpreted in the light of current context in transactions with others. This complexity implies also that there are frequent misunderstandings as a sender's intention is not fulfilled. Students in this course will learn to understand the structure of communication processes in a variety of formal and informal contexts. They will learn what constitutes challenges to achieving successful communication and to how to communicate effectively, taking the context and specific requirements for a target audience into consideration. These aspects will be discussed also in the scientific context, as well as business, and special cases, such as legal context – particularly with view to argumentation theory.

Communication is a truly transdisciplinary concept that involves knowledge from diverse fields such as biology, psychology, neuroscience, linguistics, sociology, philosophy, communication and information science. Students will learn what these different disciplines contribute to an understanding of communication and how theories from these fields can be applied in the real world. In the context of scientific communication, there will also be a focus on visual communication of data in different disciplines. Good practice examples will be contrasted with typical errors to facilitate successful communication also with view to the Bachelor's thesis.</td></tr>
</table>

Intended Learning Outcomes

Upon completion of this module, students will be able to

1. analyze communication processes in formal and informal contexts.
2. identify challenges and failures in communication.
3. design communications to achieve specified goals to specific target groups.
4. understand the principles of argumentation theory.
5. use data visualization in scientific communications.

Indicative Literature

- Joseph A. DeVito: The Interpersonal Communication Book (Global edition, 16th edition), 2022
- Steven L. Franconeri, Lace M. Padilla, Priti Shah, Jeffrey M. Zacks, and Jessica Hullman: The Science of Visual Data Communication: What Works Psychological Science in the Public Interest, 22(3), 110–161, 2022
- Douglas Walton: Argumentation Theory – A Very Short Introduction. In: Simari, G., Rahwan, I. (eds) Argumentation in Artificial Intelligence. Springer, Boston, MA, 2009

Examination Type: Module Examination

Assessment Type: Digital submission of asynchronous presentation, including reflection

Duration/Length: Asynchronous/Digital submission

Weight: 100%

Scope: All intended learning outcomes of the module

Module achievement: Asynchronous presentation on a topic relating to the major of the student, including a reflection including concept outlining the rationale for how arguments are selected and presented based on a particular target group for a particular purpose. The presentation shall be multimedial and include the presentation of data

The module achievement ensures sufficient knowledge about key concepts of effective communication including a reflection on the presentation itself

Completion: To pass this module, the examination has to be passed with at least 45%.

8.2.9 Agency, Leadership, and Accountability

Module Name			**Module Code**	**Level (type)**	**CP**
Agency, Leadership, and Accountability			CTNS-NSK-09	Year 3 (New Skills)	5
Module Components					
Number	Name			Type	CP
CTNS-09	Agency, Leadership, and Accountability			Lecture (online)	5
Module Coordinator Prof. Dr. Jules Coleman	**Program Affiliation** • CONSTRUCTOR Track Area			**Mandatory Status** Mandatory for ACS Mandatory elective for all other UG study programs	
Entry Requirements Pre-requisites ☒ none	Co-requisites ☒ none	Knowledge, Abilities, or Skills	**Frequency** Annually (Spring)	**Forms of Learning and Teaching** Online Lectures (35h) Private Study (90h)	
			Duration 1 semester	**Workload** 125 hours	
Recommendations for Preparation					

Content and Educational Aims

Each of us is judged by the actions we undertake and held to account for the consequences of them. Sometimes we may be lucky and our bad acts don't have harmful effects on others. Other times we may be unlucky and reasonable decisions can lead to unexpected or unforeseen adverse consequences for others. We are therefore held accountable both for choices and for outcomes. In either case, accountability expresses the judgment that we bear responsibility for what we do and what happens as a result. But our responsibility and our accountability in these cases is closely connected to the idea that we have agency.

Agency presumes that we are the source of the choices we make and the actions that result from those choices. For some, this may entail the idea that we have free will. But there is scientific world view that holds that all actions are determined by the causes that explain them, which is the idea that if we knew the causes of your decisions in advance, we would know the decision you would make even before you made it. If that is so, how can your choice be free? And if it is not free, how can you be responsible for it? And if you cannot be responsible, how can we justifiably hold you to account for it?

These questions express the centuries old questions about the relationship between free will and a determinist world view: for some, the conflict between a scientific world view and a moral world view.

But we do not always act as individuals. In society we organize ourselves into groups: e.g. tightly organized social groups, loosely organized market economies, political societies, companies, and more. These groups have structure. Some individuals are given the responsibility of leading the group and of exercising authority. But one can exercise authority over others in a group merely by giving orders and threatening punishment for non-compliance.

Exercising authority is not the same thing as being a leader? For one can lead by example or by encouraging others to exercise personal judgment and authority. What then is the essence of leadership?

The module has several educational goals. The first is for students to understand the difference between actions that we undertake for which we can reasonably held accountable and things that we do but which we are not responsible for. For example, a twitch is an example of the latter, but so too may be a car accident we cause as a result of a heart attack we had no way of anticipating or controlling. This suggests the importance of control to responsibility. At the heart of personal agency is the idea of control. The second goal is for students to understand what having control means. Some think that the scientific view is that the world is deterministic, and if it is then we cannot have any personal control over what happens, including what we do. Others think that the quantum scientific view entails a degree of indeterminacy and that free will and control are possible, but only in the sense of being unpredictable or random. But then random outcomes are not ones we control either. So, we will devote most attention to trying to understand the relationships between control, causation and predictability.

But we do not only exercise agency in isolation. Sometimes we act as part of groups and organizations. The law often recognizes ways in which groups and organizations can have rights, but is there a way in which we can understand how groups have responsibility for outcomes that they should be accountable for. We need to figure out then whether there is a notion of group agency that does not simply boil down to the sum of individual actions. We will explore the ways in which individual actions lead to collective agency.

Finally, we will explore the ways in which occupying a leadership role can make one accountable for the actions of others over which one has authority.

Intended Learning Outcomes

Students acquire transferable and key skills in this module.

By the end of this module, the students will be able to

1. understand and reflect how the social and moral world views that rely on agency and responsibility are compatible, if they are, with current scientific world views.
2. understand how science is an economic sector, populated by large powerful organizations that set norms and fund research agendas.
3. identify the difference between being a leader of others or of a group – whether a research group or a lab or a company – and being in charge of the group.
4. learn to be a leader of others and groups. Understand that when one graduates one will enter not just a field of work but a heavily structured set of institutions and that one's agency and responsibility for what happens, what work gets done, its quality and value, will be affected accordingly.

Indicative Literature

Hull, David L. "Science as a Process." Science as a Process. University of Chicago Press, 2010;

Feinberg, Joel. "Doing & deserving; essays in the theory of responsibility." (1970).

Usability and Relationship to other Modules

Examination Type: Module Examination

Assessment Type: Written examination

Duration/Length: 120 min

Weight: 100%

Scope: All intended learning outcomes of the module

Completion: To pass this module, the examination has to be passed with at least 45%.

8.2.10 Community Impact Project

<table>
<tr><td colspan="3">Module Name
Community Impact Project</td><td>Module Code
CTNS-CIP-10</td><td>Level (type)
Year 3
(New Skills)</td><td>CP
5</td></tr>
<tr><td colspan="6">Module Components</td></tr>
<tr><td>Number</td><td colspan="3">Name</td><td>Type</td><td>CP</td></tr>
<tr><td>CTNS-10</td><td colspan="3">Community Impact Project</td><td>Project</td><td>5</td></tr>
<tr><td>Module Coordinator
CIP Faculty Coordinator</td><td colspan="3">Program Affiliation
• CONSTRUCTOR Track Area</td><td colspan="2">Mandatory Status
Mandatory elective</td></tr>
<tr><td colspan="3" rowspan="2">Entry Requirements

Pre-requisites
☒ at least 15 CP from CORE modules in the major

Co-requisites
☒ None

Knowledge, Abilities, or Skills
Basic knowledge of the main concepts and methodological instruments of the respective disciplines</td><td>Frequency
Annually
(Fall / Spring)</td><td colspan="2">Forms of Learning and Teaching
• Introductory, accompanying, and final events: 10 hours
• Self-organized teamwork and/or practical work in the community: 115 hours</td></tr>
<tr><td>Duration
1 semester</td><td colspan="2">Workload
125 hours</td></tr>
<tr><td colspan="6">Recommendations for Preparation
Develop or join a community impact project before the 5th or 6th semester based on the introductory events during the 4th semester by using the database of projects, communicating with fellow students and faculty, and finding potential companies, organizations, or communities to target.</td></tr>
<tr><td colspan="6">Content and Educational Aims
CIPs are self-organized, major-related, and problem-centered applications of students' acquired knowledge and skills. These activities will ideally be connected to their majors so that they will challenge the students' sense of practical relevance and social responsibility within the field of their studies. Projects will tackle real issues in their direct and/or broader social environment. These projects ideally connect the campus community to other communities, companies, or organizations in a mutually beneficial way.

Students are encouraged to create their own projects and find partners (e.g., companies, schools, NGOs), but will get help from the CIP faculty coordinator team and faculty mentors to do so. They can join and collaborate in interdisciplinary groups that attack a given issue from different disciplinary perspectives.

Student activities are self-organized but can draw on the support and guidance of both faculty and the CIP faculty coordinator team.</td></tr>
</table>

Intended Learning Outcomes

The Community Impact Project is designed to convey the required personal and social competencies for enabling students to finish their studies at Constructor University as socially conscious and responsible graduates (part of the Constructor University's mission) and to convey social and personal abilities to the students, including a practical awareness of the societal context and relevance of their academic discipline.

By the end of this project, students will be able to

1. understand the real-life issues of communities, organizations, and industries and relate them to concepts in their own discipline;
2. enhance problem-solving skills and develop critical faculty, create solutions to problems, and communicate these solutions appropriately to their audience;
3. apply media and communication skills in diverse and non-peer social contexts;
4. develop an awareness of the societal relevance of their own scientific actions and a sense of social responsibility for their social surroundings;
5. reflect on their own behavior critically in relation to social expectations and consequences;
6. work in a team and deal with diversity, develop cooperation and conflict skills, and strengthen their empathy and tolerance for ambiguity.

Indicative Literature

Not specified

Usability and Relationship to other Modules

- Students who have accomplished their CIP (6th semester) are encouraged to support their fellow students during the development phase of the next year’s projects (4th semester).

Examination Type: Module Examination

Project Assessment, not numerically graded (pass/fail)

Scope: All intended learning outcomes of the module

8.3 Language and Humanities Modules

8.3.1 Languages

The descriptions of the language modules are provided in a separate document, the "Language Module Handbook" that can be accessed from the Constructor University's Language & Community Center internet sites (https://constructor.university/student-life/language-community-center).

8.3.2 Humanities

8.3.2.1 Introduction to Philosophical Ethics

<table>
<tr><td colspan="3">Module Name
Introduction to Philosophical Ethics</td><td>Module Code
CTHU-HUM-001</td><td>Level (type)
Year 1</td><td>CP
2.5</td></tr>
<tr><td colspan="6">Module Components

Number | Name | Type | CP
CTHU-001 | Introduction to Philosophical Ethics | Lecture (online) | 2.5</td></tr>
<tr><td>Module Coordinator

Dr. Eoin Ryan</td><td colspan="3">Program Affiliation

• CONSTRUCTOR Track Area</td><td colspan="2">Mandatory Status

Mandatory elective</td></tr>
<tr><td colspan="3">Entry Requirements

Pre-requisites: ☒ none
Co-requisites: ☒ none
Knowledge, Abilities, or Skills</td><td>Frequency

Annually
(Fall or Spring)</td><td colspan="2">Forms of Learning and Teaching

Online lectures (17.5 h)
Private Study (45h)</td></tr>
<tr><td colspan="3"></td><td>Duration

1 semester</td><td colspan="2">Workload

62.5 hours</td></tr>
<tr><td colspan="6">Recommendations for Preparation</td></tr>
<tr><td colspan="6">Content and Educational Aims

The nature of morality – how to lead a life that is good for yourself, and how to be good towards others – has been a central debate in philosophy since the time of Socrates, and it is a topic that continues to be vigorously discussed. This course will introduce students to some of the key aspects of philosophical ethics, including leading normative theories of ethics (e.g. consequentialism or utilitarianism, deontology, virtue ethics, natural law ethics, egoism) as well as some important questions from metaethics (are useful and generalizable ethical claims even possible; what do ethical speech and ethical judgements actually do or explain) and moral psychology (how do abstract ethical principles do when realized by human psychologies). The course will describe ideas that are key factors in ethics (free will, happiness, responsibility, good, evil, religion, rights) and indicate various routes to progress in understanding ethics, as well as some of their difficulties.</td></tr>
</table>

Intended Learning Outcomes

Upon completion of this module, students will be able to:

1. Describe normative ethical theories such as consequentialism, deontology and virtue ethics.
2. Discuss some metaethical concerns.
3. Analyze ethical language.
4. Highlight complexities and contradictions in typical ethical commitments.
5. Indicate common parameters for ethical discussions at individual and social levels.
6. Analyze notions such as objectivity, subjectivity, universality, pluralism, value.

Indicative Literature

Simon Blackburn, Being Good (2009)

Russ Shafer-Landay, A Concise Introduction to Ethics (2019)

Mark van Roojen, Metaethicas: A Contemporary Introduction (2015)

Usability and Relationship to other Modules

Examination Type: Module Examination

Assessment Type: Written Examination

Duration/Length: 60 min
Weight: 100%

Scope: All intended learning outcomes of the module.

Completion: To pass this module, the examination has to be passed with at least 45%.

8.3.2.2 Introduction to the Philosophy of Science

<table>
<tr><td colspan="2">Module Name
Introduction to the Philosophy of Science</td><td>Module Code
CTHU-HUM-002</td><td>Level (type)
Year 1</td><td>CP
2.5</td></tr>
<tr><td colspan="5">Module Components

Number | Name | Type | CP
CTHU-002 | Introduction to the Philosophy of Science | Lecture (online) | 2.5</td></tr>
<tr><td>Module Coordinator

Dr. Eoin Ryan</td><td colspan="2">Program Affiliation

• CONSTRUCTOR Track Area</td><td colspan="2">Mandatory Status

Mandatory elective</td></tr>
<tr><td colspan="2">Entry Requirements

Pre-requisites: ☒ none
Co-requisites: ☒ none
Knowledge, Abilities, or Skills</td><td>Frequency

Annually
(Fall or Spring)

Duration

1 semester</td><td colspan="2">Forms of Learning and Teaching

Online lectures (17.5h)
Private Study (45h)

Workload

62.5 hours</td></tr>
<tr><td colspan="5">Recommendations for Preparation</td></tr>
<tr><td colspan="5">Content and Educational Aims

This humanities module will introduce students to some of the central ideas in philosophy of science. Topics will include distinguishing science from pseudo-science, types of inference and the problem of induction, the pros and cons of realism and anti-realism, the role of explanation, the nature of scientific change, the difference between natural and social sciences, scientism and the values of science, as well as some examples from philosophy of the special sciences (e.g., physics, biology).
The course aims to give students an understanding of how science produces knowledge, and some of the various contexts and issues which mean this process is never entirely transparent, neutral, or unproblematic. Students will gain a critical understanding of science as a human practice and technology; this will enable them both to better understand the importance and success of science, but also how to properly critique science when appropriate.</td></tr>
<tr><td colspan="5">Intended Learning Outcomes

Upon completion of this module, students will be able to

1. understand key ideas from the philosophy of science.
2. discuss different types of inference and rational processes.
3. describe differences between how the natural sciences, social sciences and humanities discover knowledge.
4. identify ways in which science can be more and less value-laden.
5. illustrate some important conceptual leaps in the history of science.</td></tr>
<tr><td colspan="5">Indicative Literature

Peter Godfrey-Smith, Theory and Reality (2021)

James Ladyman, Understanding Philosophy of Science (2002)

Paul Song, Philosophy of Science: Perspectives from Scientists (2022)</td></tr>
</table>

Usability and Relationship to other Modules

Examination Type: Module Examination

Assessment Type: Written Examination

Duration/Length: 60 min
Weight: 100%

Scope: All intended learning outcomes of the module.

Completion: To pass this module, the examination has to be passed with at least 45%.

8.3.2.3 Introduction to Visual Culture

<table>
<tr><td colspan="3">Module Name
Introduction to Visual Culture</td><td>Module Code
CTHU-HUM-003</td><td>Level (type)
Year 1</td><td>CP
2.5</td></tr>
<tr><td colspan="6">Module Components</td></tr>
<tr><td>Number</td><td colspan="3">Name</td><td>Type</td><td>CP</td></tr>
<tr><td>CTHU-003</td><td colspan="3">Introduction to Visual Culture</td><td>Lecture (online)</td><td>2.5</td></tr>
<tr><td>Module Coordinator
Dr. Irina Chiaburu</td><td colspan="3">Program Affiliation
• CONSTRUCTOR Track Area</td><td colspan="2">Mandatory Status
Mandatory elective</td></tr>
<tr><td colspan="3" rowspan="2">Entry Requirements

Pre-requisites
☒ none

Co-requisites
☒ none

Knowledge, Abilities, or Skills</td><td>Frequency

Annually
(Spring/Fall)</td><td colspan="2">Forms of Learning and Teaching

Online Lecture</td></tr>
<tr><td>Duration
1 semester</td><td colspan="2">Workload
62.5 h</td></tr>
<tr><td colspan="6">Recommendations for Preparation</td></tr>
<tr><td colspan="6">Content and Educational Aims

Of the five senses, the sense of sight has for a long time occupied the central position in human cultures. As John Berger has suggested this could be because we can see and recognize the world around us before we learn how to speak. Images have been with us since the earliest days of the human history. In fact, the earliest records of human history are images found on cave walls across the world. We use images to capture abstract ideas, to catalogue and organize the world, to represent the world, to capture specific moments, to trace time and change, to tell stories, to express feelings, to better understand, to provide evidence and more. At the same time, images exert their power on us, seducing us into believing in their 'innocence', that is into forgetting that as representations they are also interpretations, i.e., a particular version of the world.

The purpose of this course is to explore multiple ways in which images and the visual in general mediate and structure human experiences and practices from more specialized discourses, e.g., scientific discourses, to more informal and personal day-to-day practices, such as self-fashioning in cyberspace. We will look at how social and historical contexts affect how we see, as well as what is visible and what is not. We will explore the centrality of the visual to the intellectual activity, from early genres of scientific drawing to visualizations of big data. We will examine whether one can speak of visual culture of protest, look at the relationship between looking and subjectivity and, most importantly, ponder the relationship between the visual and the real.</td></tr>
</table>

Intended Learning Outcomes

Upon completion of this module, students will be able to

1. understand a range of key concepts pertaining to visual culture, art theory and cultural analysis
2. understand the role visuality plays in development and maintenance of political, social, and intellectual discourses
3. think critically about images and their contexts
4. reflect critically on the connection between seeing and knowing

Indicative Literature

Berger, J., Blomberg, S., Fox, C., Dibb, M., & Hollis, R. (1973). Ways of seeing.

Foucault, M. (2002). The order of things: an archaeology of the human sciences (Ser. Routledge classics). Routledge.

Hunt, L. (2004). Politics, culture, and class in the French revolution: twentieth anniversary edition, with a new preface (Ser. Studies on the history of society and culture, 1). University of California Press.

Miller, V. (2020). Understanding digital culture (Second). SAGE.

Thomas, N. (1994). Colonialism's culture: anthropology, travel and government. Polity Press.

Usability and Relationship to other Modules

Examination Type: Module Component Examination

Assessment: Written examination

Duration/Length: 60 min.
Weight: 100%

Scope: all intended learning outcomes

Completion: To pass this module, the examination has to be passed with at least 45%.

9 Appendix

9.1 Intended Learning Outcomes-Assessment-Matrix

Global Economics and Management BA					Microeconomics	Macroeconomics	Introduction to International Business	Elective CHOICE	Introduction to Finance and Accounting	Public Economics and Policy	Environment and Resource Economics	Comparing Economic Systems	International Economics	Marketing	Investments and Capital Markets	Advanced Econometrics	Information Economics	Managing Public and Nonprofit Org.	Specialization Modules	Internship / Startup and CS	Bachelor Thesis and Seminar	CT Methods	CT New Skills	CT German language and Humanities
Semester					1	2	1	1-2	2	4	3	3	4	3	4	5-6	5-6	5-6	4-6	4-5	6	1-4	3-6	1-2
Mandatory/ mandatory elective					m	m	m	me	m	me	me	me	me	me	me	me	me	me	me	m	m	m	m	m
Credits					7.5	7.5	7.5	15	7.5	7.5	7.5	7.5	7.5	7.5	7.5	5	5	5	5	15	15	20	20	5
	Competencies*																							
Program Learning Outcomes	**A**	**E**	**P**	**S**																				
Distinguish among the interests and activities of private business organizations, governments, international organizations, civil society associations and non-profit organizations	x	x		x	x	x	x		x	x	x	x	x		x		x	x	x					
Evaluate economic, political and societal problems using economics and management theories and scientific reasoning	x			x	x	x				x	x	x	x			x	x	x	x			x		
Apply economic theories and analyses to issues of wide public and professional concern	x			x	x	x				x	x	x	x		x	x	x		x			x		
Apply business and management theories to basic dimensions of the conduct of business		x					x		x					x	x			x						
Articulate the relationships between business decisions, economic policies, and national and international public affairs	x			x	x	x	x			x	x	x	x				x		x					
Identify the appropriate approach to deal with business and institutional actors depending on their interests		x		x			x		x					x	x			x						
Distinguish differences in national and regional perceptions of and approaches to eco- nomic reasoning		x		x			x					x	x	x				x						
Apply social and intercultural competencies needed to take on responsibility in diverse, international teams with competing and overlapping interests		x	x	x			x							x				x	x			x		(x)
Outline and discuss their arguments and the ones of others using a combination of economic, organizational and institutional analyses	x	x	x	x								x	x	x			x	x				x		
Assess and interpret relevant information for policy analyses in selected topics of micro- and macroeconomics	x	x		x	x	x				x	x	x	x			x	x				x			
Describe the state of published knowledge in economics and management	x	x			x	x	x		x	x	x	x	x	x	x	x	x	x	x					
Explain real-life situations and problems of organizations and industries combining key contemporary theories of economics and management with methods and insights of other disciplines		x	x	x			x		x					x	x		x	x	x					
Communicate economic and managerial analysis and solutions appropriately to their audience	x	x	x	x			x							x		x	x	x	x		x			
Investigate problems and undertake scientific or applied research projects	x	x														x					x	x		
Draw scientifically-founded conclusions that consider social, professional, scientific and ethical insights	x	x	x	x				x		x	x	x	x		x	x	x	x	x		x	x	x	(x)
Engage ethically with academic, professional and wider communities and to actively contribute to a sustainable future, reflecting and respecting different views	x	x	x	x				x		x	x			x				x	x		x	x	x	(x)
reflect on interdisciplinary questions by comparing approaches from various disciplines								x									x		x	x		x	(x)	
take responsibility for their own learning, personal and professional development and role in society, evaluating critical feedback and using self-analysis								x											x	x			x	x
Assessment Type																								
Written exam					x	x	x		x	x	x		x		x	x			x			x	x	x
Term paper												x					x		x					
Essay																								x
Project report																				x		x		
Poster presentation																								
Laboratory report																								
Program Code																								
Oral examination																								x
Presentation														x				x	x	x	x		x	x
Practical Assessments																								
Project Assessments																							x	
Portfolio Assessments																								
Bachelor Thesis																					x			
Module achievements							x																x	x

***Competencies: A-scientific/academic proficiency; E-competence for qualified employment; P-development of personality; S-competence for engagement in society**