



C>ONSTRUCTOR
UNIVERSITY

**Study
Program
Handbook**

International Business Administration

Bachelor of Arts

Subject-specific Examination Regulations for International Business Administration (Fachspezifische Prüfungsordnung)

The subject-specific examination regulations for International Business Administration 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 (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).

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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 tomorrow's 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 Humanities 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 International Business Administration Program's mission is to prepare students for their professional occupations in internationally active organizations ranging from small, innovative start-ups to large multinational enterprises. Businesses are active agents of change, using cross-border transactions, such as trade and investments, to shape the future of our globalized world. To succeed in this environment, managers need to understand the nature of international business activities in order to handle the challenges of international companies. The International Business Administration program, is designed for young scholars from all over the world who share an interest in business activities, management, or entrepreneurship in an international context.

The program covers all essential areas of international business and management, combining theoretical knowledge, practical application, and scientific methods. Half of the modules in the first

year focus on the foundations of international business administration, such as management concepts and theories of internationalization of firms, as well as the principles of finance and accounting. The other half of the first year modules introduce micro- and macro-economic theories. The combination of business administration and economics in their first study year allows students to understand the interactions between the activities of individual firms and their economic environment. In the second year, the modules in the International Business Administration Program are designed to allow students to develop their own academic profile. The core topics of international business administration are conveyed through combinations of different perspectives, such as entrepreneurial challenges and creative solutions, design thinking, e-business, digital transformation, investment and capital markets, entrepreneurship and innovation, strategic management, project management, marketing, and organizational and human resource management. In their second year of studies, the students have the opportunity of choosing modules that suit their future ambitions. This could be more finance focused, entrepreneurship centred, or rooted in general business administration. The combination of these perspectives shapes the individual student's profile while simultaneously ensuring a multifaceted understanding of international business administration. The final year of the International Business Administration Program allows students to sharpen their profiles by letting them choose three specialization modules each of which places more emphasizes on the perspectives offered in the second year of studies.

To expose students to international business administration theories, to their application and to the latest scientific methods in this field, the program applies a combination of lectures, seminars, and case studies and fosters an informed, comparative, and critical understanding of common business practices, problems, and values in an international, diverse context.

The international and diverse student body at Constructor University helps students to experience, understand and manage the complex and changing environmental forces that impact international business, and to learn how managers and companies can effectively adapt to these forces.

1.2 Specific Advantages of the International Business Administration Program at Constructor University

Right from the start, the International Business Administration Program (IBA) exposes students to the challenges of international business. Challenging case studies of real companies require students to develop creative solutions in intercultural teams. Working in small teams to tackle these challenges is an integral part of the study program. With its diverse and international student body, Constructor University provides an ideal environment in which to study International Business Administration. Already in the classroom students are exposed to transnational and culturally diverse teams and topics from a variety of industries. This intense exposure to real challenges of international companies combined with highly international and diverse student teams is a unique advantage of the International Business Administration Program at Constructor University. Graduates will be prepared to take on managerial responsibilities in international companies as well as to join and undertake internationally prestigious master's programs in International Business or Management.

Within the IBA program, the students can study a wide range of modules that are business and management related. They also have the opportunity to choose a more entrepreneurship focused pathway by selecting modules that are offered as an Entrepreneurship, Innovation and Management minor (EIM), or to attend modules that are specialized in finance and economics subjects (finance and economics in the first year, investment in the second year, and blockchain technology, various finance and economics specialization modules in the final year).

Constructor University students can choose to specialize in International Business Administration or to combine their IBA studies with a minor from another discipline at Constructor University, such as Industrial Engineering and Management, International Relations and Political History, Data Science,

Integrated Social and Cognitive Psychology, Earth and Environmental Sciences, or Computer Science. Each of these minor combinations allows students to develop a specific and unique profile. A minor in Industrial Engineering and Management or Psychology emphasizes the knowledge of sourcing and production processes and the behavior of employees and consumers.

1.3 Program-specific Educational Aims

1.3.1 Qualification Aims

The IBA study program awards a Bachelor of Arts degree. This program examines the key questions of international companies and seeks to explain how these companies operate and coordinate their activities in a globalized world. The scientific education provided by the program focuses on qualitative and quantitative techniques and coursework.

1.3.2 Intended Learning Outcomes

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

1. critically discuss and apply modern theories of business and economics;
2. explain the organizational behavior of Multinational Enterprises (MNE), Small and Medium Sized Enterprises (SME) and other organizations in diverse cultural and economic environments;
3. discuss how the political, economic, social, and technological environment affects business functions in a globalized world;
4. apply principles of international strategy to evaluate and solve challenges of transnational business activities;
5. apply the principles of marketing, organization and human resource management to evaluate and solve challenges of cross-cultural stakeholders inside and outside a company;
6. Utilize the principles of finance and accounting to describe and evaluate the financial performance of companies;
7. advance creative solutions for real international business situations using management knowledge and creative techniques such as design thinking;
8. defend these solutions in discussions with specialists and non-specialists;
9. utilize entrepreneurial thinking in a variety of situations such as the development of business models and startups;
10. consider the social responsibility and ethical behavior of individuals, organizations and governments;
11. use advanced statistical software and methods in research and business;
12. work as effective members of a team and manage projects effectively;
13. structure and communicate complex issues;
14. communicate professionally with a consideration of the content and audience;
15. engage ethically with academic, professional, and wider communities and actively contribute to a sustainable future, reflecting and respecting different views;
16. take responsibility for their own learning, personal and professional development, and role in society, evaluating critical feedback and performing self-analysis;
17. apply their knowledge and understanding to a professional context;
18. take on responsibility in a diverse team;
19. adhere to and defend ethical, scientific, and professional standards.

1.4 Career Options and Support

With its clear focus on the management of firms in international business activities, students acquire solid labor-market qualifications for careers in a broad range of businesses, especially international and internationalizing firms. In the last years, our graduates have obtained internships and positions in a variety of leading companies, including Bosch, Deloitte, and KPMG.

The IBA program has taken our graduates onto a rich diversity of career paths. The academic rigor of the program prepares students for highly ranked graduate programs, such as IE Madrid or University of Amsterdam.

Due to their experience working and living with students from more than 100 countries on Constructor University's international campus, IBA 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:

Dr. PingPing Meckel

Senior Lecturer in Management

Email: pmeckel@constructor.university

or visit our program website: <https://constructor.university/programs/undergraduate-education/international-business-administration>

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. 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.

4C Curriculum

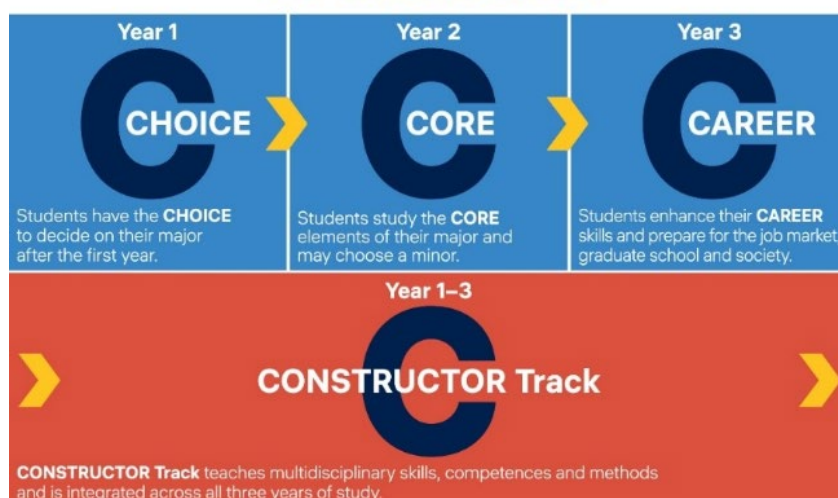


Figure 1: The Constructor University 4C-Model

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 curricular structure allows students to select their major freely upon entering Constructor University. The team of Academic Advising Services offers curricular counseling to all Bachelor students independently of their major, while Academic Advisors support students in their decision-making regarding their major study program as contact persons from the faculty.

To pursue International Business Administration as a major, students take the following mandatory (m) CHOICE modules (30 CP):

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

The combination of business administration and economics allows students to understand the interactions between the activities of individual firms and their economic environments.

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 their major choice becomes fixed.

Students can still change to another major at their beginning of the second semester of study, provided they have taken the corresponding mandatory CHOICE modules in their first semester 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.

The major change options and requirements for IBA students are listed below:

- All IBA students have the option to change to the following major, after the first year of studies:
 - o Earth Sciences and Sustainable Management of Environmental Resources (ESSMER)
 - o Industrial Engineering and Management (IEM)

- o Global Economics and Management (GEM)
- o International Relations: Politics and History (IRPH)
- o Integrated Social and Cognitive Psychology (ISCP)

Students who 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. The module descriptions can be found in the respective Study Program Handbook.

- 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)
- International Relations: Politics and History (IRPH)
CHOICE Module: Introduction to International Relations Theory (m, 7.5 CP)
CHOICE Module: Introduction to Modern European History (m, 7.5 CP)
- Integrated Social and Cognitive Psychology (ISCP)
CHOICE Module: Essentials of Cognitive Psychology (m, 7.5 CP)
CHOICE Module: Essentials of Social Psychology (m, 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 practice.

To pursue International Business Administration as a major, at least 30 CP from the following mandatory elective (me) CORE modules need to be taken:

- CORE Module: Applied Project Management (me, 7.5 CP)
- CORE Module: Marketing (me, 7.5 CP)
- CORE Module: Investments and Capital Markets (me, 7.5 CP)
- CORE Module: International Strategic Management (me, 7.5 CP)
- CORE Module: Digital Transformation and Information Economy (me, 5 CP)
- CORE Module: Design Thinking, E-Business & E-Services (me, 2.5 CP) OR Entrepreneurial Challenges and Creative Solutions (me, 2.5 CP)
- CORE Module: Entrepreneurship and Innovation (me, 7.5 CP)

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.

IBA 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 IBA students to:

- select two CHOICE modules (15 CP) from the desired minor program in the first year and
- substitute two of the mandatory elective IBA CORE modules (15 CP) 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 (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 IBA as a major cannot pursue Global Economics and Management (GEM) as a minor; students must declare whether they follow either IBA or GEM as a major at the beginning of the second year of study.

2.2.3 Year 3 – CAREER

During their third year, students prepare and make decisions for their career after graduation. To explore available choices, and to gain professional experience, students take a mandatory summer internship or the Startup Option. The third year of studies allows IBA students to further sharpen their profile with a selection of different specialization modules that can be combined to enhance their specific understanding of innovation processes, managerial capabilities or market transactions, but also focuses on the responsibility of students beyond their discipline (see CONSTRUCTOR Track).

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

The third year of studies allows IBA students to take Specialization modules within their discipline, but also focuses on the responsibility of students beyond their discipline (see CONSTRUCTOR Track).

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.

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.

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

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 IBA as a major, at least 10 of the 15 CP from the following major-specific Specialization Modules need to be taken:

- 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)

A maximum of 5 CP can be taken from major-related modules instead of major-specific Specialization Modules:

- GEM Specialization: Advanced Econometrics (me, 5 CP)
- GEM Specialization: Managing Public and Nonprofit Organizations (me, 5 CP)
- GEM Specialization: Information Economics (me, 5 CP)
- GEM Specialization: Current Topics in Business and Economics (me, 5 CP)
- MDDA Specialization: Financial Data Analytics (me, 5 CP)

Students may also select 15 CP entirely from their major-specific Specialization Modules.

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 Programs Office (<https://constructor.university/student-life/study-abroad/international-office>).

IBA 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 15 CP in this area.

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 through 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 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 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 a minimum of 20 CP in the Methods area. The size of all Methods modules is 5 CP.

To pursue IBA as a major, the following Methods modules (15 CP) must be taken as mandatory modules:

- Methods Module: Applied Calculus (m, 5 CP)
- Methods Module: Applied Statistics with SPSS (me, 5 CP) **or** Methods Module: Applied Statistics with R (me, 5 CP)
- Methods Module: Qualitative Research Methods (m, 5 CP)

For the remaining 5 CP IBA students can choose between the following two Methods modules:

- Methods Module: Econometrics (me, 5 CP)
- Methods Module: Data Collection and Empirical Research Methodologies (me, 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 20 CP of New Skills modules in their second year and third year of studies. Students choose New Skills modules from the following portfolio:

- New Skills Module: Logic* (me, 2.5 CP)
- New Skills Module: Causation and Correlation* (me, 2.5 CP)
- New Skills Module: Argumentation, Data Visualization and Communication* (me, 5 CP)
- New Skills Module: Models, Matrices and Theories of Complex Systems (me, 5 CP)
- New Skills Module: Complex Problem Solving (me, 5 CP).
- New Skills Module: Agency, Leadership and Accountability (me, 5 CP)
- New Skills Module: Community Impact Project (me, 5 CP).

Some of these modules (marked by *) will be offered with two different perspectives from which the students can only choose one for the fulfillment of graduation requirements of their degree program. The module perspectives are independent modules which examine the topic from different points of view. Please see the module description in chapter 7 for more details such as scheduling, content and assessment.

2.3.3 German Language and Humanities Modules

Students are required to take 5 CP of German language or 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 2 German modules (2.5 CP each), but are not obliged to do so. Native speakers and other students who are not taking advantage of this offer 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 International Business Administration as a Minor in Entrepreneurship, Innovation and Management

A minor in Entrepreneurship, Innovation and Management (EIM) will meet the expectations of prospective students with a strong interest in entrepreneurship and the management of innovations in a globalized and international environment. EIM focuses on how firms and individuals make decisions regarding the identification and exploitation of business opportunities and how innovations and innovation processes can be managed within a firm.

3.1 Qualification Aims

The purpose of a minor in EIM is to enable graduates to complement their knowledge obtained in their major program with an entrepreneurial business perspective. The principles of entrepreneurship and innovation management are highly relevant in a world characterized by globalization, rapid technological change, and scarce resources. The basics of international business administration, covered in the first year's CHOICE modules, convey a business-driven approach to problem solving. The two second year CORE modules Entrepreneurship and Innovation and Digital Transformation and Information Economy develop these approaches further by expanding the perspective to the process of entrepreneurship and technology management.

3.1.1 Intended Learning Outcomes

With a minor in EIM, students will be able to:

1. critically discuss and apply modern theories in business and entrepreneurship;
2. explain the principles of idea creation and innovation management;
3. discuss how the political, economic, social, and technological environments affect business functions in a globalized world;
4. Utilize the principles of finance and accounting to describe and evaluate the financial performance of companies and new business ventures;
5. defend their solutions in discussions with specialists and non-specialists.

3.2 Module Requirements

A minor in EIM requires 30 CP. The default option to obtain a minor in EIM is marked in the Study and Examination Plans in Section 6. It includes the following CHOICE and CORE modules:

- CHOICE Module: Introduction to International Business (m, 7.5 CP)
- CHOICE Module: Introduction to Finance and Accounting (m, 7.5 CP)
- CORE Module: Entrepreneurial Challenges and Creative Solutions (me, 2.5 CP)
- CORE Module: Digital Transformation and Information Economy (me, 5 CP)
- CORE Module: Entrepreneurship and Innovation (me, 7.5 CP)

3.3 Degree

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

3.4 International Business Administration Undergraduate Program Regulations

3.5 Scope of these Regulations

The regulations in this handbook are valid for all students who entered the International Business Administration undergraduate program at Constructor University in Fall 2026. In case of conflict between the regulations in this handbook and the general Policies for Bachelor Studies, the latter apply (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).

Updates to Study Program Handbooks are based on the policies approved by the Academic Senate on substantial and non-substantial changes to study programs. Students are integrated in the decision-making process through their respective committee representatives. All students affected by the changes will be properly informed.

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

3.6 Examination Concept

According to the Policies for Bachelor and Master studies, modules generally carry at least five ECTS. Each program ensures appropriate examination frequency and organization, justified in an examination concept and regularly reviewed with student involvement.

Constructor University's examination concept follows the principle of Constructive Alignment (Biggs, 1996), ensuring that learning outcomes, activities, and assessments are consistently aligned: students learn what is intended, and assessments both measure and shape learning. Where one assessment cannot cover all Intended Learning Outcomes (ILOs) complementary forms could be used (e.g., written exams plus lab reports). Module descriptions map ILOs to assessments.

In specific contexts, such as asynchronous online modules or courses emphasizing student engagement, Module Achievements or other types of formative assessments may support competence-oriented assessment.

Student feedback, embedded in the Quality Assurance System (QAS), systematically monitors workload, competence orientation, and alignment of ILOs and assessments. Student surveys and feedback are regulated in the Policy for student surveys and evaluations.

3.7 Degree

Upon successful completion of the study program, students are awarded a Bachelor of Arts (BA) degree in International Business Administration.

3.8 Graduation Requirements

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

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

4 Schematic Study Plan for International Business Administration

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.

C>ONSTRUCTOR UNIVERSITY

International Business Administration (180 CP)

CHOICE / CORE / CAREER				3 x 45 = 135 CP	CONSTRUCTOR Track	45 CP
3rd Year	Bachelor Thesis / Seminar (research or industry) m, 15 CP			Summer Internship / Start-Up (after 2nd year) m, 15 CP	New Skills modules	
	Specialization me, 5 CP	Specialization me, 5 CP	Specialization me, 5 CP			
2nd Year	Entrepreneurship & Innovation me, 7.5 CP	International Strategic Management me, 7.5 CP	Investments and Capital Markets me, 7.5 CP	Econometrics OR Data Collection and Emp. Research Method. me, 5 CP	me, 20 CP	
	Digital Transformation and Information Economy me, 5 CP	Applied Project Management me, 7.5 CP	Marketing me, 7.5 CP	Qualitative Research Methods m, 5 CP		
	Design Thinking, E-Business & E-Services OR Entrepreneurial Challenges and Creative Solutions m, 2.5 CP					
1st Year	Introduction to Finance and Accounting m, 7.5 CP	Macroeconomics m, 7.5 CP	Own Choice me, 7.5 CP	Applied Statistics with R OR Applied Statistics with SPSS me, 5 CP	German / Humanities me, 2.5 CP	
	Introduction to International Business m, 7.5 CP	Microeconomics m, 7.5 CP	Own Choice me, 7.5 CP	Applied Calculus m, 5 CP	German / Humanities me, 2.5 CP	
CHOICE	Minor Option in EIM (30 CP)					

CP: Credit Points
m: mandatory
me: mandatory elective

Study abroad Option in 5th Semester (22.5 CP)

Figure 2: Schematic Study Plan for IBA

5 Study and Examination Plan

International Business Administration

Matriculation Fall 2026

Program-Specific Modules						Type	Assessment	Period	Status ¹	Sem.	CP	Constructor Track Modules (General Education)						Type	Assessment	Period	Status ¹	Sem.	CP																																																
Year 1 - CHOICE												15																																																											
Take the mandatory CHOICE units listed below, these are a requirement for the International Business Administration program.																																																																							
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																																			
CH-300-B Introduction to International Business Seminar												Seminar																																																											
CH-301 Module: Introduction to Finance and Accounting*												m 2 7.5																																																											
CH-301-A Introduction to Finance												Lecture												Written examination												Examination period																																			
CH-301-B Introduction to Accounting												Lecture																																																											
CH-301-C Finance and Accounting Tutorial												Tutorial																																																											
Unit: General Economics												15																																																											
CH-310 Module: Microeconomics												m 1 7.5																																																											
CH-310-A Microeconomics Theory and Policy												Lecture												Written examination												Examination period																																			
CH-310-B Microeconomics Tutorial												Tutorial																																																											
CH-311 Module: Macroeconomics												m 2 7.5																																																											
CH-311-A Macroeconomics Theory and Policy												Lecture												Written examination												Examination period																																			
CH-311-B Macroeconomics Tutorial												Tutorial																																																											
Unit: CHOICE (own selection)												1/2 15																																																											
Students take one further CHOICE unit from those offered for all other study programs. ²																																																																							
Year 2 - CORE												45																																																											
Take all CORE modules listed below or replace 15 ECTS with the CORE modules from the minor unit of another study program																																																																							
Unit: Management												15																																																											
CO-600 Module: Applied Project Management												me 3 7.5																																																											
CO-600-A Applied Project Management												Lecture												Presentation												During the semester																																			
CO-600-B Applied Project Management Seminar												Seminar																																																											
CO-601 Module: International Strategic Management												me 4 7.5																																																											
CO-601-A International Strategic Management												Lecture												Portfolio												During the semester																																			
CO-601-B International Strategic Management Seminar												Seminar																																																											
Unit: Business Solutions												15																																																											
CO-611 Module: Digital Transformation and Information Economy*												me 3 5																																																											
CO-611-A Digital Transformation and Information Economy												Seminar												Project Assessment												During the semester																																			
CO-612 Module: Design Thinking, E-Business & E-Services												me 3 2.5																																																											
CO-612-A Design Thinking, E-Business & E-Services												Seminar												Project Assessment												During the semester																																			
CO-603 Module: Entrepreneurship and Innovation*												me 3 7.5																																																											
CO-603-A Entrepreneurship and Innovation												Seminar												Presentation												During the semester																																			
CO-613 Module: Entrepreneurial Challenges and Creative Solutions*												me 3 2.5																																																											
CO-613-A Entrepreneurial Challenges and Creative Solutions												Lecture												Presentation												During the semester																																			
Unit: Managing Diversity												15																																																											
CO-604 Module: Marketing												me 3 7.5																																																											
CO-604-A Marketing Lecture												Lecture																																																											
CO-604-B Marketing Seminar												Seminar												Presentation												During the semester																																			
CO-625 Module: Investments and Capital Markets												me 4 7.5																																																											
CO-625-A Investments and Capital Markets												Lecture												Written examination												Examination period																																			
CO-625-B Investments and Capital Markets - Tutorial												Tutorial																																																											

Year 3 - CAREER										45	15											
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 5 th semester																		
CA-IBA-800 Module: Thesis / Seminar IBA										m	6	15										
CA-IBA-800-T	Thesis IBA	Thesis		15 th of May																		
CA-IBA-800-S	Thesis Seminar IBA	Seminar	Presentation Thesis	During the semester																		
Unit: Specialization IBA										m	5/6	15										
Take a total of 15 CP of specialization modules																						
CA-S-IBA-801	Lean Management	Lecture	Presentation	During the semester	me	5	5															
CA-S-IBA-802	Managerial Accounting	Lecture	Written examination	Examination period	me	5	5															
CA-S-IBA-803	Contemporary Topics in Marketing	Seminar	Term paper	Examination period	me	6	5															
CA-S-IBA-805	Blockchain Technology and Applications	Lecture	Term paper	Examination period	me	6	5															
CA-S-GEM-xxx	Specialization elective (from GEM and MDDA) ²	Seminar	Various	During the semester	me	5/6	5															
Total CP													180									

Unit: New Skills										10									
Students must take a total 20 CP in New Skills modules in year 2 and 3																			
CTNS-NSK-05 Module: Models, Matrices and Theories of Complex Systems										me	3/5	5							
CTNS-05	Models, Matrices and Theories of Complex Systems	Seminar (online)	Written Examination	Examination period															
CTNS-NSK-06 Module: Complex Problem Solving										me	3/5	5							
CTNS-06	Complex Problem Solving	Lecture (online)	Written Examination	Examination period															
CTNS-NSK-07 Module: Argumentation, Data Visualization and Communication*										me	3/5	5							
CTNS-07	Argumentation, Data Visualization and Communication (per	Lecture (online)	Written Examination	Examination period															
CTNS-NSK-08 Module: Argumentation, Data Visualization and Communication*										me	4/6	5							
CTNS-08	Argumentation, Data Visualization and Communication (per	Lecture (online)	Written Examination	Examination period															
CTNS-NSK-09 Module: Agency, Accountability & Leadership										me	4/6	5							
CTNS-09	Agency, Accountability & Leadership	Lecture (online)	Written Examination	Examination period															
CTNS-CIP-10 Module: Community Impact Project										me	3/5	5							
CTNS-10	Community Impact Project	Project	Project Assessment	During the Semester															
*These modules are offered with two different perspectives, students may only select one																			

6 Module Descriptions

6.1.1 Introduction to International Business

Module Name	Introduction to International Business
Module Code	CH-300
Module ECTS	7.5
Program Owner	IBA-BA (International Business Administration)
Module Coordinator	Prof. Dr. Christoph Lattemann

Study Semester		
Program	Semester	Status
GEM-BA Global Economics and Management	1	Mandatory
IBA-BA International Business Administration	1	Mandatory
IEM-BSc Industrial Engineering & Management	1	Mandatory
MDDA-BSc Management, Decisions and Data Analytics	1	Mandatory
Minor-EIM-BSc Minor EIM	1	Mandatory

Student Workload	
Seminar	17.5
Independent Study	50
Independent Study	85
Lecture	35
Total Hours	187.5

Module Components	Number	Type	CP
Introduction to International Business	CH-300-A	Lecture	5
Introduction to International Business - Seminar	CH-300-B	Seminar	2.5

Module Description

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.

Intended Learning Outcomes

No	Competence	ILO
1	Understand	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	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	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	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.
5	Discuss	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	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	Define regional economic integration and identify its five levels. Discuss the benefits and drawbacks associated with regional economic integration.
8	Discuss	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	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	Identify international strategies and the corporate-level strategies that companies use.
11	Discuss	Discuss the important issues that influence the choice of organizational structure.

12	Explain	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	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	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.

Entry Requirements

Prerequisites	None
Co-requisites	None
Additional Remarks	None

Assessment and Completion

Module Component	Examination Type	Duration or Length	Weight (%)	Minimum for Pass	ILOs
Introduction to International Business	Written Examination	120 Minutes	100	45%	1-14
Introduction to International Business - Seminar					

Module Completion Requirements

- **Module Examination:** minimum for pass- 45%.

Module Achievement

To pass the module achievement, the average of five case studies (+ one case presentation) has to be 45% or higher. Apart from acquiring practical skills, each participant further needs to demonstrate sufficient understanding of the application of business frameworks for a given context and business challenge. Only with sufficient knowledge, students show that they understand business problems and can solve the challenges by using business frameworks. This is a basic requirement to show that students are ready for the final exam. If the average of all quizzes is lower than 45 %, students have to re-take the course again.

6.1.2 Introduction to Finance and Accounting

Module Name	Introduction to Finance and Accounting
Module Code	CH-301
Module ECTS	7.5
Program Owner	IBA-BA (International Business Administration)
Module Coordinator	Prof. Dr. Andreas Seebeck

Study Semester		
Program	Semester	Status
GEM-BA Global Economics and Management	2	Mandatory
IBA-BA International Business Administration	2	Mandatory
IEM-BSc Industrial Engineering & Management	2	Mandatory
MDDA-BSc Management, Decisions and Data Analytics	2	Mandatory
Minor-EIM-BSc Minor EIM	2	Mandatory

Student Workload	
Lecture	35
Tutorial	17.5
Independent Study	135
Total Hours	187.5

Module Components	Number	Type	CP
Introduction to Finance	CH-301-A	Lecture	2.5
Introduction to Accounting	CH-301-B	Lecture	2.5
Finance and Accounting Tutorial	CH-301-C	Tutorial	2.5

Module Description

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.

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

Recommended Knowledge

It is recommended that students have passed "Introduction to International Business" before attending "Introduction to Finance and Accounting."

Intended Learning Outcomes

No	Competence	ILO
1	Define	Define the basic types of financial management decisions and the role of the financial manager.
2	Explain	Explain the goal of financial management.
3	Compute	Compute the external financing needed to fund a firm's growth and name the determinants of a firm's growth.
4	Determine	Determine the future value of an investment made today and the present value of cash to be received at a future date.
5	Define	Define important bond features, types of bonds, and bond ratings.
6	Outline	Outline the impact of inflation on interest rates.
7	Apply	Apply the Present Value (PV), Net Present Value (NPV), Payback rule, Internal Rate of Return (IRR), and the Profitability Index (PI).
8	Apply	Apply the concept of scenario and sensitivity analysis, calculate the tax shield, accounting break-even point and degree of operating leverage.
9	Identify	Identify and describe the major functions of financial accounting and financial reporting.
10	Explain	Explain the relationship between financial statement elements.
11	Describe	Describe the roles and desirable attributes of financial reporting standards.
12	Demonstrate	Demonstrate knowledge and understanding of the elements of the balance sheet, income statement, cash flow statement, and statement of shareholders' equity.
13	Describe	Describe, explain, and classify cash flow items.

Indicative Literature

- Phillips, F., Clor-Proell, S., Libby, R., Libby P. (2021). Fundamentals of Financial Accounting, 7th Edition. New York: McGraw-Hill Education.
- Ross, S.A., Westerfield, R. and Jordan, B.D., 2023. Fundamentals of corporate finance, 13th Edition. Tata McGraw-Hill Education.

Entry Requirements

Prerequisites	None
Co-requisites	None
Additional Remarks	None

Assessment and Completion

Module Component	Examination Type	Duration or Length	Weight (%)	Minimum for Pass	ILOs
Introduction to Finance	Written Examination	120 Minutes	100	45%	1-13
Introduction to Accounting					
Finance and Accounting Tutorial					

Module Completion Requirements

- **Module Examination:** minimum for pass- 45%.

Module Achievement

None.

6.1.3 Microeconomics

Module Name	Microeconomics
Module Code	CH-310
Module ECTS	7.5
Program Owner	GEM-BA (Global Economics and Management)
Module Coordinator	Prof. Dr. Fabian Dehos

Study Semester		
Program	Semester	Status
ESSMER-BSc Earth Sciences and Sustainable Management of Environmental Resources	1	Mandatory
GEM-BA Global Economics and Management	1	Mandatory
IBA-BA International Business Administration	1	Mandatory
Minor-Gem-BA Minor in Gem	1	Mandatory

Student Workload	
Lecture	35
Seminar	17.5
Independent Study	135
Total Hours	187.5

Module Components	Number	Type	CP
Microeconomics Theory and Policy	CH-310-A	Lecture	5
Microeconomics - Tutorial	CH-310-B	Tutorial	2.5

Module Description

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.

Recommended Knowledge

- Logical reasoning
- High school mathematics
- 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.

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.

Intended Learning Outcomes

No	Competence	ILO
1	Explain	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	Understand	Understand the basics of consumer and producer behavior, and how interactions between consumers and producers give rise to market outcomes that have implications for welfare.
3	Use	Use graphical depictions to derive insights into how markets function.
4	Identify	Identify the key features that distinguish perfectly competitive markets from non-competitive markets as well as the sources of market failure.
5	Recognize	Recognize that economics is a social science that seeks to answer both positive and normative questions.
6	Distinguish	Distinguish between equity and efficiency when evaluating the outcomes of economic policies.
7	Use	Use economic concepts to critically assess the case for government policies that affect the functioning of markets.

Indicative Literature

- Krugman, P., & Wells, R. (2021). Microeconomics (6th ed.). Worth Publishers. Ch. 1 ("First Principles") to Ch. 17 ("Public Goods and Common Resources")
- Mankiw, N. G. (2023). Principles of Economics (10th ed.). Cengage Learning. Ch. 1 ("Ten Principles of Economics") to Ch. 18 ("Oligopoly")

Entry Requirements

Prerequisites	None
Co-requisites	None
Additional Remarks	None

Assessment and Completion

Module Component	Examination Type	Duration or Length	Weight (%)	Minimum for Pass	ILOs
Microeconomics Theory and Policy	Written Examination	120 Minutes	100	45%	1-7
Microeconomics - Tutorial					

Module Completion Requirements

- **Module Examination:** minimum for pass- 45%.

Module Achievement

None.

6.1.4 Macroeconomics

Module Name	Macroeconomics
Module Code	CH-311
Module ECTS	7.5
Program Owner	GEM-BA (Global Economics and Management)
Module Coordinator	Prof. Dr. Colin Vance

Study Semester		
Program	Semester	Status
ESSMER-BSc Earth Sciences and Sustainable Management of Environmental Resources	2	Mandatory
GEM-BA Global Economics and Management	2	Mandatory
IBA-BA International Business Administration	2	Mandatory
Minor-Gem-BA Minor in Gem	2	Mandatory

Student Workload	
Lecture	35
Tutorial	17.5
Independent Study	135
Total Hours	187.5

Module Components	Number	Type	CP
Macroeconomics Theory and Policy	CH-311-A	Lecture	5
Macroeconomics - Tutorial	CH-311-B	Tutorial	2.5

Module Description

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 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.

Recommended Knowledge

- Logical reasoning
- High school mathematics

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.

Intended Learning Outcomes

No	Competence	ILO
1	Express	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	Explain and differentiate the goals and effectiveness of government interventions to combat economic crises in the form of monetary and fiscal policies.
3	Describe	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	Assess the distributional consequences of economic development and economic policy decisions.
5	Explain	Explain the policy implications of macroeconomic theories.

Indicative Literature

- Mankiw, N.G. (2025). Macroeconomics (12th ed.). Worth Publishers/Macmillan Learning.

Entry Requirements

Prerequisites	None
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Co-requisites	None
Additional Remarks	None

Assessment and Completion

Module Component	Examination Type	Duration or Length	Weight (%)	Minimum for Pass	ILOs
Macroeconomics Theory and Policy	Written Examination	120 Minutes	100	45%	1-5
Macroeconomics - Tutorial					

Module Completion Requirements

- **Module Examination:** minimum for pass- 45%.

Module Achievement

None.

6.1.5 Applied Project Management

Module Name	Applied Project Management
Module Code	CO-600
Module ECTS	7.5
Program Owner	IBA-BA (International Business Administration)
Module Coordinator	Prof. Dr. Lennart Ante

Study Semester		
Program	Semester	Status
IBA-BA International Business Administration	3	Mandatory Elective
IEM-BSc Industrial Engineering & Management	3	Mandatory Elective
Minor-EIM-BSc Minor EIM	3	Mandatory
IRPH-BA International Relations: Politics and History	5	Mandatory Elective

Student Workload	
Lecture	35
Seminar	17.5
Independent Study	135
Total Hours	187.5

Module Components	Number	Type	CP
Applied Project Management	CO-600-A	Lecture	5
Applied Project Management - Seminar	CO-600-B	Seminar	2.5

Module Description

Well-run projects depend entirely on the foundation laid in the initial planning stages, the care and precision of project organization, and excellent teamwork. The module Applied Project Management (APM) offers a detailed look at the characteristics of projects and a hands-on team simulation of the project planning and management process.

The APM module explains various project phases, including major and detailed tasks. It will deal with task assignment and resource allocation, budgeting, tracking, and scheduling techniques as well as with project leadership and team processes. The course will give students hands-on experience with project management, as students have to run a project on their own in teams over the semester.

The lecture component of this module covers the theoretical basics and offers practical examples. The seminar component of this module serves as an exercise based on examples and case studies, which are also carried out over the course hours in homework.

Recommended Knowledge

Before the first session, students should read: Luecke, R. (2004) : Managing Projects Large and Small - The Fundamental Skills for Delivering on Budget and on Time, Harvard Business School Press

Intended Learning Outcomes

No	Competence	ILO
1	Identify	Identify and memorize the key skills to manage projects, including internationally accepted standards and procedures for running and controlling projects.
2	Apply	Apply project management skills to set up, organize, manage and control (real) projects.
3	Analyze	Analyze project performance.
4	Develop	Develop strong analytical and presentation skills.

Indicative Literature

- Bittner, E., Gregorc, W. (ed.) (2010). Experiencing Project Management: Projects, Challenges and Lessons Learned. Hoboken: John Wiley & Sons.
- Larson, E. W., Gray, C. F. (2015). A guide to the project management body of knowledge: PMBOK (®) guide. In: Project Management Institute.
- Larson, E.W.; Gray, C. (2017). Project management: the managerial process, 7th edition. New York: McGraw-Hill Education.
- Luecke, R (2004). Managing projects large and small: the fundamental skills for delivering on budget and on time. Harvard: Harvard Business Press.
- Marks, T. (2012). 20:20 Project Management: How to deliver on time, on budget and on spec. London: Kogan Page Publishers.
- Moriis, P.W.G., Pinto, J. K, Söderland, Jonas (Hg.) (2012). The Oxford handbook of project management. Oxford: Oxford University Press.
- Pries, K. H.; Quigley, J.M (2010). Scrum project management. Boca Raton: CRC press.

Entry Requirements

Prerequisites	CH-300 Introduction to International Business CH-301 Introduction to Finance and Accounting
Co-requisites	None
Additional Remarks	None

Assessment and Completion

Module Component	Examination Type	Duration or Length	Weight (%)	Minimum for Pass	ILOs
Applied Project Management	Presentation	45 minutes	100	45%	1-4
Applied Project Management - Seminar					

Module Completion Requirements

- **Module Examination:** minimum for pass- 45%.

Module Achievement

None.

6.1.6 Entrepreneurial Challenges and Creative Solutions

Module Name	Entrepreneurial Challenges and Creative Solutions
Module Code	CO-613
Module ECTS	2.5
Program Owner	IBA-BA (International Business Administration)
Module Coordinator	Prof. Dr. Lennart Ante

Study Semester		
Program	Semester	Status
IBA-BA International Business Administration	3	Mandatory Elective
Minor-EIM-BSc Minor EIM	3	Mandatory

Student Workload	
Lecture	17.5
Independent Study	45
Total Hours	62.5

Module Components	Number	Type	CP
Entrepreneurial Challenges and Creative Solutions	CO-613-A	Lecture	2.5

Module Description

Many challenges of the ever-growing digitalization require creative approaches to complex solutions. In this course, these challenges will be regarded as entrepreneurial opportunities which can be assessed and potentially solved with an entrepreneurial approach. Due to the complex nature of many challenges, students will apply selective creative techniques, such as brainstorming, 6-3-5 or Walt-Disney, to dismantle problems, question potential solutions and finally develop entrepreneurial answers to these questions.

By applying principles from entrepreneurship and critical decision making, students shall be enabled to discover alternative and transdisciplinary options to address challenges in various settings.

This 2.5 CP module supports Academic Excellence by providing essential contextual knowledge that underpins the program's qualification aims, while appropriately limiting academic depth relative to the core technical competencies of the field.

Intended Learning Outcomes

No	Competence	ILO
1	Understand	Understand the essence of entrepreneurship.

2	Understand	Understand the principles of creativity in management.
3	Learn	Learn and apply different creativity techniques.
4	Assess	Assess various challenges through the lens of entrepreneurial principles.
5	Analyze	Analyze and identify opportunities and solutions in a creative and systematic way.

Indicative Literature

Entry Requirements

Prerequisites	None
Co-requisites	None
Additional Remarks	None

Assessment and Completion

Module Component	Examination Type	Duration or Length	Weight (%)	Minimum for Pass	ILOs
Entrepreneurial Challenges and Creative Solutions	Presentation	20 min	100	45%	1-5

Module Completion Requirements

- **Module Examination:** minimum for pass- 45%.

Module Achievement

None.

6.1.7 International Strategic Management

Module Name	International Strategic Management
Module Code	CO-601
Module ECTS	7.5
Program Owner	IBA-BA (International Business Administration)
Module Coordinator	Dr. Matthias Meckel

Study Semester		
Program	Semester	Status
IBA-BA International Business Administration	4	Mandatory Elective
IEM-BSc Industrial Engineering & Management	4	Mandatory Elective
Minor-EIM-BSc Minor EIM	4	Mandatory

Student Workload	
Lecture	35
Seminar	17.5
Independent Study	135
Total Hours	187.5

Module Components	Number	Type	CP
International Strategic Management	CO-601-A	Lecture	5
International Strategic Management - Seminar	CO-601-B	Seminar	2.5

Module Description

This module will explore the nature of strategy, the forces of competition and strategic decision-making in a globalized world. The module covers the principles of both business-level and corporate-level strategies in international organizations. It is designed to introduce a wide variety of modern strategy frameworks and methodologies, including methods of assessing the attractiveness of foreign markets, and the strength of competition, for understanding relative bargaining power, for anticipating competitors' actions, and for analyzing cost and value structures in global supply chains.

The lecture part of this module conveys the relevant concepts and theories of international strategic management in an interactive manner. In the seminar part, students will apply this knowledge to real world challenges in international strategic management.

Recommended Knowledge

- Academic writing skills

- Good understanding of the principles of international management
- Students should have developed a sound understanding of the principles of international management. In this advanced module, these principles are not repeated but are used as a basis. It is strongly recommended for

all students to refresh their knowledge of the CHOICE module Introduction to International Business.

Usability and Relationship to other Modules

This module prepares students for the Bachelor Thesis focusing on topics in international management

Intended Learning Outcomes

No	Competence	ILO
1	Identify	Identify and explain critical challenges in strategic management.
2	Develop	Develop a sound understanding of the mechanisms behind international strategic assessments and planning processes.
3	Evaluate	Evaluate and design strategies in international management, such as market selection or entry mode choices.
4	Acquire	Acquire and develop additional knowledge and skills needed to support strategic decision making in international firms.
5	Utilize	Utilize analytical skills and apply relevant tools as required in the discipline.

Indicative Literature

- Morschett, D., Schramm-Klein, H. & Zentes, J. (2015). Strategic International Management – 3rd edition. Wiesbaden: Springer Gabler.
- Verbeke, A. (2013). International Business Strategy – 2nd edition. Cambridge: Cambridge: University Press.

Entry Requirements

Prerequisites	CH-300 Introduction to International Business CH-301 Introduction to Finance and Accounting
Co-requisites	None
Additional Remarks	None

Assessment and Completion

Module Component		Examination Type	Duration or Length	Weight (%)	Minimum for Pass	ILOs
International Strategic Management	Strategic	Portfolio Assessment (Individual Assignments, Group Assignments)		100	45%	1-5
International Strategic Management - Seminar	Strategic					

Module Completion Requirements

- **Module Examination:** minimum pass 45%- portfolio.

Module Achievement

None.

6.1.8 Digital Transformation and Information Economy

Module Name	Digital Transformation and Information Economy
Module Code	CO-611
Module ECTS	5
Program Owner	IBA-BA (International Business Administration)
Module Coordinator	Dr. Matthias Meckel

Study Semester		
Program	Semester	Status
IBA-BA International Business Administration	3	Mandatory Elective
MDDA-BSc Management, Decisions and Data Analytics	3	Mandatory
Minor-EIM-BSc Minor EIM	3	Mandatory

Student Workload	
Lecture and Presentations	35
Independent Study	90
Total Hours	125

Module Components	Number	Type	CP
Digital Transformation and Information Economy	CO-611-A	Seminar	5

Module Description

Information is a key resource in today's business operations and an important tool for decision-making. This module provides the basics for making informed and effective business decisions in today's information economy. The content of this module is located in the intersection of the Information Economy, Electronic Business, Electronic Commerce, and Electronic Services.

The overall goal of this module is to help students to learn, understand and practice entrepreneurial and innovation processes in the information age. The "Digital Transformation and Information Economy" module helps students to understand today's real-life challenges and problems and to explain complex problems coherently and concisely. Further, students learn to develop and present innovative user-centered and theory-oriented solutions for real-world challenges in an IT-driven world.

The module is strongly based on the paradigm of user-centeredness, the user centered design of services and the ideas of Service Dominant Logic. Service-dominant (S-D) logic is a meta-theoretical framework for explaining value creation, through exchange, among configurations of actors. One underlying idea of S-D logic is that goods are a distribution mechanism for co-created service provision.

In the information age, these co-created services can be supported and enhanced through information technologies (applications and devices). Hence, new technologies enable humans to apply their competences to benefit others and reciprocally benefit from others' applied competences through service-for-service exchange in a more advanced way.

Major challenges and concerns of the digital transformation and information economy will be reflected:

- the role of information in an information society
- globalization & strategic business
- information infrastructure
- new theories and concepts (such as service dominant logic, customer integration, gamification, P2P)
- new applications (e.g., Web 2.0 and Industry 4.0, Facebook, Twitter, Google, eBay, WeChat,)
- new business models
- ethics and security

The module will enable students to collaborate across disciplines with experts in other areas (in particular Design and Engineering) and to apply knowledge in areas of expertise other than their own (thus building so called t-shaped people).

Recommended Knowledge

- Basic knowledge of management concepts and economics
- This module is based on the knowledge students acquired in the CHOICE modules during the first study year

Usability and Relationship to other Modules

This module prepares students who are interested in the consequences of digitization and creative problem solving for their independent studies in the Bachelor Thesis module

Intended Learning Outcomes

No	Competence	ILO
1	Describe	Describe the role of information in the internet economy and in the digital transformation.
2	Summarize	Summarize and classify the new Web 2.0 and Industry 4.0 technologies.
3	Indicate	Indicate the economic and business rules in the information age.
4	Develop	Develop practical knowledge and management skills for digital transformation.
5	Develop	Develop broad global and strategic perspectives.
6	Develop	Develop sensitivity to international social responsibility and public interest issues from various perspectives.

7	Explain	Explain the “service dominant logic” (SDL) for business/entrepreneurial activities and the power of new technologies (e.g. IoT) for customer relationship management.
8	Improve	Improve their oral communication, group and individual presentation skills.
9	Work	Work better as individuals, group members, and group leaders.
10	Outline	Outline how business ethics are also applicable in the field of Information Systems and Management.
11	Adapt	Adapt to a new working culture based on a user-centricity, empathy, and playful testing.

Indicative Literature

- Brynjolfsson, E., McAfee, A. (2016). The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies. New York: Norton & Company, ISBN-13: 978-0393350647, ISBN-10: 0393350649
- Laudon, K. C., Traver, C.G., (2011). Management Information Systems – Managing the Digital Firm (12th Edition). Upper Sadle River: Pearson; ISBN-10: 0-27-375453-X; ISBN-13: 978-0-27-375453-X

Entry Requirements

Prerequisites	CH-300 Introduction to International Business CH-301 Introduction to Finance and Accounting
Co-requisites	None
Additional Remarks	None

Assessment and Completion

Module Component	Examination Type	Duration or Length	Weight (%)	Minimum for Pass	ILOs
Digital Transformation and Information Economy	Project Assessment	40 minutes; Group presentation	100	45%	1-11

Module Completion Requirements

- **Module Examination:** minimum for pass- 45%.

Module Achievement

None.

6.1.9 Design Thinking, E-Business & E-Service

Module Name	Design Thinking, E-Business & E-Service
Module Code	CO-612
Module ECTS	2.5
Program Owner	IBA-BA (International Business Administration)
Module Coordinator	Prof. Dr. Christoph Lattemann

Study Semester		
Program	Semester	Status
IBA-BA International Business Administration	3	Mandatory Elective
MDDA-BSc Management, Decisions and Data Analytics	3	Mandatory

Student Workload	
Project Work	17.5
Independent Study	45
Total Hours	62.5

Module Components	Number	Type	CP
Design Thinking, E-Business & E-Services	CO-612-A	Seminar	2.5

Module Description

This module helps students to improve their theoretical and practical skills in finding practical and innovative solutions for real-world challenges in a business environment

The Design Thinking approach has rapidly been adopted by some of the world's leading brands, such as Apple, Google, Samsung, and GE and the approach is being taught at leading universities around the world, including Stanford and Harvard

Design Thinking is a human-focused, prototype-driven process for innovation. Students will develop a solid understanding of the fundamental concepts of Design Thinking and will learn how to implement new found knowledge in their professional work life

This module is intentionally designed as a 2.5 CP module to enhance Employability by exposing students to professionally relevant working and thinking modes (Design Thinking) rather than requiring in-depth content specialization.

Recommended Knowledge

- Basic knowledge of management concepts and economics

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

Usability and Relationship to other Modules

This module prepares students who are interested in the consequences of digitization and creative problem solving for their independent studies in the Bachelor Thesis module

Intended Learning Outcomes

No	Competence	ILO
1	Apply	Apply the fundamental concepts of Design Thinking by working through a complete innovation project.
2	Understand	Understand why Design Thinking is relevant in an IT-driven world.
3	Apply	Apply ethnographic and analysis methods, which differ from classical market research, such as focus groups and surveys.
4	Initiate	Initiate a new working culture based on a user-centric approach, empathy, and playful testing.
5	Apply	Apply early and fast prototyping as well as testing methods that will help reduce risks and accelerate organizational learning.
6	Work	Work in a team of diverse people and in a diverse environment.

Indicative Literature

- Jakob Schneider und Marc Stickdorn (2010) This is Service Design Thinking: Basics, Tools, Cases; Consortium Book Sales & Dist; ISBN: 9063692560, 9789063692568.

Entry Requirements

Prerequisites	CH-310 Microeconomics CH-311 Macroeconomics CH-300 Introduction to International Business CH-301 Introduction to Finance and Accounting
Co-requisites	None
Additional Remarks	None

Assessment and Completion

Module Component	Examination Type	Duration or Length	Weight (%)	Minimum for Pass	ILOs
Design Thinking, E-Business & E-Services	Project Assessment	30 minutes (Group presentation)	100	45%	1-6

Module Completion Requirements

- **Module Examination:** minimum for pass- 45%.

Module Achievement

None.

6.1.10 Entrepreneurship and Innovation

Module Name	Entrepreneurship and Innovation
Module Code	CO-603
Module ECTS	7.5
Program Owner	IBA-BA (International Business Administration)
Module Coordinator	Prof. Dr. Sven Voelpel

Study Semester		
Program	Semester	Status
IBA-BA International Business Administration	4	Mandatory Elective
MDDA-BSc Management, Decisions and Data Analytics	4	Mandatory
Minor-EIM-BSc Minor EIM	4	Mandatory

Student Workload	
Seminar	52.5
Independent Study	135
Total Hours	187.5

Module Components	Number	Type	CP
Entrepreneurship and Innovation	CO-603-A	Seminar	7.5

Module Description

Innovation is the principal source of sustainable competitive advantage for firms around the world. However, building an organization that can successfully and repeatedly bring innovations to market is a daunting managerial challenge. This module will focus on the practices and processes managers use to manage innovation effectively. Over the semester, several aspects will be examined with regard to innovation: such as exploring, executing, leveraging and renewing innovation. The focus will be on entrepreneurial organizations. The module is designed to provide a deep grounding in the field of innovation for managers and entrepreneurs whose goal is to play a leading role in innovation-driven firms. The material moves between strategic issues (what should you do?) and organizational and managerial issues (how should you get it done?). The focus of the module is on exemplifying and experiencing the innovation process and implementation. Students have to develop business ideas and business plans. They will also be trained to present their business ideas in a pitch.

Recommended Knowledge

This module is based on the knowledge students acquired in the CHOICE modules during the first study year. For preparation, students should recall the topics related to innovation and financial planning.

Usability and Relationship to other Modules

This module prepares students who are interested in founding their own business or StartUp. As such the module can support students who would like to choose the StartUp – Option in the “Internship/ StartUp and Career Skills” module

Intended Learning Outcomes

No	Competence	ILO
1	Identify	Identify organizational, managerial and financial opportunities and challenges within businesses.
2	Create	Create value in terms of products and services while forming a business idea.
3	Sell	Sell their ideas to investors using excellent oral and visual presentation skills.
4	Transform	Transform theoretical knowledge into creative approaches while solving real-world problems.
5	Evaluate	Evaluate the needs of innovation and initiate creative processes to expand businesses.
6	Analyze	Analyze markets and identify the best opportunities for the company formation.

Indicative Literature

- Fraser, L.M., Ormiston, A. (2015). Understanding Financial Statements, 11th Edition, London: Pearson.
- Hisrich, R., Peters, M., Shepherd D (2017). Entrepreneurship & Innovation, 10th Edition, New York: McGraw-Hill.
- Phillips, F., Libby, R., Libby P. (2015). Fundamentals of Financial Accounting, 5th Edition. New York: McGraw-Hill Education.

Entry Requirements

Prerequisites	CH-300 Introduction to International Business CH-301 Introduction to Finance and Accounting
Co-requisites	None
Additional Remarks	None

Assessment and Completion

Module Component	Examination Type	Duration or Length	Weight (%)	Minimum for Pass	ILOs
Entrepreneurship and Innovation	Presentation	10 minutes	100	45%	1-6

Module Completion Requirements

- **Module Examination:** minimum for pass- 45%.

Module Achievement

None.

6.1.11 Investments and Capital Markets

Module Name	Investments and Capital Markets
Module Code	CO-625
Module ECTS	7.5
Program Owner	GEM-BA (Global Economics and Management)
Module Coordinator	Prof. Dr. Lennart Ante

Study Semester		
Program	Semester	Status
GEM-BA Global Economics and Management	4	Mandatory Elective
IBA-BA International Business Administration	4	Mandatory Elective

Student Workload	
Tutorial	17.5
Independent Study	135
Lecture	35
Total Hours	187.5

Module Components	Number	Type	CP
Investments and Capital Markets	CO-625-A	Lecture	5
Investments and Capital Markets - Tutorial	CO-625-B	Tutorial	2.5

Module Description

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.

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

Intended Learning Outcomes

No	Competence	ILO
1	Identify	Identify and describe key concepts and principles of investment theory, including risk-return tradeoffs, portfolio diversification, and asset valuation techniques.
2	Explain	Explain the role of financial instruments such as stocks, bonds, and derivatives within investment strategies and financial markets.
3	Utilize	Utilize basic investment tools and frameworks to analyze financial opportunities and construct diversified portfolios.
4	Assess	Assess how economic trends, sustainability concerns, and technological advancements affect investments and financial markets.
5	Evaluate	Evaluate different investment strategies in light of market conditions and investor goals, identifying trade-offs and potential risks.
6	Utilize	Utilize analytical skills and apply relevant tools as required in investments and capital markets.

Indicative Literature

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

Entry Requirements

Prerequisites	CH-301 Introduction to Finance and Accounting
Co-requisites	None
Additional Remarks	None

Assessment and Completion

Module Component	Examination Type	Duration or Length	Weight (%)	Minimum for Pass	ILOs
Investments and Capital Markets	Written Examination	120 Minutes	100	45%	1-6
Investments and Capital Markets - Tutorial					

Module Completion Requirements

- **Module Examination:** minimum for pass- 45%.

Module Achievement

None.

6.1.12 Marketing

Module Name	Marketing
Module Code	CO-604
Module ECTS	7.5
Program Owner	IBA-BA (International Business Administration)
Module Coordinator	Dr. PingPing Meckel

Study Semester		
Program	Semester	Status
GEM-BA Global Economics and Management	3	Mandatory Elective
IBA-BA International Business Administration	3	Mandatory Elective

Student Workload	
Lecture	35
Seminar	17.5
Independent Study	135
Total Hours	187.5

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

Module Description

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.

Recommended Knowledge

- Academic writing skills
- Interest in creative thinking
- This module is based on the knowledge students acquired in the CHOICE modules during the first year of studies.

Usability and Relationship to other Modules

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

Intended Learning Outcomes

No	Competence	ILO
1	Identify	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 such as the impact of demographic change on consumer segments or the changing influence of market participants in social media.
2	Develop	Develop a sound understanding of the mechanisms behind the marketing of branded goods and services.
3	Connect	Connect theoretical knowledge and practical tools (e.g. online surveys) to explain and evaluate marketing strategies.
4	Combine	Combine entrepreneurial spirit with marketing knowledge when creating and testing their marketing concepts.
5	Utilize	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>.

Entry Requirements

Prerequisites	CH-310 Microeconomics
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	CH-311 Macroeconomics CH-300 Introduction to International Business CH-301 Introduction to Finance and Accounting
Co-requisites	None
Additional Remarks	None

Assessment and Completion

Module Component	Examination Type	Duration or Length	Weight (%)	Minimum for Pass	ILOs
Marketing	Presentation	30 minutes	100	45%	1-5
Marketing - Seminar					

Module Completion Requirements

- **Module Examination:** minimum for pass- 45%.

Module Achievement

None.

6.1.13 Lean Management

Module Name	Lean Management
Module Code	CA-S-IBA-801
Module ECTS	5
Program Owner	IBA-BA (International Business Administration)
Module Coordinator	Prof. Dr.-Ing. Steffen Christoph Eickemeyer

Study Semester		
Program	Semester	Status
GEM-BA Global Economics and Management	5	Mandatory Elective
IBA-BA International Business Administration	5	Mandatory Elective

Student Workload	
Lecture	35
Independent Study	90
Total Hours	125

Module Components	Number	Type	CP
Lean Management	CA-IBA-801	Lecture	5

Module Description

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.

Recommended Knowledge

Before the first session, students should familiarize themselves with Gouveia, R., & Ferro, J. R. (2023). Daily Management to Execute Strategy: Solving Problems and Developing People Every Day. Lean Enterprise Institute. | Caseau, Y. (2022). The Lean Approach to Digital Transformation: From Customer to Code and From Code to Customer. Productivity Press. | Deuse, J., Dombrowski, U., Nöhring, F., Mazarov, J., & Dix, Y. (2020). "Systematic combination of Lean Management with digitalization to improve production systems on the example of Jidoka 4.0." Journal of Industrial Engineering and Management, 13(3), 567-581.

Intended Learning Outcomes

No	Competence	ILO
1	Illustrate	Illustrate an understanding of contemporary topics in lean management relating to theories, models, research methods and industrial applications.
2	Analyze	Analyze published journal articles in the field of lean management and apply these theories to real-world cases.
3	Use	Use the basics of production management and lean office culture.
4	Choose	Choose and use the right lean principles.
5	Develop	Develop a sensibility for the phenomenon of change and the factors that facilitate or hinder it.
6	Discuss	Discuss strategies for managing change in an industrial environment.
7	Explain	Explain tips and tricks for application and implementation.
8	Practice	Practice industry-relevant behavior in their careers.

Indicative Literature

- A Systematic Literature Review on Lean, Industry 4.0, and Digital Factory. (2024). Journal of the Knowledge Economy, 15, 13486–13508.
- Industry 4.0: Managing The Digital Transformation. Springer; Winkelhake, U. (2018). The Digital Transformation of the Automotive Industry. Springer.
- Johansson, P. E., Bruch, J., Chirumalla, K., Osterman, C., & Ståhlberg, L. (2024). "Integrating advanced digital technologies in existing lean-based production systems: analysis of paradoxes, imbalances and management strategies." International Journal of Operations & Production Management, 44(6), 1158-1191.
- 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.

- Powell, D. J., Laubengaier, D. A., Tortorella, G. L., Saabye, H., Antony, J., & Cagliano, R. (2024). "Digitalization in lean manufacturing firms: a cumulative capability development perspective." International Journal of Operations & Production Management, 44(6), 1249-1278.

Entry Requirements

Prerequisites	CH-300 Introduction to International Business CH-301 Introduction to Finance and Accounting
Co-requisites	None
Additional Remarks	None

Assessment and Completion

Module Component	Examination Type	Duration or Length	Weight (%)	Minimum for Pass	ILOs
Lean Management	Presentation	40 minutes	100	45%	1-8

Module Completion Requirements

- **Module Examination:** minimum for pass- 45%.

Module Achievement

None.

6.1.14 Managerial Accounting

Module Name	Managerial Accounting
Module Code	CA-S-IBA-802
Module ECTS	5
Program Owner	IBA-BA (International Business Administration)
Module Coordinator	Prof. Dr. Andreas Seebeck

Study Semester		
Program	Semester	Status
GEM-BA Global Economics and Management	5	Mandatory Elective
IBA-BA International Business Administration	5	Mandatory Elective

Student Workload	
Lecture	35
Independent Study	90
Total Hours	125

Module Components	Number	Type	CP
Managerial Accounting	CA-IBA-802	Lecture	5

Module Description

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.

Recommended Knowledge

Students are expected to refresh their knowledge obtained from the module "Introduction to Finance and Accounting".

Intended Learning Outcomes

No	Competence	ILO
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1	Understand	Understand cost classifications used for assigning costs to cost objects and preparing financial statements.
2	Prepare	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	Apply overhead cost to jobs using a predetermined overhead rateanalyze published journal articles in the field of accounting.
4	Compute	Compute the total cost and the unit product cost of a job.
5	Understand	Understand the flow of costs in a job-order costing system and prepare appropriate journal entries and T-accounts to record costs.
6	Discuss	Discuss contemporary accounting phenomena and practices as outlined in academic and professional publications.
7	Understand	Understand the basic approach in activity-based costing and how it differs from conventional costing.
8	Apply	Apply contemporary accounting practices to real-world challenges.
9	Assign	Assign costs to units and prepare a cost reconciliation report using the weighted-average method.
10	Explain	Explain how changes in activity affect contribution margin and net operating income.
11	Determine	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	Prepare different types of budgets.
13	Compute	Compute different performance

Indicative Literature

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

Entry Requirements

Prerequisites	CH-301 Introduction to Finance and Accounting
Co-requisites	None
Additional Remarks	None

Assessment and Completion

Module Component	Examination Type	Duration or Length	Weight (%)	Minimum for Pass	ILOs

Managerial Accounting	Written Examination	120 Minutes	100	45%	1-13
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Module Completion Requirements

- **Module Examination:** minimum for pass- 45%.

Module Achievement

None.

6.1.15 Contemporary Topics in Marketing

Module Name	Contemporary Topics in Marketing
Module Code	CA-S-IBA-803
Module ECTS	5
Program Owner	IBA-BA (International Business Administration)
Module Coordinator	Dr. Matthias Meckel

Study Semester		
Program	Semester	Status
GEM-BA Global Economics and Management	6	Mandatory Elective
IBA-BA International Business Administration	6	Mandatory Elective
MDDA-BSc Management, Decisions and Data Analytics	6	Mandatory Elective

Student Workload	
Seminar	35
Independent Study	90
Total Hours	125

Module Components	Number	Type	CP
Contemporary Topics in Marketing	CA-IBA-803	Seminar	5

Module Description

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

Recommended Knowledge

- Basic Concepts of Marketing

- 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.

Intended Learning Outcomes

No	Competence	ILO
1	Illustrate	Illustrate an understanding of contemporary topics in marketing relating to theories, models, research methods and empirical phenomena.
2	Analyze	Analyze and assess published journal articles in the field of marketing.
3	Discuss	Discuss contemporary marketing phenomena and practices.
4	Design	Design an adequate empirical research approach for an analysis of a contemporary topic in marketing.

Indicative Literature

- Hanlon, A. (2019). Digital Marketing - Strategic Planning & Integration. Thousand Oakes: Sage.

Entry Requirements

Prerequisites	CH-300 Introduction to International Business CH-301 Introduction to Finance and Accounting
Co-requisites	None
Additional Remarks	None

Assessment and Completion

Module Component	Examination Type	Duration or Length	Weight (%)	Minimum for Pass	ILOs
Contemporary Topics in Marketing	Term Paper	2500 words	100	45%	1-4

Module Completion Requirements

- **Module Examination:** minimum for pass- 45%.

Module Achievement

None.

6.1.16 Blockchain Technology and Applications

Module Name	Blockchain Technology and Applications
Module Code	CA-S-IBA-805
Module ECTS	5
Program Owner	IBA-BA (International Business Administration)
Module Coordinator	Prof. Dr. Lennart Ante

Study Semester		
Program	Semester	Status
GEM-BA Global Economics and Management	6	Mandatory Elective
IBA-BA International Business Administration	6	Mandatory Elective
IEM-BSc Industrial Engineering & Management	6	Mandatory Elective
MDDA-BSc Management, Decisions and Data Analytics	6	Mandatory Elective

Student Workload	
Lecture	35
Independent Study	90
Total Hours	125

Module Components	Number	Type	CP
Blockchain Technology and Applications	CA-IBA-805	Lecture	5

Module Description

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.

Recommended Knowledge

- Basic understanding of digital technologies and business management
- Students are encouraged to familiarize themselves with fundamental blockchain concepts by exploring online resources

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

Intended Learning Outcomes

No	Competence	ILO
1	Explain	Explain the core concepts, architecture, and principles of blockchain technology.
2	Analyze	Analyze the economic, business and societal implications of blockchain applications.
3	Apply	Apply blockchain tools, including digital wallets, tokenization, and transaction verification.
4	Evaluate	Evaluate the potential and limitations of blockchain applications.
5	Propose	Propose blockchain-based solutions to address business and societal challenges, while considering the practical and contextual constraints of their implementation.

Indicative Literature

- Antonopoulos, A. M. (2017). Mastering Bitcoin: Unlocking Digital Cryptocurrencies. O'Reilly Media.
- Nakamoto, S. (2008). Bitcoin: A Peer-to-Peer Electronic Cash System.
- 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>.

Entry Requirements

Prerequisites	None
Co-requisites	None
Additional Remarks	None

Assessment and Completion

Module Component	Examination Type	Duration or Length	Weight (%)	Minimum for Pass	ILOs
Blockchain Technology and Applications	Term Paper	2500 words	100	45%	1-5

Module Completion Requirements

- **Module Examination:** minimum for pass- 45%.

Module Achievement

None.

6.1.17 Advanced Econometrics

Module Name	Advanced Econometrics
Module Code	CA-S-GEM-801
Module ECTS	5
Program Owner	GEM-BA (Global Economics and Management)
Module Coordinator	Prof. Dr. Colin Vance

Study Semester		
Program	Semester	Status
GEM-BA Global Economics and Management	5	Mandatory Elective
IBA-BA International Business Administration	5	Mandatory Elective
MDDA-BSc Management, Decisions and Data Analytics	5	Mandatory Elective

Student Workload	
Seminar	35
Independent Study	90
Total Hours	125

Module Components	Number	Type	CP
Advanced Econometrics	CA-GEM-801	Seminar	5

Module Description

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 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.

Recommended Knowledge

- Notions of substantive versus statistical significance
- Basic knowledge of econometrics
- Academic writing skills
- 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.

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 introductory level towards advanced techniques and applications.

Intended Learning Outcomes

No	Competence	ILO
1	Identify	Identify the econometric method appropriate to specific data types.
2	Implement	Implement the method using R-software and interpret the results.
3	Design	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	Articulate model results in terms that a lay person can understand.
5	Discriminate	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.

Entry Requirements

Prerequisites	CTMS-MET-05 Econometrics
Co-requisites	None
Additional Remarks	None

Assessment and Completion

Module Component	Examination Type	Duration or Length	Weight (%)	Minimum for Pass	ILOs
Advanced Econometrics	Written Examination	120 Minutes	100	45%	1-5

Module Completion Requirements

- **Module Examination:** minimum for pass- 45%.

Module Achievement

None.

6.1.18 Managing Public and Nonprofit Organizations

Module Name	Managing Public and Nonprofit Organizations
Module Code	CA-S-GEM-802
Module ECTS	5
Program Owner	GEM-BA (Global Economics and Management)
Module Coordinator	Prof. Dr. Andreas Seebeck

Study Semester		
Program	Semester	Status
GEM-BA Global Economics and Management	6	Mandatory Elective
IBA-BA International Business Administration	6	Mandatory Elective
IRPH-BA International Relations: Politics and History	6	Mandatory Elective

Student Workload	
Seminar	35
Independent Study	90
Total Hours	125

Module Components	Number	Type	CP
Managing Public and Nonprofit Organizations	CA-GEM-802	Seminar	5

Module Description

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 that 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-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.

Recommended Knowledge

- 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).

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.

Intended Learning Outcomes

No	Competence	ILO
1	Differentiate	Differentiate among the interests and main challenges of the three sectors at play in societies and markets.
2	Label	Label and discuss the fundamental distinctive dimensions of public and nonprofit organizations.
3	Articulate	Articulate the managerial challenges of managing public organizations and nonprofits compared to private firms.
4	Infer	Infer solutions to cross-sector problems in real case situations.
5	Explain	Explain the notion of institutional change from the perspectives of economics, management and organization theory.
6	Practice	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.

Entry Requirements

Prerequisites	CH-300 Introduction to International Business CH-301 Introduction to Finance and Accounting
Co-requisites	None

Additional Remarks	None
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Assessment and Completion

Module Component	Examination Type	Duration or Length	Weight (%)	Minimum for Pass	ILOs
Managing Public and Nonprofit Organizations	Presentation	30 minutes	100	45%	1-6

Module Completion Requirements

- **Module Examination:** minimum for pass- 45%.

Module Achievement

None.

6.1.19 Information Economics

Module Name	Information Economics
Module Code	CA-S-GEM-803
Module ECTS	5
Program Owner	GEM-BA (Global Economics and Management)
Module Coordinator	Prof. Dr. Gert Brunekreeft

Study Semester		
Program	Semester	Status
GEM-BA Global Economics and Management	6	Mandatory Elective
IBA-BA International Business Administration	6	Mandatory Elective

Student Workload	
Seminar	35
Independent Study	90
Total Hours	125

Module Components	Number	Type	CP
Information Economics	CA-GEM-803	Seminar	5

Module Description

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.

Recommended Knowledge

- Writing skills
- Logical and causality-based reasoning
- Students prepare best for this module by reviewing their notes and material from first-year modules in Microeconomics and Macroeconomics.

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.

Intended Learning Outcomes

No	Competence	ILO
1	Distinguish	Distinguish among the key theoretical dimensions of information economics.
2	Apply	Apply microeconomics to analyze real-world cases in information economics.
3	Appraise	Appraise examples of economic policies in information economics.
4	Assess	Assess and discuss key arguments in current debates on information.
5	Reflect	Reflect on what constitutes a clear concise piece of academic writing.

Indicative Literature

- Cabral, L. M. B. (2002). Chapter 17: Networks and Standards, in: Introduction to industrial organization. Cambridge MA: The MIT Press.
- Varian, H.R. (2010). Intermediate microeconomics – a modern approach, 8th Edition. Norton & Company.

Entry Requirements

Prerequisites	CH-310 Microeconomics CH-311 Macroeconomics
Co-requisites	None
Additional Remarks	None

Assessment and Completion

Module Component	Examination Type	Duration or Length	Weight (%)	Minimum for Pass	ILOs
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Information Economics	Term Paper	2500-3000 words	100	45%	1-5
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Module Completion Requirements

- **Module Examination:** minimum for pass- 45%.

Module Achievement

None.

6.1.20 Financial Data Analytics

Module Name	Financial Data Analytics
Module Code	CA-S-MDDA-801
Module ECTS	5
Program Owner	MDDA-BSc (Management, Decisions and Data Analytics)
Module Coordinator	Prof. Dr. Andreas Seebeck

Study Semester		
Program	Semester	Status
GEM-BA Global Economics and Management	5	Mandatory Elective
IBA-BA International Business Administration	5	Mandatory Elective
MDDA-BSc Management, Decisions and Data Analytics	5	Mandatory Elective

Student Workload	
Seminar	35
Independent Study	90
Total Hours	125

Module Components	Number	Type	CP
Financial Data Analytics	CA-MDDA-801	Seminar	5

Module Description

The module 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.

Recommended Knowledge

Basic Concepts of Accounting and Finance

Intended Learning Outcomes

No	Competence	ILO
1	Calculate	Calculate and use accounting ratios.
2	Extract	Extract decision-relevant information from quantitative and qualitative disclosure.
3	Conduct	Conduct an analysis of corporate strategy and link this to the company's financial performance.
4	Identify	Identify and apply the tools of financial statement analysis, including appropriate technology.
5	Integrate	integrate and apply finance and accounting concepts for valuation analysis, including appropriate technology.
6	Apply	Apply a set of diagnostics to assess the quality of the accounting in financial statements.

Indicative Literature

- 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.
- Subramanyam, K. R. (2014). Financial statement analysis. Không nhà xuất bản.
- Yam, P., Cheung, K. C., Fan, K., & Chen, Y. (2023). Financial Data Analytics with Machine Learning, Optimization and Statistics. United Kingdom: Wiley.

Entry Requirements

Prerequisites	CH-301 Introduction to Finance and Accounting
Co-requisites	None
Additional Remarks	None

Assessment and Completion

Module Component	Examination Type	Duration or Length	Weight (%)	Minimum for Pass	ILOs
Financial Data Analytics	Term Paper	2500 words	100	45%	1-6

Module Completion Requirements

- **Module Examination:** minimum for pass- 45%.

Module Achievement

None.

6.1.21 Current Topics in Business and Economics

Module Name	Current Topics in Business and Economics
Module Code	CA-S-GEM-804
Module ECTS	5
Program Owner	GEM-BA (Global Economics and Management)
Module Coordinator	Prof. Dr. Andreas Seebeck

Study Semester		
Program	Semester	Status
GEM-BA Global Economics and Management	5	Mandatory Elective
IBA-BA International Business Administration	5	Mandatory Elective

Student Workload	
Seminar	35
Independent Study	90
Total Hours	125

Module Components	Number	Type	CP
Current Topics in Business and Economics	CA-S-GEM-804	Seminar	5

Module Description

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.

Recommended Knowledge

- 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

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.

Intended Learning Outcomes

No	Competence	ILO
1	Analyze	Analyze and critically evaluate current topics in business and economics.
2	Apply	Apply contemporary theories, practices, and tools to real-world scenarios.
3	Engage	Engage with industry experts and researchers to gain practical insights.
4	Understand	Understand the dynamic nature of business and economic challenges.
5	Adapt	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.

Entry Requirements

Prerequisites	CH-310 Microeconomics CH-311 Macroeconomics CH-300
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	Introduction to International Business CH-301 Introduction to Finance and Accounting
Co-requisites	None
Additional Remarks	None

Assessment and Completion

Module Component	Examination Type	Duration or Length	Weight (%)	Minimum for Pass	ILOs
Current Topics in Business and Economics	Portfolio Assessment (Individual Assignments, Group Assignments)		100	45%	1-5

Module Completion Requirements

- **Module Examination:** minimum pass 45%- portfolio.

Module Achievement

None.

6.1.22 Internship / Startup and Career Skills

Module Name	Internship / Startup and Career Skills
Module Code	CA-INT-900
Module ECTS	15
Program Owner	Career (Career Module for UG programs)
Module Coordinator	Dr. Tanja Woebs Clémentine Senicourt

Study Semester		
Program	Semester	Status
BCCB-BSc Biochemistry and Cell Biology	5	Mandatory
CBT-BSc Chemistry and Biotechnology	5	Mandatory
CS-BSc Computer Science	5	Mandatory
ECE-BSc Electrical and Computer Engineering	5	Mandatory
ESSMER-BSc Earth Sciences and Sustainable Management of Environmental Resources	5	Mandatory
F-ACS-BSc Applied Computer Science	5	Mandatory
IBA-BA International Business Administration	5	Mandatory
IRPH-BA International Relations: Politics and History	5	Mandatory
ISCP-BA Integrated Social and Cognitive Psychology	5	Mandatory
MCCB-BSc Medicinal Chemistry and Chemical Biology	5	Mandatory
MDDA-BSc Management, Decisions and Data Analytics	5	Mandatory
MMDA-BSc Mathematics, Modeling, and Data Analytics	5	Mandatory
PHDS-BSc Physics and Data Science	5	Mandatory
BCCB-BSc Biochemistry and Cell Biology	6	Mandatory
CBT-BSc Chemistry and Biotechnology	6	Mandatory
CS-BSc Computer Science	6	Mandatory
ECE-BSc	6	Mandatory

Electrical and Computer Engineering		
ESSMER-BSc Earth Sciences and Sustainable Management of Environmental Resources	6	Mandatory
GEM-BA Global Economics and Management	6	Mandatory
IBA-BA International Business Administration	6	Mandatory
IRPH-BA International Relations: Politics and History	6	Mandatory
ISCP-BA Integrated Social and Cognitive Psychology	6	Mandatory
MCCB-BSc Medicinal Chemistry and Chemical Biology	6	Mandatory
MMDA-BSc Mathematics, Modeling, and Data Analytics	6	Mandatory
PHDS-BSc Physics and Data Science	6	Mandatory
RIS-BSc Robotics and Intelligent Systems	6	Mandatory
S-ACS-BSc Applied Computer Science	6	Mandatory
SDT-BSc Software, Data and Technology	6	Mandatory

Student Workload	
Internship	308
Internship Event	2
Independent Study	32
Interactive Learning	33
Total Hours	375

Module Components	Number	Type	CP
Internship	CA-INT-900-0	Internship	15

Module Description

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.

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.

Recommended Knowledge

- Information provided on CSC

- Major specific knowledge and skills
- 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

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.

Intended Learning Outcomes

No	Competence	ILO
1	Describe	Describe the scope and the functions of the employment market and personal career development.
2	Apply	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	Manage	Manage their own career orientation processes independently 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	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	Justify professional decisions based on theoretical knowledge and academic methods.
6	Reflect	Reflect on their professional conduct in the context of the expectations of and consequences for employers and their society.
7	Reflect	Reflect on and set their own targets for the further development of their knowledge, skills, interests, and values.
8	Establish	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	Discuss observations and reflections in a professional network.

Indicative Literature

Entry Requirements

Prerequisites	CA-INT-900 Internship / Startup and Career Skills At least 15 CP from CORE modules in the major
Co-requisites	None
Additional Remarks	None

Assessment and Completion

Module Component	Examination Type	Duration or Length	Weight (%)	Minimum for Pass	ILOs
Internship	Project Report	3500 words	100	Pass/Fail	1-9

Module Completion Requirements

- **Module Examination:** pass/fail grading.

Module Achievement

None.

6.1.23 Bachelor Thesis and Seminar IBA

Module Name	Bachelor Thesis and Seminar IBA
Module Code	CA-IBA-800
Module ECTS	15
Program Owner	IBA-BA (International Business Administration)
Module Coordinator	Dr. PingPing Meckel

Study Semester		
Program	Semester	Status
IBA-BA International Business Administration	6	Mandatory Elective

Student Workload	
Independent Study/Laboratory Work	350
Seminar	25
Total Hours	375

Module Components	Number	Type	CP
Thesis IBA	CA-IBA-800-T	Thesis	12
Thesis Seminar IBA	CA-IBA-800-S	Seminar	3

Module Description

This module is a mandatory graduation requirement for all undergraduate students to demonstrate their ability to address a problem from their respective major subject independently by using academic/scientific methods within a time frame. Although supervised, this module requires students to be able to work independently and systematically and set their own goals in exchange for the opportunity to explore a topic that excites and interests them personally and that a faculty member is interested in supervising. Within this module, students apply their acquired knowledge about their major discipline, and their learned skills, and methods for conducting research, ranging from the identification of suitable (short-term) research projects, preparatory literature searches, the realization of discipline-specific research, and the documentation, discussion, interpretation, and communication of the results.

This module consists of two components, an independent thesis and an accompanying seminar. The thesis component must be supervised by a Constructor University faculty member and requires short-term research work, the results of which must be documented in a comprehensive written thesis including an introduction, a justification of the methods, results, a discussion of the results, and a conclusion. The seminar provides students with the opportunity to practice their ability to present, discuss, and justify their and other students' approaches, methods, and results at various stages of their research in order to improve their academic writing, receive and reflect on formative feedback, and therefore grow personally and professionally.

Recommended Knowledge

- Comprehensive knowledge of the subject and deeper insight into the chosen topic
- ability to plan and undertake work independently
- skills to identify and critically review literature
- Identify an area or a topic of interest and discuss this with your prospective supervisor in a timely manner
- Create a research proposal including a research plan to ensure timely submission
- Ensure you possess all required technical research skills or are able to acquire them on time
- Review the University's Code of Academic Integrity and Guidelines to Ensure Good Academic Practice

Usability and Relationship to other Modules

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

Intended Learning Outcomes

No	Competence	ILO
1	Plan	Plan and organize advanced learning processes independently.
2	Design	Design and implement appropriate research methods, taking full account of the range of alternative techniques and approaches.
3	Collect	Collect, assess, and interpret relevant information.
4	Draw	Draw scientifically-founded conclusions that consider social, scientific, and ethical factors.
5	Apply	Apply their knowledge and understanding to a context of their choice.
6	Develop	Develop, formulate, and advance solutions to problems and debates within their subject area, and defend these through argument.
7	Discuss	Discuss information, ideas, problems, and solutions with specialists and non-specialists.

Indicative Literature

- Bell, E., Harley, B. and Bryman, A. (2022), Business Research Methods. 6th ed. Oxford: Oxford University Press.
- Saunders M., Lewis P. and Thornhill A. (2023), Research Methods for Business Students. 9th ed. Harlow: Pearson Education Limited.

Entry Requirements

Prerequisites	None
Co-requisites	None

Additional Remarks	None
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Assessment and Completion

Module Component	Examination Type	Duration or Length	Weight (%)	Minimum for Pass	ILOs
Thesis IBA	Thesis	6.000-8.000 words (15-25 pages), excluding front and back matter.	80	45%	1-6
Thesis Seminar IBA	Presentation	15 to 30 minutes	20	45%	6-7

Module Completion Requirements

- **Module Component Examination:** minimum pass 45% of each assessment.

Module Achievement

None.

7 Constructor Track Modules

7.1 Method Modules

7.1.1 Applied Calculus

Module Name	Applied Calculus
Module Code	CTMS-MAT-08
Module ECTS	5
Program Owner	CT (CONSTRUCTOR Track Area)
Module Coordinator	Prof. Dr. Igors Gorbovickis

Study Semester		
Program	Semester	Status
GEM-BA Global Economics and Management	1	Mandatory
IBA-BA International Business Administration	1	Mandatory
IBA-Online-BA International Business Administration (Online)	1	Mandatory
IEM-BSc Industrial Engineering & Management	1	Mandatory
IEM-Online-BSc Industrial Engineering & Management (Online)	1	Mandatory
MDDA-BSc Management, Decisions and Data Analytics	1	Mandatory

Student Workload	
Lecture	35
Independent Study	90
Total Hours	125

Module Components	Number	Type	CP
Applied Calculus	CTMS-08	Lecture	5

Module Description

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

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.

Recommended Knowledge

- 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

Intended Learning Outcomes

No	Competence	ILO
1	Apply	Apply the fundamental concepts of Calculus in structured situations.
2	Command	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	Explain importance of the methods of Calculus in problems arising from applications.
4	Understand	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.

Entry Requirements

Prerequisites	None
Co-requisites	None
Additional Remarks	None

Assessment and Completion

Module Component	Examination Type	Duration or Length	Weight (%)	Minimum for Pass	ILOs
Applied Calculus	Written Examination	120 Minutes	100	45%	All

Module Completion Requirements

- **Module Examination:** minimum for pass- 45%.

Module Achievement

None.

7.1.2 Applied Statistics with R

Module Name	Applied Statistics with R
Module Code	CTMS-MET-03
Module ECTS	5
Program Owner	CT (CONSTRUCTOR Track Area)
Module Coordinator	Prof. Dr. Adalbert F.X. Wilhelm

Study Semester		
Program	Semester	Status
ESSMER-BSc Earth Sciences and Sustainable Management of Environmental Resources	2	Mandatory
GEM-BA Global Economics and Management	2	Mandatory
IBA-BA International Business Administration	2	Mandatory Elective
IBA-Online-BA International Business Administration (Online)	2	Mandatory
IEM-BSc Industrial Engineering & Management	2	Mandatory
IEM-Online-BSc Industrial Engineering & Management (Online)	2	Mandatory
IRPH-BA International Relations: Politics and History	2	Mandatory Elective
ISCP-BA Integrated Social and Cognitive Psychology	2	Mandatory
MDDA-BSc Management, Decisions and Data Analytics	2	Mandatory

Student Workload	
Assessment Preparation	10
Lecture	17.5
Independent Study	80
Laboratory	17.5
Total Hours	125

Module Components	Number	Type	CP
Applied Statistics with R	CTMS-03	Lecture and Laboratory	5

Module Description

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-variables. 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.

Recommended Knowledge

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

Usability and Relationship to other Modules

- Quantitative analytical skills are used and needed in many modules of all study programs
- Pre-requisite for Econometrics
- This module introduces students to R in preparation for the 2nd year mandatory method module on econometrics and 3rd year module on advanced econometrics

Intended Learning Outcomes

No	Competence	ILO
1	Apply	Apply basic techniques in statistical modeling and quantitative research methods.
2	Describe	Describe fundamental statistical concepts, procedures, their assumptions and statistical fallacies.
3	Explain	Explain the potential of using quantitative methods in all fields of applications.
4	Express	Express informed skepticism of the limitations of statistical reasoning.
5	Interpret	Interpret statistical modeling results in scientific publications.
6	Perform	Perform basic and intermediate-level statistical analyses of data, using R.

Indicative Literature

- Charles Wheelan (2013). Naked Statistics: Stripping the Dread from The Data. New York: W.W. Norton & Company.
- Christopher Gandrud (2015). Reproducible Research with R and RStudio, Second Edition. The R Series, Chapman & Hall/CRC Press.
- 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.
- Michael J. Crawley (2013). The R Book, Second Edition. Hoboken: John Wiley & Sons.
- Peter Daalgaard (2008). Introductory Statistics with R. Berlin: Springer.
- Randall E. Schumacker (2014). Learning Statistics Using R. Thousand Oaks: Sage.

Entry Requirements

Prerequisites	None
Co-requisites	None
Additional Remarks	None

Assessment and Completion

Module Component	Examination Type	Duration or Length	Weight (%)	Minimum for Pass	ILOs
Applied Statistics with R	Written Examination	120 Minutes	100	45%	All

Module Completion Requirements

- **Module Examination:** minimum for pass- 45%.

Module Achievement

None.

7.1.3 Applied Statistics with SPSS

Module Name	Applied Statistics with SPSS
Module Code	CTMS-MET-02
Module ECTS	5
Program Owner	CT (CONSTRUCTOR Track Area)
Module Coordinator	Prof. Dr. Klaus Boehnke

Study Semester		
Program	Semester	Status
IBA-BA International Business Administration	2	Mandatory Elective
IRPH-BA International Relations: Politics and History	2	Mandatory Elective

Student Workload	
Lecture	17.5
Laboratory	17.5
Independent Study	55
Presentation	35
Total Hours	125

Module Components	Number	Type	CP
Applied Statistics with SPSS	CTMS-02	Lecture and Laboratory	5

Module Description

The module offers insights into quantitative methods of social science research and beyond. Students are familiarized with statistical concepts of basic and intermediate complexity. They examine their potential as well as limitations. Students gain knowledge about hypothesis testing for differences in the central tendencies of variables assessed in two or more groups, about bivariate correlations and—simple and multiple—regression. Approaches to finding patterns in social science data will be introduced; alternatives for non-metric, non-normal data will be discussed. The module takes a ‘cookbook approach’, to statistical methods. This means that it conveys how statistical tests are performed and how results are interpreted in the social sciences and beyond, while not requiring students to delve deeply into the mathematical foundations of applied statistics. The material will be presented in more traditional lectures and highly interactive practical labs. During the practical sessions, the tools and concepts discussed during the lecture sessions are applied to data obtained via a survey amongst participants and to ‘real’ datasets obtained in research projects of the methods section of the Department of Psychology & Methods. By attending the module, students will receive a basic training in the statistics software SPSS and develop proficiency in using SPSS as a social science research tool.

Usability and Relationship to other Modules

- Quantitative analytical skills are used and needed in many modules of all study programs.
- 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

Intended Learning Outcomes

No	Competence	ILO
1	Explain	Explain the potential of using quantitative methods in the social sciences.
2	Express	Express informed skepticism to the limitations of statistical reasoning in the social sciences.
3	Interpret	Interpret, within limits, the results sections of reports of empirical social science research.
4	Perform	Perform simple and intermediate-level statistical analyses of social science data, using SPSS.
5	Interpret	Show flexibility in interpreting SPSS output, generated for unknown datasets, obtained from open access sources.

Indicative Literature

- Bryman, A. & Cramer, D. (2011). Quantitative data analysis with IBM SPSS. London: Routledge.
- Field, A. (2017). Discovering statistics using IBM SPSS Statistics. London: Sage.
- George, D. & Mallery, P. (2019). IBM SPSS Statistics 26 step by step. A simple guide and reference. London: Routledge.
- Hinton, P., McMurray, I., & Brownlow, C. (2014). SPSS explained. London: Routledge.
- Pollock III, P.H. (2019). An IBM SPSS companion to political Analysis. London: Sage.

Entry Requirements

Prerequisites	None
Co-requisites	None
Additional Remarks	None

Assessment and Completion

Module Component	Examination Type	Duration or Length	Weight (%)	Minimum for Pass	ILOs
Applied Statistics with SPSS	Written Examination	120 min; During the examinat	100	45%	All

		ion students use of the software SPSS as an auxiliary resource approve d by the Instructo r of Record.			
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Module Completion Requirements

- **Module Examination:** minimum for pass- 45%.

Module Achievement

None.

7.1.4 Qualitative Research Methods

Module Name	Qualitative Research Methods
Module Code	CTMS-MET-04
Module ECTS	5
Program Owner	CT (CONSTRUCTOR Track Area)
Module Coordinator	Dr. Irina Chiaburu

Study Semester		
Program	Semester	Status
GEM-BA Global Economics and Management	3	Mandatory
IBA-BA International Business Administration	3	Mandatory
IBA-Online-BA International Business Administration (Online)	3	Mandatory
IRPH-BA International Relations: Politics and History	3	Mandatory
ISCP-BA Integrated Social and Cognitive Psychology	3	Mandatory

Student Workload	
Independent Study	90
Class Attendance	35
Total Hours	125

Module Components	Number	Type	CP
Qualitative Research Methods	CTMS-04	Seminar	5

Module Description

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 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. 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.

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.

Recommended Knowledge

Patton, Michael Quinn: Qualitative evaluation and research methods (4th ed.), Thousand Oaks etc.: Sage, chapter 2, 2015

Usability and Relationship to other Modules

- Complements Method and Skills module Data Collection and Empirical Research Methodologies.
- This module prepares students for the GEM and IBA 2nd year module on organization and HRM as well as Marketing, the GEM 3rd year module on public and nonprofit management, the IBA 3rd year module on Contemporary Topics in Marketing, and the thesis.

Intended Learning Outcomes

No	Competence	ILO
1	Explain	Explain the principles underlying qualitative research.
2	Apply	Apply basic qualitative approaches and designs.
3	Identify	Identify and address ethical issues arising in qualitative research.
4	Apply	Apply strategies for purposefully selecting participants and cases.
5	Apply	Apply methods for collecting qualitative data.
6	Apply	Apply methods for analyzing qualitative data.
7	Know	Know what to look for in evaluating qualitative research.

Indicative Literature

- Dresing, T., Pehl, T., & Schmieder, C. (2015). Manual (on) transcription. Transcription conventions, software guides, and practical hints for qualitative researchers. 3rd English edition. Marburg. Available under: <http://www.audiotranskription.de/english/transcription-practicalguide.htm>
- 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.

Entry Requirements

Prerequisites	None
Co-requisites	None
Additional Remarks	None

Assessment and Completion

Module Component	Examination Type	Duration or Length	Weight (%)	Minimum for Pass	ILOs
Qualitative Research Methods	Portfolio Assessment	6 Homework assignments and reflection	100	45%	All

Module Completion Requirements

- **Module Examination:** minimum pass 45%- portfolio.

Module Achievement

None.

7.1.5 Econometrics

Module Name	Econometrics
Module Code	CTMS-MET-05
Module ECTS	5
Program Owner	CT (CONSTRUCTOR Track Area)
Module Coordinator	Prof. Dr. Fabian Dehos

Study Semester		
Program	Semester	Status
MDDA-BSc Management, Decisions and Data Analytics	3	Mandatory
ESSMER-BSc Earth Sciences and Sustainable Management of Environmental Resources	4	Mandatory
GEM-BA Global Economics and Management	4	Mandatory
IBA-BA International Business Administration	4	Mandatory Elective
IBA-Online-BA International Business Administration (Online)	4	Mandatory
IEM-BSc Industrial Engineering & Management	4	Mandatory Elective

Student Workload	
Independent Study	90
Seminar	35
Total Hours	125

Module Components	Number	Type	CP
Econometrics	CTMS-05	Seminar	5

Module Description

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.

Recommended Knowledge

- 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”. Journal of Economic Perspectives 22(4): 199-216.
- Knowledge of the ordinary least-squares regression model.
- Ability to estimate regression models using R software.
- Skills in conducting statistical inference tests.

Usability and Relationship to other Modules

- The module is a mandatory / mandatory elective module of the Methods area that is part of the Constructor Track (Methods and New Skills modules; Language and Humanities 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 “Development Economics”
- 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
- Mandatory for a major in GEM.
- Mandatory elective for a major in IBA
- Elective for all other study programs.

Intended Learning Outcomes

No	Competence	ILO
1	Explain	Explain the mechanics and assumptions underpinning the Ordinary Least Squares (OLS) regression model.
2	Estimate	Estimate an OLS model on secondary data using R-software.
3	Interpret	Interpret the coefficient estimates from an OLS model with respect to their sign and magnitude.
4	Conduct	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.

Entry Requirements

Prerequisites	CTMS-MET-03 Applied Statistics with R
Co-requisites	None
Additional Remarks	None

Assessment and Completion

Module Component	Examination Type	Duration or Length	Weight (%)	Minimum for Pass	ILOs
Econometrics	Written Examination	120 Minutes	100	45%	All

Module Completion Requirements

- **Module Examination:** minimum for pass- 45%.

Module Achievement

None.

7.1.6 Data Collection and Empirical Research Methodologies

Module Name	Data Collection and Empirical Research Methodologies
Module Code	CTMS-MET-06
Module ECTS	5
Program Owner	CT (CONSTRUCTOR Track Area)
Module Coordinator	Dr. Mandi Larsen

Study Semester		
Program	Semester	Status
IBA-BA International Business Administration	2	Mandatory Elective
IRPH-BA International Relations: Politics and History	4	Mandatory
ISCP-BA Integrated Social and Cognitive Psychology	4	Mandatory

Student Workload	
Lecture	35
Independent Study and Additional Readings	30
Questionnaire construction and data collection	35
Preparation of research report	25
Total Hours	125

Module Components	Number	Type	CP
Data Collection and Empirical Research Methodologies	CTMS-06	Lecture	5

Module Description

How exactly does empirical research work? This module gives an overview of the basic concepts and strategies involved in conducting empirical research in the social sciences. Students learn about basic approaches towards research, such as quantitative and qualitative, basic and applied, descriptive and explanatory research, and about core concepts of empirical research such as research ethics, generating hypotheses and hypothesis testing, measurement, and evaluation criteria such as reliability and validity. The module shows how these concepts and ideas are applied in the context of various research techniques. Students will actively apply this knowledge to the context of survey research, which is presumably the most widespread mode of gathering data in the social sciences and adjacent disciplines. Students will be familiarized with diverse aspects of sampling strategies, developing state-of-the-art questionnaires, and conducting cutting-edge survey research. Questionnaire construction for different data-gathering modalities (paper-pencil, telephone, face-to-face, online) will be

discussed, as will their utilization in diverse populations (different social groups, cultures and languages). Students will carry out small empirical survey research projects putting these skills into practice.

Usability and Relationship to other Modules

- This module builds on “Academic Writing and Academic Skills”, where students gain critical skills related to academic writing, as well as to understanding empirical literature.
- This module prepares IBA students with an interest in consumer or firm-level research for their Bachelor Thesis
- This module also provides students with a first opportunity to carry out their own data collection, which will be helpful for the Bachelor Thesis.

Intended Learning Outcomes

No	Competence	ILO
1	Describe	Describe basic concepts involved in conducting empirical research in the social sciences.
2	Outline	Outline the empirical research process.
3	Carry out	Carry out a small research project from start to finish.
4	Formulate	Formulate an empirical research question, as well as develop relevant hypotheses.
5	Address	Address issues of random probability sampling.
6	Recognize	Recognize issues related to various modes of data collection.
7	Construct	Construct a social science questionnaire.
8	Compose	Compose a first empirical research report.

Indicative Literature

- Fowler, F. J. (2015). Survey research methods. Thousand Oaks, CA: Sage.
- Gray, D. E. (2014). Doing research in the real world (3rd edition). London: Sage.
- Neumann, W. (2014). Social research methods: Qualitative and quantitative approaches (7th International Edition). Har- low: Pearson.
- Picardie, C. A. & Masick, K. D. (2014). Research methods: Designing and conducting research with a real-world focus. London: Sage.

Entry Requirements

Prerequisites	None
Co-requisites	None
Additional Remarks	None

Assessment and Completion

Module Component	Examination Type	Duration or Length	Weight (%)	Minimum for Pass	ILOs
Data Collection and Empirical Research Methodologies	Term Paper	2500-3000 words	100	45%	Should demonstrate: (1) knowledge of the empirical research process and its key concepts; (2) ability to carry out a small empirical research project; and (3) ability to accurately report on the research process in writing. All intended learning outcomes of the module.

Module Completion Requirements

- **Module Examination:** minimum for pass- 45%.

Module Achievement

None.

7.2 New Skills

7.2.1 Logic (perspective I)

Module Name	Logic (perspective I)
Module Code	CTNS-NSK-01
Module ECTS	2.5
Program Owner	CT (CONSTRUCTOR Track Area)
Module Coordinator	Dr. Marina Christodoulou

Study Semester		
Program	Semester	Status
BCCB-BSc Biochemistry and Cell Biology	3	Mandatory Elective
CBT-BSc Chemistry and Biotechnology	3	Mandatory Elective
CS-BSc Computer Science	3	Mandatory Elective
ECE-BSc Electrical and Computer Engineering	3	Mandatory Elective
ESSMER-BSc Earth Sciences and Sustainable Management of Environmental Resources	3	Mandatory Elective
F-ACS-BSc Applied Computer Science	3	Mandatory Elective
GEM-BA Global Economics and Management	3	Mandatory Elective
IBA-BA International Business Administration	3	Mandatory Elective
IEM-BSc Industrial Engineering & Management	3	Mandatory Elective
IEM-Online-BSc Industrial Engineering & Management (Online)	3	Mandatory Elective
IRPH-BA International Relations: Politics and History	3	Mandatory Elective
ISCP-BA Integrated Social and Cognitive Psychology	3	Mandatory Elective
MCCB-BSc Medicinal Chemistry and Chemical Biology	3	Mandatory Elective
MDDA-BSc Management, Decisions and Data Analytics	3	Mandatory Elective
MMDA-BSc Mathematics, Modeling, and Data Analytics	3	Mandatory Elective

PHDS-BSc Physics and Data Science	3	Mandatory Elective
RIS-BSc Robotics and Intelligent Systems	3	Mandatory Elective
SDT-BSc Software, Data and Technology	3	Mandatory Elective
IRPH-BA International Relations: Politics and History	4	Mandatory Elective
ISCP-BA Integrated Social and Cognitive Psychology	4	Mandatory Elective
S-ACS-BSc Applied Computer Science	4	Mandatory Elective

Student Workload	
Tutorial	17.5
Independent Study	27.5
Online Lecture	17.5
Total Hours	62.5

Module Components	Number	Type	CP
Logic (perspective I)	CTNS-01	Lecture (Online)	2.5

Module Description

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 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.

This 2.5 CP module supports Academic Excellence by providing essential contextual knowledge that underpins the program's qualification aims, while appropriately limiting academic depth relative to the core technical competencies of the field

Intended Learning Outcomes

No	Competence	ILO
1	Apply	Apply the various principles of logic and expand them to computational thinking.
2	Understand	Understand the way in which logical processes in humans and in computers are similar and different at the same time.
3	Apply	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	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.
- Kubica, Jeremy. Computational fairy tales. Jeremy Kubica, 2012.
- Leeds, Stephen. "George Boolos and Richard Jeffrey. Computability and logic. Cambridge University Press, New York and London 1974, x+ 262 pp." The Journal of Symbolic Logic 42.4 (1977): 585-586.
- 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.

Entry Requirements

Prerequisites	None
Co-requisites	None
Additional Remarks	None

Assessment and Completion

Module Component	Examination Type	Duration or Length	Weight (%)	Minimum for Pass	ILOs
Logic (perspective I)	Written Examination	60 Minutes	100	45%	All

Module Completion Requirements

- **Module Examination:** minimum for pass- 45%.

Module Achievement

None.

7.2.2 Logic (perspective II)

Module Name	Logic (perspective II)
Module Code	CTNS-NSK-02
Module ECTS	2.5
Program Owner	CT (CONSTRUCTOR Track Area)
Module Coordinator	Prof. Dr. Jules Coleman

Study Semester		
Program	Semester	Status
BCCB-BSc Biochemistry and Cell Biology	3	Mandatory Elective
CBT-BSc Chemistry and Biotechnology	3	Mandatory Elective
CS-BSc Computer Science	3	Mandatory Elective
ECE-BSc Electrical and Computer Engineering	3	Mandatory Elective
ESSMER-BSc Earth Sciences and Sustainable Management of Environmental Resources	3	Mandatory Elective
F-ACS-BSc Applied Computer Science	3	Mandatory Elective
GEM-BA Global Economics and Management	3	Mandatory Elective
IBA-BA International Business Administration	3	Mandatory Elective
IBA-Online-BA International Business Administration (Online)	3	Mandatory Elective
IEM-BSc Industrial Engineering & Management	3	Mandatory Elective
IEM-Online-BSc Industrial Engineering & Management (Online)	3	Mandatory Elective
IRPH-BA International Relations: Politics and History	3	Mandatory Elective
ISCP-BA Integrated Social and Cognitive Psychology	3	Mandatory Elective
MCCB-BSc Medicinal Chemistry and Chemical Biology	3	Mandatory Elective
MDDA-BSc Management, Decisions and Data Analytics	3	Mandatory Elective
MMDA-BSc Mathematics, Modeling, and Data Analytics	3	Mandatory Elective
PHDS-BSc Physics and Data Science	3	Mandatory Elective

RIS-BSc Robotics and Intelligent Systems	3	Mandatory Elective
SDT-BSc Software, Data and Technology	3	Mandatory Elective
IRPH-BA International Relations: Politics and History	4	Mandatory Elective
ISCP-BA Integrated Social and Cognitive Psychology	4	Mandatory Elective
S-ACS-BSc Applied Computer Science	4	Mandatory Elective

Student Workload	
Independent Study	45
Online Lecture	17.5
Total Hours	62.5

Module Components	Number	Type	CP
Logic (perspective II)	CTNS-02	Lecture (Online)	2.5

Module Description

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. One can view temporal logics as a form of modal logics where propositions are 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.

This 2.5 CP module supports Academic Excellence by providing essential contextual knowledge that underpins the program's qualification aims, while appropriately limiting academic depth relative to the core technical competencies of the field

Intended Learning Outcomes

No	Competence	ILO
1	Apply	Apply the various principles of logic.
2	Explain	Explain practical relevance of non-standard logic.
3	Describe	Describe how many-valued logic extends basic predicate logic.
4	Apply	Apply basic rules of fuzzy logic to calculate partial truth values.
5	Sketch	Sketch basic rules of temporal logic.
6	Implement	Implement predicates in a logic programming language.
7	Prove	Prove some simple non-standard logic theorems.

Indicative Literature

- Baader, Franz. "The Description Logic Handbook: Theory Implementation and Applications", Cambridge University Press, 2nd edition, May 2010.
- Bergmann, Merry. "An Introduction to Many-Valued and Fuzzy Logic: Semantics, Algebras, and Derivation Systems", Cambridge University Press, April 2008.
- Fisher, Michael. "An Introduction to Practical Formal Methods Using Temporal Logic", Wiley, Juli 2011.
- Sterling, Leon S., Ehud Y. Shapiro, Ehud Y. "The Art of Prolog", 2nd edition, MIT Press, March 1994.

Entry Requirements

Prerequisites	None
Co-requisites	None
Additional Remarks	None

Assessment and Completion

Module Component	Examination Type	Duration or Length	Weight (%)	Minimum for Pass	ILOs
Logic (perspective II)	Written Examination	60 Minutes	100	45%	All

Module Completion Requirements

- **Module Examination:** minimum for pass- 45%.

Module Achievement

None.

7.2.3 Causation and Correlation (perspective I)

Module Name	Causation and Correlation (perspective I)
Module Code	CTNS-NSK-03
Module ECTS	2.5
Program Owner	CT (CONSTRUCTOR Track Area)
Module Coordinator	Dr. Marina Christodoulou

Study Semester		
Program	Semester	Status
BCCB-BSc Biochemistry and Cell Biology	4	Mandatory Elective
CBT-BSc Chemistry and Biotechnology	4	Mandatory Elective
CS-BSc Computer Science	4	Mandatory Elective
ECE-BSc Electrical and Computer Engineering	4	Mandatory Elective
ESSMER-BSc Earth Sciences and Sustainable Management of Environmental Resources	4	Mandatory Elective
F-ACS-BSc Applied Computer Science	4	Mandatory Elective
GEM-BA Global Economics and Management	4	Mandatory Elective
IBA-BA International Business Administration	4	Mandatory Elective
IBA-Online-BA International Business Administration (Online)	4	Mandatory Elective
IEM-BSc Industrial Engineering & Management	4	Mandatory Elective
IEM-Online-BSc Industrial Engineering & Management (Online)	4	Mandatory Elective
IRPH-BA International Relations: Politics and History	4	Mandatory Elective
ISCP-BA Integrated Social and Cognitive Psychology	4	Mandatory Elective
MCCB-BSc Medicinal Chemistry and Chemical Biology	4	Mandatory Elective
MDDA-BSc Management, Decisions and Data Analytics	4	Mandatory Elective
MMDA-BSc Mathematics, Modeling, and Data Analytics	4	Mandatory Elective
PHDS-BSc Physics and Data Science	4	Mandatory Elective

RIS-BSc Robotics and Intelligent Systems	4	Mandatory Elective
SDT-BSc Software, Data and Technology	4	Mandatory Elective

Student Workload	
Tutorial	17.5
Independent Study	27.5
Online Lecture	17.5
Total Hours	62.5

Module Components	Number	Type	CP
Causation and Correlation	CTNS-03	Lecture (Online)	2.5

Module Description

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 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.

This 2.5 CP module supports Academic Excellence by providing essential contextual knowledge that underpins the program's qualification aims, while appropriately limiting academic depth relative to the core technical competencies of the field

Intended Learning Outcomes

No	Competence	ILO
1	Formulate	Formulate testable hypotheses that are designed to reveal causal connections and those designed to reveal interesting, important and useful correlations.
2	Distinguish	Distinguish scientifically interesting correlations from unimportant ones.
3	Apply	Apply critical thinking skills to evaluate information.
4	Understand	Understand when and why inquiry into unrealized possibility is important and relevant.

Indicative Literature

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

Entry Requirements

Prerequisites	None
Co-requisites	None
Additional Remarks	None

Assessment and Completion

Module Component	Examination Type	Duration or Length	Weight (%)	Minimum for Pass	ILOs

Causation and Correlation	Written Examination	60 Minutes	100	45%	1-4
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Module Completion Requirements

- **Module Examination:** minimum for pass- 45%.

Module Achievement

None.

7.2.4 Causation and Correlation (perspective II)

Module Name	Causation and Correlation (perspective II)
Module Code	CTNS-NSK-04
Module ECTS	2.5
Program Owner	CT (CONSTRUCTOR Track Area)
Module Coordinator	Dr. Eoin Ryan Dr. Irina Chiaburu Prof. Dr. Keivan Mallahi Karai

Study Semester		
Program	Semester	Status
ISCP-BA Integrated Social and Cognitive Psychology	3	Mandatory Elective
S-ACS-BSc Applied Computer Science	3	Mandatory Elective
BCCB-BSc Biochemistry and Cell Biology	4	Mandatory Elective
CBT-BSc Chemistry and Biotechnology	4	Mandatory Elective
CS-BSc Computer Science	4	Mandatory Elective
ECE-BSc Electrical and Computer Engineering	4	Mandatory Elective
ESSMER-BSc Earth Sciences and Sustainable Management of Environmental Resources	4	Mandatory Elective
F-ACS-BSc Applied Computer Science	4	Mandatory Elective
GEM-BA Global Economics and Management	4	Mandatory Elective
IBA-BA International Business Administration	4	Mandatory Elective
IBA-Online-BA International Business Administration (Online)	4	Mandatory Elective
IEM-BSc Industrial Engineering & Management	4	Mandatory Elective
IEM-Online-BSc Industrial Engineering & Management (Online)	4	Mandatory Elective
IRPH-BA International Relations: Politics and History	4	Mandatory Elective
ISCP-BA Integrated Social and Cognitive Psychology	4	Mandatory Elective
MCCB-BSc Medicinal Chemistry and Chemical Biology	4	Mandatory Elective

MDDA-BSc Management, Decisions and Data Analytics	4	Mandatory Elective
MMDA-BSc Mathematics, Modeling, and Data Analytics	4	Mandatory Elective
PHDS-BSc Physics and Data Science	4	Mandatory Elective
RIS-BSc Robotics and Intelligent Systems	4	Mandatory Elective
SDT-BSc Software, Data and Technology	4	Mandatory Elective
MMDA-BSc Mathematics, Modeling, and Data Analytics	5	Mandatory Elective

Student Workload	
Independent Study	45
Online Lecture	17.5
Total Hours	62.5

Module Components	Number	Type	CP
Causation and Correlation (perspective II)	CTNS-04	Lecture (Online)	2.5

Module Description

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

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" or "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.

This 2.5 CP module supports Academic Excellence by providing essential contextual knowledge that underpins the program's qualification aims, while appropriately limiting academic depth relative to the core technical competencies of the field

Recommended Knowledge

Basic probability theory

Intended Learning Outcomes

No	Competence	ILO
1	Have	Have a clear understanding of the history of causal thinking.
2	Form	Form a critical understanding of the key debates and controversies surrounding the idea of causality.
3	Recognize	Recognize and apply probabilistic causal models.
4	Explain	Explain how understanding of causality differs among different disciplines.
5	Demonstrate	Demonstrate how theoretical thinking about causality has shaped scientific practices.

Indicative Literature

- Ilari, Phyllis McKay and Federica Russo. Causality: Philosophical Theory Meets Scientific Practice. Oxford University Press 2014.
- Paul, L. A. and Ned Hall. Causation: A User's Guide. Oxford University Press 2013.

- Pearl, Judea, Glymour Madelyn and Jewell, Nicolas. Causal Inference in Statistics: A Primer. Wiley 2016.
- Pearl, Judea. Causality: Models, Reasoning and Inference. Cambridge University Press 2009.

Entry Requirements

Prerequisites	None
Co-requisites	None
Additional Remarks	None

Assessment and Completion

Module Component	Examination Type	Duration or Length	Weight (%)	Minimum for Pass	ILOs
Causation and Correlation (perspective II)	Written Examination	60 Minutes	100	45%	1-5

Module Completion Requirements

- **Module Examination:** minimum for pass- 45%.

Module Achievement

None.

7.2.5 Models, Matrices and Theories of Complex Systems

Module Name	Models, Matrices and Theories of Complex Systems
Module Code	CTNS-NSK-05
Module ECTS	5
Program Owner	CT (CONSTRUCTOR Track Area)
Module Coordinator	Prof. Dr. Marc-Thorsten Hütt

Study Semester		
Program	Semester	Status
BCCB-BSc Biochemistry and Cell Biology	5	Mandatory Elective
CBT-BSc Chemistry and Biotechnology	5	Mandatory Elective
CS-BSc Computer Science	5	Mandatory Elective
ECE-BSc Electrical and Computer Engineering	5	Mandatory Elective
ESSMER-BSc Earth Sciences and Sustainable Management of Environmental Resources	5	Mandatory Elective
GEM-BA Global Economics and Management	5	Mandatory Elective
IBA-BA International Business Administration	5	Mandatory Elective
IBA-Online-BA International Business Administration (Online)	5	Mandatory Elective
IRPH-BA International Relations: Politics and History	5	Mandatory Elective
ISCP-BA Integrated Social and Cognitive Psychology	5	Mandatory Elective
MCCB-BSc Medicinal Chemistry and Chemical Biology	5	Mandatory Elective
MDDA-BSc Management, Decisions and Data Analytics	5	Mandatory Elective
MMDA-BSc Mathematics, Modeling, and Data Analytics	5	Mandatory Elective
PHDS-BSc Physics and Data Science	5	Mandatory Elective
RIS-BSc Robotics and Intelligent Systems	5	Mandatory Elective
SDT-BSc Software, Data and Technology	5	Mandatory Elective

Student Workload	
Independent Study	90
Online Lecture	35
Total Hours	125

Module Components	Number	Type	CP
Models, Matrices and Theories of Complex Systems	CTNS-05	Seminar (Online)	5

Module Description

Linear and nonlinear models together with matrix approaches can be useful in diverse disciplines to implement quantitative, computational approaches to exploring complex systems. Some of the most popular data and systems analysis strategies are built upon matrices. 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 and graph theory (part 2) and the embedding of these concepts in nonlinear dynamics (part 3). At the end of the course, we outline applications to graph theory and machine learning (part 4). Along the way we will encounter some of the classical approaches in complex systems: self-organization, deterministic chaos, cellular automata and fractals. 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?

In the end, students will have a clearer understanding of matrix approaches as well as linear and nonlinear models 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.

Recommended Knowledge

The modules Logic and Causation & Correlation are highly recommended.

Intended Learning Outcomes

No	Competence	ILO
1	Apply	Apply the concept of linear modeling in their own discipline.
2	Distinguish	Distinguish between linear and nonlinear interpretation strategies and understand the range of applicability of linear models.

3	Make	Make use of data analysis / data interpretation strategies from other disciplines, which are derived from linear algebra.
4	Know	Be aware of the ties that linear models have to machine learning and network theory,
5	Note	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.

Entry Requirements

Prerequisites	None
Co-requisites	None
Additional Remarks	None

Assessment and Completion

Module Component	Examination Type	Duration or Length	Weight (%)	Minimum for Pass	ILOs
Models, Matrices and Theories of Complex Systems	Written Examination	120 Minutes	100	45%	1-4

Module Completion Requirements

- **Module Examination:** minimum for pass- 45%.

Module Achievement

None.

7.2.6 Complex Problem Solving

Module Name	Complex Problem Solving
Module Code	CTNS-NSK-06
Module ECTS	5
Program Owner	CT (CONSTRUCTOR Track Area)
Module Coordinator	Prof. Dr. Marco Verweij

Study Semester		
Program	Semester	Status
BCCB-BSc Biochemistry and Cell Biology	5	Mandatory Elective
CBT-BSc Chemistry and Biotechnology	5	Mandatory Elective
CS-BSc Computer Science	5	Mandatory Elective
ECE-BSc Electrical and Computer Engineering	5	Mandatory Elective
ESSMER-BSc Earth Sciences and Sustainable Management of Environmental Resources	5	Mandatory Elective
GEM-BA Global Economics and Management	5	Mandatory Elective
IBA-BA International Business Administration	5	Mandatory Elective
IBA-Online-BA International Business Administration (Online)	5	Mandatory Elective
IRPH-BA International Relations: Politics and History	5	Mandatory Elective
ISCP-BA Integrated Social and Cognitive Psychology	5	Mandatory Elective
MCCB-BSc Medicinal Chemistry and Chemical Biology	5	Mandatory Elective
MDDA-BSc Management, Decisions and Data Analytics	5	Mandatory Elective
MMDA-BSc Mathematics, Modeling, and Data Analytics	5	Mandatory Elective
PHDS-BSc Physics and Data Science	5	Mandatory Elective
RIS-BSc Robotics and Intelligent Systems	5	Mandatory Elective
SDT-BSc Software, Data and Technology	5	Mandatory Elective

Student Workload	
Tutorial	17.5
Independent Study	72.5
Online Lecture	35
Total Hours	125

Module Components	Number	Type	CP
Complex Problem Solving	CTNS-06	Lecture (Online)	5

Module Description

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.

Recommended Knowledge

- Being able to read primary academic literature
- Willingness to engage in teamwork
- 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.

Intended Learning Outcomes

No	Competence	ILO
1	Identify	Identify a complex problem.

2	Develop	Develop an acceptable recommendation for resolving complex problems.
3	Understand	Understand the roles that natural and social scientists can play in helping stakeholders resolve complex problems.

Indicative Literature

- 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.
- 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.

Entry Requirements

Prerequisites	None
Co-requisites	None
Additional Remarks	None

Assessment and Completion

Module Component	Examination Type	Duration or Length	Weight (%)	Minimum for Pass	ILOs
Complex Problem Solving	Written Examination	120 Minutes	100	45%	1-3

Module Completion Requirements

- **Module Examination:** minimum for pass- 45%.

Module Achievement

The module achievement is designed to encourage students to regularly engage with the online course materials throughout the semester, thereby providing them with a sufficient grounding in the concepts and applications of complex problem-solving to take the exam. The module achievement consists of online quizzes tied to the course content. In order to fulfill the module achievement — and to be eligible to sit for the final exam — students are required to participate in at least 80% of the available online quizzes. The module achievement is assessed on a pass/non-pass basis and does not affect the overall module grade. Given the flexible, online nature of the quizzes, students are able to complete them at their own convenience within the set timeframes. Students who do not meet the 80% participation threshold before their first exam attempt will have the opportunity to fulfill the module achievement prior to their second exam attempt.

7.2.7 Argumentation, Data Visualization and Communication (perspective I)

Module Name	Argumentation, Data Visualization and Communication (perspective I)
Module Code	CTNS-NSK-07
Module ECTS	5
Program Owner	CT (CONSTRUCTOR Track Area)
Module Coordinator	Prof. Dr. Arvid Kappas

Study Semester		
Program	Semester	Status
BCCB-BSc Biochemistry and Cell Biology	5	Mandatory Elective
CBT-BSc Chemistry and Biotechnology	5	Mandatory Elective
CS-BSc Computer Science	5	Mandatory Elective
ECE-BSc Electrical and Computer Engineering	5	Mandatory Elective
ESSMER-BSc Earth Sciences and Sustainable Management of Environmental Resources	5	Mandatory Elective
F-ACS-BSc Applied Computer Science	5	Mandatory Elective
GEM-BA Global Economics and Management	5	Mandatory Elective
IBA-BA International Business Administration	5	Mandatory Elective
IBA-Online-BA International Business Administration (Online)	5	Mandatory Elective
IRPH-BA International Relations: Politics and History	5	Mandatory Elective
ISCP-BA Integrated Social and Cognitive Psychology	5	Mandatory Elective
MCCB-BSc Medicinal Chemistry and Chemical Biology	5	Mandatory Elective
MDDA-BSc Management, Decisions and Data Analytics	5	Mandatory Elective
MMDA-BSc Mathematics, Modeling, and Data Analytics	5	Mandatory Elective
PHDS-BSc Physics and Data Science	5	Mandatory Elective
RIS-BSc Robotics and Intelligent Systems	5	Mandatory Elective

S-ACS-BSc Applied Computer Science	5	Mandatory Elective
SDT-BSc Software, Data and Technology	5	Mandatory Elective

Student Workload	
Tutorial	17.5
Independent Study	72.5
Online Lecture	35
Total Hours	125

Module Components	Number	Type	CP
Argumentation, Data Visualization and Communication (perspective I)	CTNS-07	Lecture (Online)	5

Module Description

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.

This course is divided into three sections. Section one develops argumentation skills, including how to construct and evaluate claims, how to reason from evidence to conclusions, and how to recognize the cognitive biases and fallacies that can cause arguments to fail. Section two focuses on data visualization as a tool for supporting arguments. A well-designed graph can clarify complex evidence and make an argument accessible, while a poorly designed one can distort the truth. Section three addresses communication. Even a well-designed and supported argument will not persuade its audience if it is not communicated well. You will explore models of communication, the importance of rhetorics, and the ethics of attempting to change the mind of others, including the new and exciting challenges posed by generative AI.

The thread that runs through these sections is a consistent concern with how to support what we claim effectively. Some reasoning is linear: from A we infer B, and from A and B, we infer C, building stepwise towards a conclusion. But not all reasoning takes this form. Sometimes we argue for a claim by showing

that it slots neatly, or fits coherently, with other claims for which we have independent support, or by establishing that those individual pieces of evidence mutually reinforce one another. A key goal of this course is to introduce you to these different structures of justification so that you are aware of both the norms of your discipline and to what makes knowledge trustworthy in the first place.

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.

Recommended Knowledge

The modules Logic and Causation & Correlation are highly recommended.

Intended Learning Outcomes

No	Competence	ILO
1	Distinguish	Distinguish among different modalities of argument, e.g. legal arguments, vs. scientific ones.
2	Construct	Construct arguments using tools of data visualization.
3	Communicate	Communicate conclusions and arguments concisely, clearly and convincingly.

Indicative Literature

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

Entry Requirements

Prerequisites	None
Co-requisites	None
Additional Remarks	None

Assessment and Completion

Module Component	Examination Type	Duration or Length	Weight (%)	Minimum for Pass	ILOs

Argumentation, Visualization Communication (perspective I)	Data and	Written Examination	120 minutes	100	45%	1-3
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Module Completion Requirements

- **Module Examination:** minimum for pass- 45%.

Module Achievement

None.

7.2.8 Argumentation, Data Visualization and Communication (perspective II)

Module Name	Argumentation, Data Visualization and Communication (perspective II)
Module Code	CTNS-NSK-08
Module ECTS	5
Program Owner	CT (CONSTRUCTOR Track Area)
Module Coordinator	Prof. Dr. Arvid Kappas

Study Semester		
Program	Semester	Status
BCCB-BSc Biochemistry and Cell Biology	6	Mandatory Elective
CBT-BSc Chemistry and Biotechnology	6	Mandatory Elective
CS-BSc Computer Science	6	Mandatory Elective
ECE-BSc Electrical and Computer Engineering	6	Mandatory Elective
ESSMER-BSc Earth Sciences and Sustainable Management of Environmental Resources	6	Mandatory Elective
F-ACS-BSc Applied Computer Science	6	Mandatory Elective
GEM-BA Global Economics and Management	6	Mandatory Elective
IBA-BA International Business Administration	6	Mandatory Elective
IBA-Online-BA International Business Administration (Online)	6	Mandatory Elective
IRPH-BA International Relations: Politics and History	6	Mandatory Elective
ISCP-BA Integrated Social and Cognitive Psychology	6	Mandatory Elective
MCCB-BSc Medicinal Chemistry and Chemical Biology	6	Mandatory Elective
MDDA-BSc Management, Decisions and Data Analytics	6	Mandatory Elective
MMDA-BSc Mathematics, Modeling, and Data Analytics	6	Mandatory Elective
PHDS-BSc Physics and Data Science	6	Mandatory Elective
RIS-BSc Robotics and Intelligent Systems	6	Mandatory Elective

S-ACS-BSc Applied Computer Science	6	Mandatory Elective
SDT-BSc Software, Data and Technology	6	Mandatory Elective

Student Workload	
Independent Study	80
Online Lecture	35
Tutorial	10
Total Hours	125

Module Components	Number	Type	CP
Argumentation, Data Visualization and Communication (perspective II)	CTNS-08	Lecture (Online)	5

Module Description

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.

Recommended Knowledge

- The modules Logic and Causation & Correlation are highly recommended.
- Ability and openness to engage in interactions
- Media literacy, critical thinking and a proficient handling of data sources
- Own research in academic literature

Intended Learning Outcomes

No	Competence	ILO
1	Analyze	Analyze communication processes in formal and informal contexts.
2	Identify	Identify challenges and failures in communication.
3	Design	Design communications to achieve specified goals to specific target groups.
4	Understand	Understand the principles of argumentation theory.
5	Use	Use data visualization in scientific communications.

Indicative Literature

- Douglas Walton: Argumentation Theory – A Very Short Introduction. In: Simari, G., Rahwan, I. (eds) Argumentation in Artificial Intelligence. Springer, Boston, MA, 2009.
- 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.

Entry Requirements

Prerequisites	None
Co-requisites	None
Additional Remarks	None

Assessment and Completion

Module Component	Examination Type	Duration or Length	Weight (%)	Minimum for Pass	ILOs
Argumentation, Data and Visualization Communication (perspective II)	Presentation	7-11 mins	100	45%	1-5

Module Completion Requirements

- **Module Examination:** minimum for pass- 45%.

Module Achievement

None.

7.2.9 Agency, Leadership, and Accountability

Module Name	Agency, Leadership, and Accountability
Module Code	CTNS-NSK-09
Module ECTS	5
Program Owner	CT (CONSTRUCTOR Track Area)
Module Coordinator	Dr. Marina Christodoulou

Study Semester		
Program	Semester	Status
S-ACS-BSc Applied Computer Science	5	Mandatory
BCCB-BSc Biochemistry and Cell Biology	6	Mandatory Elective
CBT-BSc Chemistry and Biotechnology	6	Mandatory Elective
CS-BSc Computer Science	6	Mandatory Elective
ECE-BSc Electrical and Computer Engineering	6	Mandatory Elective
ESSMER-BSc Earth Sciences and Sustainable Management of Environmental Resources	6	Mandatory Elective
F-ACS-BSc Applied Computer Science	6	Mandatory Elective
GEM-BA Global Economics and Management	6	Mandatory Elective
IBA-BA International Business Administration	6	Mandatory Elective
IBA-Online-BA International Business Administration (Online)	6	Mandatory
IRPH-BA International Relations: Politics and History	6	Mandatory Elective
ISCP-BA Integrated Social and Cognitive Psychology	6	Mandatory Elective
MCCB-BSc Medicinal Chemistry and Chemical Biology	6	Mandatory Elective
MDDA-BSc Management, Decisions and Data Analytics	6	Mandatory Elective
MMDA-BSc Mathematics, Modeling, and Data Analytics	6	Mandatory Elective
PHDS-BSc Physics and Data Science	6	Mandatory Elective
RIS-BSc Robotics and Intelligent Systems	6	Mandatory Elective

SDT-BSc Software, Data and Technology	6	Mandatory Elective
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Student Workload	
Tutorial	17.5
Independent Study	72.5
Online Lecture	35
Total Hours	125

Module Components	Number	Type	CP
Agency, Leadership, and Accountability	CTNS-09	Lecture (Online)	5

Module Description

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

No	Competence	ILO
1	Understand	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	Understand how science is an economic sector, populated by large powerful organizations that set norms, fund research agendas.
3	Identify	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	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

- Feinberg, Joel. "Doing & deserving; essays in the theory of responsibility." (1970).
- Hull, David L. "Science as a Process." Science as a Process. University of Chicago Press, 2010.

Entry Requirements

Prerequisites	None
Co-requisites	None
Additional Remarks	None

Assessment and Completion

Module Component	Examination Type	Duration or Length	Weight (%)	Minimum for Pass	ILOs
Agency, Leadership, and Accountability	Written Examination	120 Minutes	100	45%	1-4

Module Completion Requirements

- **Module Examination:** minimum for pass- 45%.

Module Achievement

None.

7.2.10 Community Impact Project

Module Name	Community Impact Project
Module Code	CTNS-CIP-10
Module ECTS	5
Program Owner	CT (CONSTRUCTOR Track Area)
Module Coordinator	CIP Faculty Coordinator

Study Semester		
Program	Semester	Status
BCCB-BSc Biochemistry and Cell Biology	5	Mandatory Elective
CBT-BSc Chemistry and Biotechnology	5	Mandatory Elective
CS-BSc Computer Science	5	Mandatory Elective
ECE-BSc Electrical and Computer Engineering	5	Mandatory Elective
ESSMER-BSc Earth Sciences and Sustainable Management of Environmental Resources	5	Mandatory Elective
GEM-BA Global Economics and Management	5	Mandatory Elective
IBA-BA International Business Administration	5	Mandatory Elective
IRPH-BA International Relations: Politics and History	5	Mandatory Elective
ISCP-BA Integrated Social and Cognitive Psychology	5	Mandatory Elective
MCCB-BSc Medicinal Chemistry and Chemical Biology	5	Mandatory Elective
MDDA-BSc Management, Decisions and Data Analytics	5	Mandatory Elective
MMDA-BSc Mathematics, Modeling, and Data Analytics	5	Mandatory Elective

Student Workload	
Introductory, Accompanying, and Final Events	10
Self-Organized Teamwork	115
Total Hours	125

Module Components	Number	Type	CP
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Community Impact Project	CTNS-10	Project	5
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Module Description

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.

Students may begin their project in the 4th semester but must complete it by the end of the 5th semester; the module counts toward the workload of the 5th semester.

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).

Recommended Knowledge

- Basic knowledge of the main concepts and methodological instruments of the respective disciplines.
- 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.

Intended Learning Outcomes

No	Competence	ILO
1	Understand	Understand the real-life issues of communities, organizations, and industries and relate them to concepts in their own discipline.
2	Enhance	Enhance problem-solving skills and develop critical faculty, create solutions to problems, and communicate these solutions appropriately to their audience.
3	Apply	Apply media and communication skills in diverse and non-peer social contexts.
4	Develop	Develop an awareness of the societal relevance of their own scientific actions and a sense of social responsibility for their social surroundings.

5	Reflect	Reflect on their own behavior critically in relation to social expectations and consequences.
6	Work	Work in a team and deal with diversity, develop cooperation and conflict skills, and strengthen their empathy and tolerance for ambiguity.
		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.

Indicative Literature

Entry Requirements

Prerequisites	None
Co-requisites	None
Additional Remarks	None

Assessment and Completion

Module Component	Examination Type	Duration or Length	Weight (%)	Minimum for Pass	ILOs
Community Impact Project	Project Assessment		100	Pass/Fail	All

Module Completion Requirements

- **Module Examination:** pass/fail grading.

Module Achievement

None.

7.3 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/learninglanguages>).

7.4 Humanities

7.4.1 Introduction to the Philosophy of Science

Module Name	Introduction to the Philosophy of Science
Module Code	CTHU-HUM-002
Module ECTS	2.5
Program Owner	CT (CONSTRUCTOR Track Area)
Module Coordinator	Dr. Eoin Ryan

Study Semester		
Program	Semester	Status
BCCB-BSc Biochemistry and Cell Biology	1	Mandatory Elective
CBT-BSc Chemistry and Biotechnology	1	Mandatory Elective
CS-BSc Computer Science	1	Mandatory Elective
ECE-BSc Electrical and Computer Engineering	1	Mandatory Elective
ESSMER-BSc Earth Sciences and Sustainable Management of Environmental Resources	1	Mandatory Elective
GEM-BA Global Economics and Management	1	Mandatory Elective
IBA-BA International Business Administration	1	Mandatory Elective
IBA-Online-BA International Business Administration (Online)	1	Mandatory Elective
IEM-Online-BSc Industrial Engineering & Management (Online)	1	Mandatory Elective
IRPH-BA International Relations: Politics and History	1	Mandatory Elective
ISCP-BA Integrated Social and Cognitive Psychology	1	Mandatory Elective
MCCB-BSc Medicinal Chemistry and Chemical Biology	1	Mandatory Elective

MDDA-BSc Management, Decisions and Data Analytics	1	Mandatory Elective
MMDA-BSc Mathematics, Modeling, and Data Analytics	1	Mandatory Elective
PHDS-BSc Physics and Data Science	1	Mandatory Elective
RIS-BSc Robotics and Intelligent Systems	1	Mandatory Elective
SDT-BSc Software, Data and Technology	1	Mandatory Elective
BCCB-BSc Biochemistry and Cell Biology	2	Mandatory Elective
CBT-BSc Chemistry and Biotechnology	2	Mandatory Elective
CS-BSc Computer Science	2	Mandatory Elective
ECE-BSc Electrical and Computer Engineering	2	Mandatory Elective
ESSMER-BSc Earth Sciences and Sustainable Management of Environmental Resources	2	Mandatory Elective
IBA-BA International Business Administration	2	Mandatory Elective
IBA-Online-BA International Business Administration (Online)	2	Mandatory Elective
IEM-BSc Industrial Engineering & Management	2	Mandatory Elective
IEM-Online-BSc Industrial Engineering & Management (Online)	2	Mandatory Elective
IRPH-BA International Relations: Politics and History	2	Mandatory Elective
ISCP-BA Integrated Social and Cognitive Psychology	2	Mandatory Elective
MCCB-BSc Medicinal Chemistry and Chemical Biology	2	Mandatory Elective
MDDA-BSc Management, Decisions and Data Analytics	2	Mandatory Elective
MMDA-BSc Mathematics, Modeling, and Data Analytics	2	Mandatory Elective
PHDS-BSc Physics and Data Science	2	Mandatory Elective
RIS-BSc Robotics and Intelligent Systems	2	Mandatory Elective
SDT-BSc Software, Data and Technology	2	Mandatory Elective

Student Workload	
Independent Study	45
Online Lecture	17.5
Total Hours	62.5

Module Components	Number	Type	CP
Introduction to the Philosophy of Science	CTHU-002	Lecture (Online)	2.5

Module Description

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.

This 2.5 CP module is part of a portfolio of several 2.5 CP modules designed to allow students to have a wider choice of electives. To compensate for the smaller size of this module, the assessment is of smaller scope.

Intended Learning Outcomes

No	Competence	ILO
1	Understand	Understand key ideas from the philosophy of science.
2	Discuss	Discuss different types of inference and rational processes.
3	Describe	Describe differences between how the natural sciences, social sciences and humanities discover knowledge.
4	Identify	Identify ways in which science can be more and less value-laden.
5	Illustrate	Illustrate some important conceptual leaps in the history of science.

Indicative Literature

- James Ladyman, Understanding Philosophy of Science (2002).
- Paul Song, Philosophy of Science: Perspectives from Scientists (2022).
- Peter Godfrey-Smith Theory and Reality (2021)

Entry Requirements

Prerequisites	None
Co-requisites	None
Additional Remarks	None

Assessment and Completion

Module Component	Examination Type	Duration or Length	Weight (%)	Minimum for Pass	ILOs
Introduction to the Philosophy of Science	Written Examination	60 Minutes	100	45%	1-5

Module Completion Requirements

- **Module Examination:** minimum for pass- 45%.

Module Achievement

None.

7.4.2 Introduction to Visual Culture

Module Name	Introduction to Visual Culture
Module Code	CTHU-HUM-003
Module ECTS	2.5
Program Owner	CT (CONSTRUCTOR Track Area)
Module Coordinator	Dr. Irina Chiaburu

Study Semester		
Program	Semester	Status
BCCB-BSc Biochemistry and Cell Biology	1	Mandatory Elective
CBT-BSc Chemistry and Biotechnology	1	Mandatory Elective
CS-BSc Computer Science	1	Mandatory Elective
ECE-BSc Electrical and Computer Engineering	1	Mandatory Elective
ESSMER-BSc Earth Sciences and Sustainable Management of Environmental Resources	1	Mandatory Elective
IBA-BA International Business Administration	1	Mandatory Elective
IEM-Online-BSc Industrial Engineering & Management (Online)	1	Mandatory Elective
IRPH-BA International Relations: Politics and History	1	Mandatory Elective
ISCP-BA Integrated Social and Cognitive Psychology	1	Mandatory Elective
MDDA-BSc Management, Decisions and Data Analytics	1	Mandatory Elective
MMDA-BSc Mathematics, Modeling, and Data Analytics	1	Mandatory Elective
PHDS-BSc Physics and Data Science	1	Mandatory Elective
RIS-BSc Robotics and Intelligent Systems	1	Mandatory Elective
SDT-BSc Software, Data and Technology	1	Mandatory Elective
BCCB-BSc Biochemistry and Cell Biology	2	Mandatory Elective
CBT-BSc Chemistry and Biotechnology	2	Mandatory Elective
CS-BSc Computer Science	2	Mandatory Elective

ECE-BSc Electrical and Computer Engineering	2	Mandatory Elective
ESSMER-BSc Earth Sciences and Sustainable Management of Environmental Resources	2	Mandatory Elective
GEM-BA Global Economics and Management	2	Mandatory Elective
IBA-BA International Business Administration	2	Mandatory Elective
IBA-Online-BA International Business Administration (Online)	2	Mandatory Elective
IEM-BSc Industrial Engineering & Management	2	Mandatory Elective
IEM-Online-BSc Industrial Engineering & Management (Online)	2	Mandatory Elective
IRPH-BA International Relations: Politics and History	2	Mandatory Elective
ISCP-BA Integrated Social and Cognitive Psychology	2	Mandatory Elective
MCCB-BSc Medicinal Chemistry and Chemical Biology	2	Mandatory Elective
MDDA-BSc Management, Decisions and Data Analytics	2	Mandatory Elective
MMDA-BSc Mathematics, Modeling, and Data Analytics	2	Mandatory Elective
PHDS-BSc Physics and Data Science	2	Mandatory Elective
RIS-BSc Robotics and Intelligent Systems	2	Mandatory Elective
SDT-BSc Software, Data and Technology	2	Mandatory Elective

Student Workload	
Independent Study	45
Online Lecture	17.5
Total Hours	62.5

Module Components	Number	Type	CP
Introduction to Visual Culture	CTHU-003	Lecture (Online)	2.5

Module Description

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.

This 2.5 CP module is part of a portfolio of several 2.5 CP modules designed to allow students to have a wider choice of electives. To compensate for the smaller size of this module, the assessment is of smaller scope.

Intended Learning Outcomes

No	Competence	ILO
1	Understand	Understand a range of key concepts pertaining to visual culture, art theory and cultural analysis.
2	Understand	Understand the role visuality plays in development and maintenance of political, social, and intellectual discourses.
3	Think	Think critically about images and their contexts.
4	Reflect	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.

Entry Requirements

Prerequisites	None
Co-requisites	None
Additional Remarks	None

Assessment and Completion

Module Component	Examination Type	Duration or Length	Weight (%)	Minimum for Pass	ILOs
Introduction to Visual Culture	Written Examination	60 Minutes	100	45%	1-4

Module Completion Requirements

- **Module Examination:** minimum for pass- 45%.

Module Achievement

None.

7.4.3 Introduction to Philosophical Ethics

Module Name	Introduction to Philosophical Ethics
Module Code	CTHU-HUM-001
Module ECTS	2.5
Program Owner	CT (CONSTRUCTOR Track Area)
Module Coordinator	Dr. Eoin Ryan

Study Semester		
Program	Semester	Status
BCCB-BSc Biochemistry and Cell Biology	1	Mandatory Elective
CBT-BSc Chemistry and Biotechnology	1	Mandatory Elective
CS-BSc Computer Science	1	Mandatory Elective
ECE-BSc Electrical and Computer Engineering	1	Mandatory Elective
ESSMER-BSc Earth Sciences and Sustainable Management of Environmental Resources	1	Mandatory Elective
IBA-BA International Business Administration	1	Mandatory Elective
IBA-Online-BA International Business Administration (Online)	1	Mandatory Elective
IEM-BSc Industrial Engineering & Management	1	Mandatory Elective
IEM-Online-BSc Industrial Engineering & Management (Online)	1	Mandatory Elective
IRPH-BA International Relations: Politics and History	1	Mandatory Elective
ISCP-BA Integrated Social and Cognitive Psychology	1	Mandatory Elective
MCCB-BSc Medicinal Chemistry and Chemical Biology	1	Mandatory Elective
MDDA-BSc Management, Decisions and Data Analytics	1	Mandatory Elective
MMDA-BSc Mathematics, Modeling, and Data Analytics	1	Mandatory Elective
PHDS-BSc Physics and Data Science	1	Mandatory Elective
RIS-BSc Robotics and Intelligent Systems	1	Mandatory Elective
SDT-BSc Software, Data and Technology	1	Mandatory Elective

BCCB-BSc Biochemistry and Cell Biology	2	Mandatory Elective
CBT-BSc Chemistry and Biotechnology	2	Mandatory Elective
CS-BSc Computer Science	2	Mandatory Elective
ECE-BSc Electrical and Computer Engineering	2	Mandatory Elective
ESSMER-BSc Earth Sciences and Sustainable Management of Environmental Resources	2	Mandatory Elective
GEM-BA Global Economics and Management	2	Mandatory Elective
IBA-BA International Business Administration	2	Mandatory Elective
IBA-Online-BA International Business Administration (Online)	2	Mandatory Elective
IEM-Online-BSc Industrial Engineering & Management (Online)	2	Mandatory Elective
IRPH-BA International Relations: Politics and History	2	Mandatory Elective
ISCP-BA Integrated Social and Cognitive Psychology	2	Mandatory Elective
MCCB-BSc Medicinal Chemistry and Chemical Biology	2	Mandatory Elective
MDDA-BSc Management, Decisions and Data Analytics	2	Mandatory Elective
MMDA-BSc Mathematics, Modeling, and Data Analytics	2	Mandatory Elective
PHDS-BSc Physics and Data Science	2	Mandatory Elective
RIS-BSc Robotics and Intelligent Systems	2	Mandatory Elective
SDT-BSc Software, Data and Technology	2	Mandatory Elective

Student Workload	
Independent Study	45
Online Lecture	17.5
Total Hours	62.5

Module Components	Number	Type	CP
Introduction to Philosophical Ethics	CTHU-001	Lecture (Online)	2.5

Module Description

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.

This 2.5 CP module is part of a portfolio of several 2.5 CP modules designed to allow students to have a wider choice of electives. To compensate for the smaller size of this module, the assessment is of smaller scope.

Intended Learning Outcomes

No	Competence	ILO
1	Describe	Describe normative ethical theories such as consequentialism, deontology and virtue ethics.
2	Discuss	Discuss some metaethical concerns.
3	Analyze	Analyze ethical language.
4	Highlight	Highlight complexities and contradictions in typical ethical commitments.
5	Indicate	Indicate common parameters for ethical discussions at individual and social levels.
6	Analyze	Analyze notions such as objectivity, subjectivity, universality, pluralism, value.

Indicative Literature

- Mark van Roojen Metaethics: A Contemporary Introduction (2015).
- Russ Shafer-Landay A Concise Introduction to Ethics (2019).
- Simon Blackburn Being Good (2009).

Entry Requirements

Prerequisites	None
Co-requisites	None
Additional Remarks	None

Assessment and Completion

Module Component	Examination Type	Duration or Length	Weight (%)	Minimum for Pass	ILOs
Introduction to Philosophical Ethics	Written Examination	60 Minutes	100	45%	1-6

Module Completion Requirements

- **Module Examination:** pass/fail grading.

Module Achievement

None.

8.1 Intended Learning Outcomes Assessment-Matrix

International Business Administration BA																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
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applying principles of marketing, organization and human resource management to evaluate and solve challenges of cross-cultural stakeholders insight and outside a company				x	x		x									x	x	x	x																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
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Figure 4: Intended Learning Outcome Assessment Matrix for IBA