



JACOBS
UNIVERSITY



International Logistics Management and Engineering

Bachelor's Degree Program (BSc)

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1 International Logistics at Jacobs University

1.1 Preface

Over the last few decades, trade has increased faster than the world economy due to business and production processes that have become increasingly global and networked. The need to manage supply chains, production facilities and transport more efficiently has intensified the demand for educated professionals with both management and engineering skills. The International Logistics Management and Engineering program equips students with appropriate methods for designing procurement, production and distribution processes as well as executing them in a competitive way. Whereas the first year provides an overview over the fundamentals of logistics and basic knowledge in formal methods, management and engineering, students will be introduced to more details in logistics, engineering and management from the second year onwards. Therefore, students take a certain number of specialized courses on International Logistics, Management and Economics and Engineering and ICT in the second and third year in order to gain knowledge in the three areas and to complete their competence profile. Furthermore, all logistics students spent their fifth semester doing a guided industrial project (an internship lasting at least 4 months), which enables them to acquire valuable practical experience and is thus an essential part of the logistics program. Students of the International Logistics study program will graduate with a Bachelor of Science (BSc).

1.2 Advisory Board Members

The International Logistics program is supported by an advisory board, whose members are representatives of different logistics companies and institutions. The Advisory Board provides advice to the logistics faculty in designing and further developing the study program. In addition, each year the board awards one student from the graduating class for outstanding academic achievement.

- Chair: Christian Vollers, Geschäftsführer Berthold Vollers GmbH
- Jörg Conrad, Geschäftsführender Gesellschafter Anker Leschaco Group
- Eduard Dubbers-Albrecht, Geschäftsführender Gesellschafter IPSEN LOGISTICS GMBH
- Robert Hempel, Geschäftsführender Gesellschafter Hanseatische Waren Handelsgesellschaft MBH & CO KG
- Hans-Ludger Körner, Chief Financial Officer Röhlig & Co. Holding GmbH & Co. KG
- Jens Bieniek, Leiter Finanzen M&A BLG Logistics Group AG & Co. KG
- Svenja Miller, Geschäftsführerin des Stiftungsrates Kieserling-Stiftung
- Dirk O. Rogge, Geschäftsführer D. Oltmann Reederei GmbH & Co. KG
- Prof. Dr.-Ing. Thomas Wimmer, Vorsitzender der Geschäftsführung Bundesvereinigung Logistik (BVL) e. V.

1.3 Concept

As business becomes more complex and increasingly global, the need for logistics specialists increases as well. Networked companies in a globalized trade need an intelligent coordination of all relevant logistics processes. The growing recognition of the value of more effective and efficient management of the supply chains has intensified demand for persons with a degree in this area at the interface between engineering and management. Particular emphasis is on the development of communication and social skills needed to perform these tasks in a global setting with high cultural diversity. Bremen with its world-ranking seaports, important location for automobile manufacture, electronics, steel, shipbuilding, and aerospace industry, has a long-standing tradition in logistics. With this background, the international Bachelor program "International Logistics Management and Engineering" at Jacobs University Bremen, complementing the logistics competence already available in the area Bremen, was launched in 2007.

International and intercultural

Jacobs University is in an excellent position to provide a complete undergraduate program, based on existing accredited programs taught in English. This, and the fact that at Jacobs University students from about 100 nations are living on a campus in colleges makes it a unique environment: Students acquire the relevant academic skills and, in addition, they learn in a challenging environment where cultural diversity is part of the environment.

Management and Engineering Perspectives

The interdisciplinary study program in Logistics develops a thorough understanding of the Logistics processes and sub-processes and the necessary generic competencies needed for them.

The program includes a strong general content in engineering, management, natural and social sciences and international law. The students will be provided with knowledge of logistics processes, in particular the ability to control logistics processes, modeling and design of logistics processes, logistics regulations and security demands, quality management in logistics, and technical logistics systems. Understanding of information and communication systems, like planning and control systems, data management, e-logistics, identification and positioning systems is acquired. Management abilities, the management of change, project management as well as financial management and controlling in logistics will be trained. Intercultural understanding, and training as well as courses familiarize students with various aspects of nations; their political systems, history, and culture amend the course program.

For almost all disciplines, the use of information technology tools has become an important driver for innovation, for logistics there is a particularly strong impact. Therefore, research and education in logistics at Jacobs University will have a "natural" close relation to the research into mobile communication, network and database management. Also, some research areas, which deal with organizational development, value changes and other cultural development in a globalized world, are potential starting points for logistics research at Jacobs University.

Practical experiences

At Jacobs University, a practical work experience is a required and valuable element of the bachelor education of every student. Therefore, practical experience is an integral part of all bachelor programs. Internships give the students opportunities to apply academic concepts in practice and to explore possible future opportunities for employment. Internships must take place off campus.

As acquiring practical experience is particularly important for the Logistics major, logistics students engage in a longer internship. The so-called ("Guided Industrial Project") lasts at least 4 months and can be extended up to 6 months. Moreover, the logistics program has been designed in a close cooperation with business partners and institutions in order to ensure that the needs of potential future employers are taken into account.

Guest lectures from industry

The study program includes guest lectures from selective and experienced guest lecturers who are in responsible positions in various well-known industrial and logistics companies. The guest lecturers provide an insight into existing problems and present the application of methods coping with these logistics challenges. Excursions to industrial and logistics companies will enhance this practical approach and combine successfully the theoretical learning targets with industrial application for a deeper understanding of logistics processes.

Theoretical basics combined with exercises

One main characteristic of the study program is the integration of interactive elements. Lectures include exercises as well as tutorials within the semester. The tutorials enable the students to apply the learned theories and methods on real examples and case studies.

1.4 Preparation for the Students' Future Careers

Traditionally, many skills acquired in scientific research are transferable to other fields. In addition, however, a central element of the education will be the general and broad preparation of the students for their future careers, by developing personal and social skills, which are normally not part of an academic curriculum.

- To this end, Jacobs University Bremen has professional Career Services which give complementary help to the "Academic and Professional Skills" course: they provide graduate and undergraduate students with advice and with the tools to identify and follow up rewarding careers after their time at Jacobs University (see <http://www.jacobs-university.de/csc>).
- Furthermore, Jacobs University Bremen has established an Alumni Association that helps students to establish a long-lasting and worldwide network with colleagues representing additional expertise; it will also help them to explore job options in academia, industry, and elsewhere (see <http://www.jacobs-university.de/alumni>).
- Several guest lectures given by business leaders bring the undergraduate logistics students in close contact with leading professionals industry.

The studies in International Logistics aim for providing the students with integrated competencies, which comprise of components from an engineering perspective as well as from a managerial point of view, because leading positions in logistics companies need both: a technological and a commercial understanding of logistics. Therefore, this study program combines a basic education in engineering with a profound qualification in management and economics. Therefore, the students will be introduced to basic knowledge in management (e.g. marketing, accounting, finance, etc.) and in engineering (e.g. traffic, transport and storage systems, etc.).

During their studies at Jacobs University students in International Logistics should acquire a certain setting of competencies, which are vital for a career in logistics. This includes functional competencies as well as methodological and socio-cultural competencies.

The functional competencies refer to professional skills that are connected to the logistics function in companies and value adding networks. Those skill are based on a profound understanding of logistics, its challenges, and options to deal with those challenges. The students will be introduced to a broad basic knowledge about the different aspects of logistics (e.g. strategies for procurement, distribution production, etc).

The methodological competencies comprise of formal and analytical instruments, that are necessary to plan and control logistics systems and processes. These competencies are more generic and will not be used for logistics issues only, but also for other functional business areas like marketing or quality management. In this section the students will be provided with the ability to use tools of modeling business processes, ABC-Analysis, Programming, etc.).

Regarding the socio-cultural competencies it is to mention here that students from all over the world will experience Jacobs University Bremen's international community and diversity composed of more than 100 nationalities. Intercultural understanding is a pre-condition for a functioning university community. Students come to Jacobs University because they want to extend their experiences. They know that this experience will be a crucial element for their future careers.

1.5 Support to the Students from Jacobs University

In order to attract the brightest students from abroad and from inside Germany, and to make their stay as efficient as possible for excellent scientific training, a number of services will be provided. These are generally aimed at meeting the special needs of foreign students.

- Jacobs University Bremen has an English-speaking administration. This makes it easy for international students to conduct their general paperwork, especially with visa and other legal matters

with which Jacobs University has extensive experience.

- The "Jacobs University Bremen volunteers" is a program of Bremen citizens who help non-German-speaking students with tasks in their daily life that require language or organizational knowledge, such as doctor's or office appointments. This is organized through the university's Student Service Center (see <http://www.jacobs-university.de/service-center>).
- Jacobs University Bremen runs a highly successful host families program, a scheme of local Bremen families who associate with one foreign student each to help them adapting to the new environment, and introduce them to German culture and customs (see <http://www.jacobs-university.de/host-family-program>).
- Students will have the option of accommodation in one of the residential colleges on campus during their stay at Jacobs University (see <http://www.jacobs-university.de/colleges>).
- Jacobs University Bremen provides full-day English/German bilingual childcare for children from the age of 6 months to three years on campus (see <http://www.jacobs-university.de/node/439>).

1.6 The Structure of the International Logistics Bachelor Program

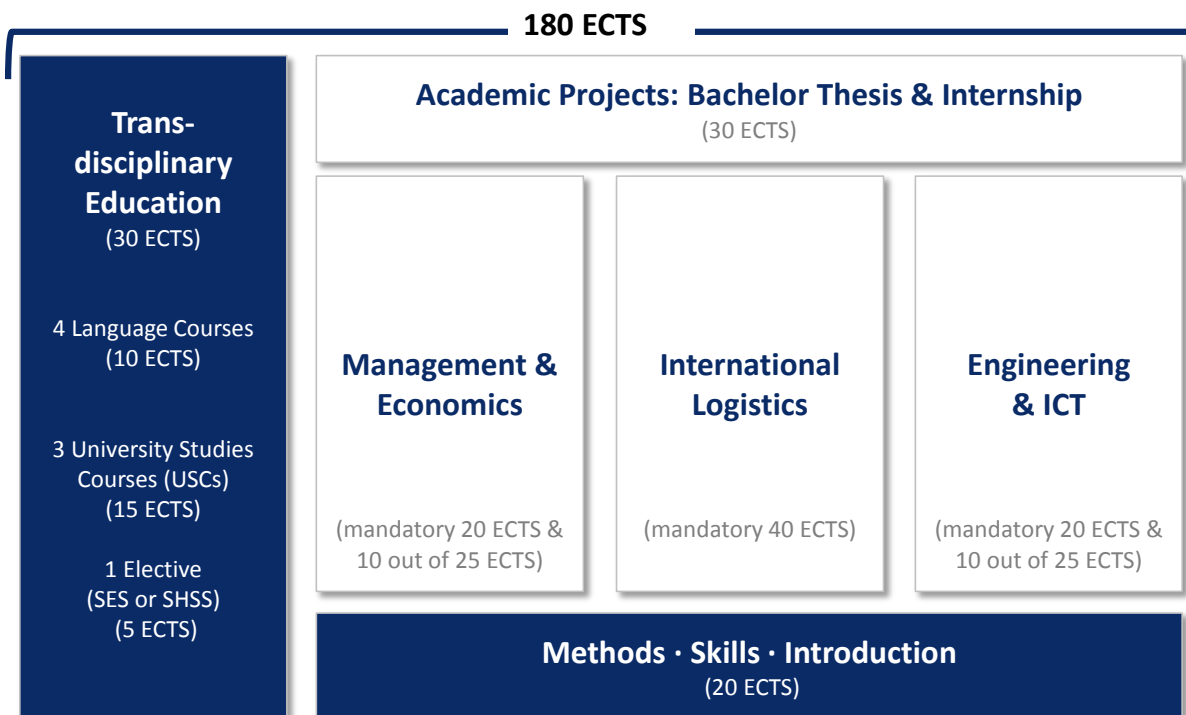


Figure 1: International Logistics Management and Engineering - Program Structure

Undergraduate education at Jacobs University Bremen aims for quality, flexibility, and transdisciplinarity. Courses and labs are combined logically to modules connected by contents and by learning goals. The goal is to train abilities, rather than the mere transfer of knowledge. This includes also the communication of contents and the training of methods. The distinctive feature of the curriculum is the obtained specialized knowledge in logistics processes on the one hand and the integration of management and engineering skills on the other. The program also provides a strong basis in formal methods as well as a possibility to select and transdisciplinary and language courses. The whole International Logistics Program structure is illustrated on Figure 1.

The aim of the International Logistics study program is to impart a profound logistic process understanding. Considering the entire value added chain from the customer to the supplier, the procurement, the production, the distribution and the reverse (waste management) logistics are representing the basic processes. Logistics contains the integrated planning, control, realization and monitoring of all internal and network-wide material-, part- and product flow including the necessary information flow in industrial and trading companies along the complete value-added chain for the purpose of conforming to customer requirements [acc. Council of Logistics Management]. The goal of logistics is to deliver the correct commodities in the correct quantity to the correct place for the correct customer at the correct time in the correct quality for correct costs [Plowman].

The study program aims to anticipate the developments in further logistic processes for example the after-sales logistics including spare part logistics and the logistic services.

2 Requirements for a Bachelor Degree in International Logistics Management and Engineering

To obtain a Bachelor degree in International Logistics Management and Engineering at Jacobs University a minimum of 180 ECTS credit points must be earned over a period of 6 semesters.

- 20 ECTS credits must be earned in the Methods, Skills and Introduction Module
- 40 ECTS credits must be earned in the International Logistics Module
- 30 ECTS credits must be earned in the Management and Economics Module
- 30 ECTS credits must be earned in the Engineering and ICT Module
- 30 ECTS credits must be earned in the Academic Projects Module
- 15 ECTS credits must be earned through University Studies Courses (**USC**) or equivalents
- 5 ECTS credits must be earned through any course offered by the School of Engineering and Science or the School of Humanities and Social Sciences
- 10 ECTS credits must be earned through language courses especially in German.

1st Year

- **Methods, Skills and Introduction:**
 - ESM 1A (Single Variable Calculus) (**120101**, 5 ECTS credits)
 - ESM 2 A (Linear Algebra, Probability, Statistics) (**120102**, 5 ECTS credits)
 - Academic and Professional Skills (**990100**, 2.5 ECTS credits)
 - Statistical Concepts and Data Analysis (**990121**, 5 ECTS credits)
 - SAP Lab (**080201**, 2.5 ECTS credits)
- **International logistics:**
 - General Logistics I/II (**050101**, **050102**, 10 ECTS credits)
 - NatSciLab Unit Logistics I/II (**050111**, (**050112**, 5 ECTS credits)
- **Management and Economics:**
 - Introduction to Economics (**930201**, 5 ECTS credits)
 - Managerial and Financial Accounting (**930221**, 5 ECTS credits)
- **Engineering and ICT:**
 - Fundamentals of Engineering Design (**050131**, 2.5 ECTS credits)
 - Basics of Manufacturing Technology (**050262**, 2.5 ECTS credits)
 - Strengths of Materials (**400902**, 5 ECTS credits)
 - NatSciLab Unit Programming in Python I/II (**350111**, **350112**, 5 ECTS credits)

2nd Year

- **International logistics:**
 - Traffic, Transport and Storage Systems (**050211**, 5 ECTS credits)
 - Distribution Logistics (**050231**, 2.5 ECTS credits)
 - Production Logistics (**050232**, 2.5 ECTS credits)
 - Procurement Logistics (**050322**, 2.5 ECTS credits)
 - Contract Logistics (**050221**, 2.5 ECTS credits)
 - Advanced Lean Methods (**050332**, 2.5 ECTS credits)
- **Management and Economics:**
 - International Economics (**910301**, 5 ECTS credits)
 - **2 out of the following 5 courses (10 ECTS):**
 - Global Leadership (**032311**, 5 ECTS credits)
 - Marketing (**930352**, 5 ECTS credits)
 - Finance (**930241**, 5 ECTS credits)

- Firms and Markets (930312, 5 ECTS credits)
- Organisation (930211, 5 ECTS credits)
- **Engineering and ICT:**
 - Material Handling (050271, 2.5 ECTS credits)
 - Process Modeling and Simulation (050212, 2.5 ECTS credits)
 - 2 out of the following 5 courses (10 ECTS):**
 - ESM III A (Advanced Linear Algebra, Stochastic Processes) (120201, 5 ECTS credits)
 - General Information and Communication Technology I (350101, 5 ECTS credits)
 - General Information and Communication Technology II (350102, 5 ECTS credits)
 - Basic Principles of Modeling Dynamics in Logistics (050242, 5 ECTS credits)
 - Intermodal Logistics (050222, 5 ECTS credits)**

3rd Year

- **Academic Projects:**
 - Guided Industrial Project (050301, 20 ECTS credits): a 4 - 6 months internship at a company
 - BSc Thesis Project (050372, 10 ECTS credits)
- **International logistics:**
 - Supply Chain Management (050252, 2.5 ECTS credits)
 - Law of Transportation, Forwarding and Logistics (930351, 5 ECTS credits)
- **Management and Economics:**
 - Managing Strategies and Innovations in Logistics (930361, 5 ECTS credits)

** replaced by the course Operations Research (080202) due to changes in the logisitcs faculty.

3 Recommended Course Plan

| Year 1 Courses | Fall | C | T | Spring | C | T |
|---|-------------|----------|----------|---------------|----------|----------|
| Methods, Skills and Introduction | | | | | | |
| ESM 1 A (Single Variable Calculus) | 120101 | 5 | m | | | |
| ESM 2 A (Linear Algebra, Probability, Statistics) | | | | 120102 | 5 | m |
| Academic and Professional Skills | 990100 | 2.5 | m | | | |
| Statistical Concepts and Data Analysis | | | | 990121 | 5 | m |
| SAP Lab | 080201 | 2.5 | m | | | |
| International logistics | | | | | | |
| General Logistics I | 050101 | 5 | m | | | |
| NatSciLab Unit Logistics I | 050111 | 2.5 | m | | | |
| General Logistics II | | | | 050102 | 5 | m |
| NatSciLab Unit Logistics II | | | | 050112 | 2.5 | m |
| Management and Economics | | | | | | |
| Introduction to Economics | 930201 | 5 | m | | | |
| Managerial and Financial Accounting | | | | 930221 | 5 | m |
| Engineering and ICT | | | | | | |
| Fundamentals of Engineering Design* | 050131 | 2.5 | m | | | |
| Basics of Manufacturing Technology | 050262 | 2.5 | m | | | |
| Strengths of Materials | | | | 400902 | 5 | m |
| NatSciLab Unit Programming in Python I | 350111 | 2.5 | m | | | |
| NatSciLab Unit Programming in Python II | | | | 350112 | 2.5 | m |
| Transdisciplinary Education | | | | | | |
| Language | | 2.5 | e | | | |
| Language | | | | | 2.5 | e |
| Running Total / Semester Total | 32.5 | 32.5 | | 65 | 32.5 | |

C = ECTS credit points, T=type (m=mandatory, e=elective, u=university)

* offered in Intersession (January 2013)

| Year 2 Courses | Fall | C | T | Spring | C | T |
|---|-------------|----------|----------|---------------|----------|----------|
| International Logistics | | | | | | |
| Traffic, Transport and Storage Systems | 050211 | 5 | m | | | |
| Distribution Logistics | 050231 | 2.5 | m | | | |
| Production Logistics | | | | 050232 | 2.5 | m |
| Procurement Logistics | | | | 050322 | 2.5 | m |
| Contract Logistics | | | | 050221 | 2.5 | m |
| Advanced Lean Methods | | | | 050332 | 2.5 | m |
| Management and Economics | | | | | | |
| International Economics | 910301 | 5 | m | | | |
| Management and Economics Elective | | | 5 e | | | |
| Management and Economics Elective | | | | | 5 | e |
| Engineering and ICT | | | | | | |
| Material Handling | | | | 050271 | 2.5 | m |
| Process Modeling and Simulation | | | | 050212 | 2.5 | m |
| Engineering and ICT elective | | | 5 e | | | |
| Engineering and ICT elective | | | | | 5 | e |
| Transdisciplinary Education | | | | | | |
| USC | | | 5 e | | | |
| Language | | | 2.5 e | | | |
| USC | | | | | 5 | e |
| Language | | | | | 2.5 | e |
| Running Total / Semester Total | 95 | 30 | | 127.5 | 32.5 | |
| Year 2 Management and Economics Elective Courses | | | | | | |
| 2 out of the following 5 electives (10 ECTS): | | | | | | |
| Global Leadership | 032311 | 5 | e | | | |
| Marketing | 930352 | 5 | e | | | |
| Finance | | | | 930241 | 5 | e |
| Firms and Markets | | | | 930312 | 5 | e |
| Organisation | | | | 930211 | 5 | e |
| Year 2 Engineering and ICT Elective Courses | | | | | | |
| 2 out of the following 5 electives (10 ECTS): | | | | | | |
| ESM III A (Advanced Linear Algebra, Stochastic Processes) | 120201 | 5 | e | | | |
| General Information and Communication Technology I | 350101 | 5 | e | | | |
| General Information and Communication Technology II | | | | 350102 | 5 | e |
| Basic Principles of Modeling Dynamics in Logistics | | | | 050242 | 5 | e |
| Intermodal Logistics** | | | | 050222 | 5 | e |

C = ECTS credit points, T=type (m=mandatory, e=elective, u=university)

** replaced by the course Operations Research (080202) due to changes in the logisitcs faculty.

| Year 3 Courses | Fall | C | T | Spring | C | T |
|--|-------------|----------|----------|---------------|----------|----------|
| Academic Projects | | | | | | |
| Guided Industrial Project | 050301 | 20 | m | | | |
| BSc Thesis Project | | | | 050372 | 10 | m |
| International Logistics | | | | | | |
| Supply Chain Management | | | | 050252 | 2.5 | m |
| Law of Transportation, Forwarding and Logistics | | | | 930351 | 5 | m |
| Management | | | | | | |
| Managing Strategies and Innovations in Logistics | | | | 930361 | 5 | m |
| Transdisciplinary Education | | | | | | |
| USC | | | | | 5 | e |
| Elective | | | | | 5 | e |
| <i>Running Total / Semester Total</i> | 147.5 | 20 | | 180.0 | 32.5 | |

C = ECTS credit points, T=type (m=mandatory, e=elective, u=university)

4 Description of Courses

4.1 Methods, Skills and Introduction

120101 – ESM 1 A (Single Variable Calculus)

| | |
|-----------------------|---------|
| <i>Short Name:</i> | ESM1A |
| <i>Type:</i> | Lecture |
| <i>Semester:</i> | 1 |
| <i>Credit Points:</i> | 5 ECTS |
| <i>Prerequisites:</i> | None |
| <i>Corequisites:</i> | None |
| <i>Tutorial:</i> | Yes |

Course contents This course concentrates on complex numbers, functions of one variable (in particular exponential, logarithm, and trigonometric functions), graphs of functions and equations, limits and continuity, differentiation with applications, integration with applications, as well as brief introductions to series, differential equations (scalar and separable examples only), and vectors in two and three dimensions.

120102 – ESM 2 A (Linear Algebra, Probability, Statistics)

| | |
|-----------------------|---------|
| <i>Short Name:</i> | ESM2A |
| <i>Type:</i> | Lecture |
| <i>Semester:</i> | 2 |
| <i>Credit Points:</i> | 5 ECTS |
| <i>Prerequisites:</i> | None |
| <i>Corequisites:</i> | None |
| <i>Tutorial:</i> | Yes |

Course contents This course offers a profound understanding in linear algebra (equations of lines and planes, matrix algebra, system of linear equations, matrix inverse, vector spaces, linear independence, basis, dimension, linear transformations, change of basis, eigenvalues and eigenvectors, diagonalization). Probability (basic notions of set theory, outcomes, events, sample space, probability, conditional probability, Bayes' rule, permutations and combinations, random variables, expected value, variance, binomial, Poisson, and normal distributions, central limit theorem). Statistics (one-sample hypothesis testing, two sample hypothesis testing, chi-square hypothesis testing, analysis of variance, bivariate association, simple linear regression, multiple regression and correlation).

990101 – Academic and Professional Skills

| | |
|-----------------------|----------|
| <i>Short Name:</i> | APS |
| <i>Type:</i> | Lecture |
| <i>Semester:</i> | 1 |
| <i>Credit Points:</i> | 2.5 ECTS |
| <i>Prerequisites:</i> | None |
| <i>Corequisites:</i> | None |
| <i>Tutorial:</i> | No |

Course contents The Academic and Professional Skills (APS) module aims at broadening students' key qualifications to increase academic success, foster career planning, and enhance employability. The APS module is mandatory for all students of the School of Humanities and Social Sciences (SHSS), International Logistics majors and Global Economics and Management majors. APS consists of one obligatory course "Academic skills in a nutshell: an introduction to writing an academic paper" (1.6 credits), which must be completed in the first semester of studies, and a series of elective workshops (0.9 credits), which can be completed during the three years at Jacobs University. Students pass the APS module when they successfully obtain a total of 2.5 credits, including the obligatory course. "Academic skills in a nutshell: an introduction to writing an academic paper" introduces students to the basic principles and procedures of scientific inquiry. Students will learn the essentials of writing an academic paper, which will prepare them for academic life at the university level and enable them to be more successful throughout their studies. On successful completion of the course students will be awarded 1.6 credits toward the overall APS module credit. The elective credits in the APS module cover a wide range of professional, academic, coping, and interpersonal skills. Workshops are offered by SHSS, Career Services, the Information Resource Center, the Counseling Center, Financial Services, and more. SHSS publishes a schedule and description of upcoming elective credits at the start of every semester. Students are able to choose workshops tailored to their needs and wishes (to a total of at least 0.9 credits).

990121 – Statistical Concepts and Data Analysis

Short Name: StatsConcepts
Type: Lecture
Semester: 2
Credit Points: 5 ECTS
Prerequisites: None
Corequisites: None
Tutorial: No

Course contents This course aims to provide an introduction to fundamental statistical concepts and tools for data analysis. It is intended as a one-semester course that combines selected topics from both the mandatory statistical methods courses for SHSS students (Statistical Methods I: Exploring Relationships and Comparing Groups and Statistical Methods II: Classification, Modelling and Prediction) to offer the more relevant topics for logistics and SES major students. The course will focus on the understanding of statistical concepts and the application of statistical techniques. While some formulae might be used, no stringent mathematical derivation will be provided. The general objective is to become an intelligent user of the various univariate and multivariate statistical techniques and to acquire the knowledge for deciding which procedure is most suitable for the given business situation. We will discuss the theoretical aspects of the statistical methods, discuss the assumptions for their use, reflect on their limitations and the controversies they create. In practical sessions we will learn how to run the particular procedures using SPSS and/or R, how to interpret the computer output and how to skillfully communicate the results of statistical analyses.

080201 – SAP Lab

| | |
|-----------------------|----------|
| <i>Short Name:</i> | SAP |
| <i>Type:</i> | Lab |
| <i>Semester:</i> | 1 |
| <i>Credit Points:</i> | 2.5 ECTS |
| <i>Prerequisites:</i> | None |
| <i>Corequisites:</i> | None |
| <i>Tutorial:</i> | No |

Course contents Distribution as well as application of standard business software continually increases demanding for fundamental knowledge in handling and operating these software. Especially SAP standard software like SAP ERP for supporting and optimizing complex business processes is applied not only in big enterprises but also in small and medium-sized companies all over the globe. Accordingly, more and more firms expect students to have first experiences in SAP tools when they leave university. Current application requirements underline this trend. The course SAP Lab offers students the opportunity to gain and apply first knowledge in the SAP ERP 6.0 software. In the course, the SAP ERP system will be introduced including basic terms of the system like organizational units, master data, transaction data, and documents. Afterwards, students will be trained in using and handling the SAP ERP system. This comprises an overview about the graphical user interface, system functionality, navigation etc. Additionally, students will work with different modules and execute tasks like entering master data, booking business transactions, or approve and release orders. In a nutshell, this course provides a basic and general overview and understanding of the SAP ERP 6.0 software suite and thus increases the attractiveness of students towards the relevant industries. The course will be conducted as a workshop based on specific course materials in form of slides, case studies, and accompanying literature.

4.2 International Logistics**050101 – General Logistics I**

| | |
|-----------------------|---------|
| <i>Short Name:</i> | GenIL I |
| <i>Type:</i> | Lecture |
| <i>Semester:</i> | 1 |
| <i>Credit Points:</i> | 5 ECTS |
| <i>Prerequisites:</i> | None |
| <i>Corequisites:</i> | None |
| <i>Tutorial:</i> | Yes |

Course contents After an introduction to the purpose / scope of logistics and future trends in the logistics industry, the following subjects will be covered, aligned to the logistics processes: Logistic market segments and customer base, modelling of logistic systems, overview of procurement, production, distribution logistics and strategies, transport systems overview, warehouse technology and engineering, packaging technology, parallel flow of material and information, information systems for logistics, introduction to accounting/finance and resource management for logistics, international and transport law, customer requirements and service level management.

050111 – Natural Science Lab Unit Logistics I

| | |
|-----------------------|----------------|
| <i>Short Name:</i> | NatSciLab IL I |
| <i>Type:</i> | Lab |
| <i>Semester:</i> | 1 |
| <i>Credit Points:</i> | 2.5 ECTS |
| <i>Prerequisites:</i> | None |
| <i>Corequisites:</i> | None |
| <i>Tutorial:</i> | No |

Course contents The **Natural ScienceLab Unit Logistics I** substantiates and amends the technical concepts taught in the General Logistics I lecture by exercises, experiments and/or simulations. These include exercises to demonstrate the principles of logistics methods (e.g. business process modeling, computer simulation of a production process, distribution planning, safety stock calculation, operations research). Moreover, in order to get familiar with new technologies used in logistics, practical exercises will show an RFID experimental system. In addition, students will also gain practical knowledge by means of two business games. The Presto business game will help students understand how important the organization of production processes is. Furthermore, the Beer Game (a computer based business game) will address the bullwhip effect in supply chains and improve students' understanding of logistics and supply chain management. Finally, an excursion to a logistic company in Bremen will be offered within one lab session in order to show how logistics works in the industry world.

050102 – General Logistics II

| | |
|-----------------------|----------------------|
| <i>Short Name:</i> | General Logistics II |
| <i>Type:</i> | Lecture |
| <i>Semester:</i> | 2 |
| <i>Credit Points:</i> | 5 ECTS |
| <i>Prerequisites:</i> | None |
| <i>Corequisites:</i> | None |
| <i>Tutorial:</i> | No |

Course contents This course will provide a comprehensive overview of different areas, which are relevant for logistics performance. Therefore, the course will address topics like human resources in logistics, supply chain management, environmental management, resource management for logistics, as well as customer requirements and service level management. Beside others, the course will provide deeper knowledge in areas like logistics and supply chain, supply chain planning and control, value and logistics costs, and managing internationally logistics.

050112 – Natural Science Lab Unit Logistics II

| | |
|-----------------------|----------------------|
| <i>Short Name:</i> | NatSciLab Unit Logis |
| <i>Type:</i> | Lab |
| <i>Semester:</i> | 2 |
| <i>Credit Points:</i> | 2.5 ECTS |
| <i>Prerequisites:</i> | None |
| <i>Corequisites:</i> | None |
| <i>Tutorial:</i> | No |

Course contents During this lab the TOPSIM General Management II game will be played. TOPSIM General Management II is a business management game that establishes a link between business management theory and business management in practice. The simulation creates a realistic market situation for several companies acting as competitors. Groups of small students manage a (virtual) company and render typical business decisions (e.g. production amount, sales price) in a realistic environment. Thereby, they learn principles of business administration like how to use information in decision-making and how to handle risk and uncertainty. The decisions and according results are examined and discussed in class in order to reveal consequences of the student's behavior and for identifying theoretical phenomena in practice. TOPSIM is learning business by doing business.

050211 – Traffic, Transport and Storage Systems

Short Name: TTSS
Type: Lecture
Semester: 3
Credit Points: 5 ECTS
Prerequisites: None
Corequisites: None
Tutorial: No

Course contents The acquisition of detailed knowledge concerning **Traffic, Transport and Storage Systems**, their targets and key figures is the aim of this course. Aspects included are supplier, distribution and shipping networks, information systems in traffic and communication e.g. navigation and tracking systems traffic modes, air and rail freight management, fundamentals in transport economics, combined traffic, quality and performance criteria and approaches for modeling traffic and transport processes.

050231 – Distribution Logistics

Short Name: DisLog
Type: Lecture
Semester: 3
Credit Points: 2.5 ECTS
Prerequisites: None
Corequisites: None
Tutorial: No

Course contents The definition and the targets of distribution logistics as well as its importance and the relevant tasks and functions will be integrated in the course **Distribution Logistics**. This includes the structural parameters of different types of distribution structures, the planning functions for distribution and procurement processes, routing, methods and key figures for an evaluation system for distribution and procurement processes, especially for the suppliers' evaluation. The content does not include only the functions of distribution logistics for production but also for the transportation as well as the strategic planning such as establishing cargo distribution centre, etc.

050232 – Production Logistics

| | |
|-----------------------|----------|
| <i>Short Name:</i> | ProLog |
| <i>Type:</i> | Lecture |
| <i>Semester:</i> | 4 |
| <i>Credit Points:</i> | 2.5 ECTS |
| <i>Prerequisites:</i> | None |
| <i>Corequisites:</i> | None |
| <i>Tutorial:</i> | No |

Course contents A thorough treatment of planning and control basics and its coherences with the essential processes of the order management within production companies as well as the co-ordination of the entire manufacturing processes will be given in the course **Production Logistics**. The problems production companies are confronted with will be presented, the targets and key figures of production logistics, the modeling methods of production systems and the production planning and control (PPC) tasks, types of production, functions as well as the production planning and control methods are integrated in this course. Furthermore the importance of monitoring and controlling systems will be shown. Planning games will ensure an understanding of the complexity of the production logistics.

050322 – Procurement Logistics

| | |
|-----------------------|----------|
| <i>Short Name:</i> | ProcLog |
| <i>Type:</i> | Lecture |
| <i>Semester:</i> | 4 |
| <i>Credit Points:</i> | 2.5 ECTS |
| <i>Prerequisites:</i> | None |
| <i>Corequisites:</i> | None |
| <i>Tutorial:</i> | No |

Course contents The course **Procurement Logistics** is referring to the increasing importance of procurement logistics especially in supply networks. The management of the procurement process in general as well as in specific countries (e.g. India) is covered on the one hand, and characteristics and methods and software tools of the procurement of technical products and parts will be presented.

050221 – Contract Logistics

| | |
|-----------------------|----------|
| <i>Short Name:</i> | ConLog |
| <i>Type:</i> | Lecture |
| <i>Semester:</i> | 4 |
| <i>Credit Points:</i> | 2.5 ECTS |
| <i>Prerequisites:</i> | None |
| <i>Corequisites:</i> | None |
| <i>Tutorial:</i> | No |

Course contents In the past years, **Contract Logistics** is the most growing field in the logistics business resulting in the changes of the structure in the industry. The definition of contract logistics will be treated deeply as well as the role and its importance to the logistics market. Examples of the companies offering this service will be illustrated to emphasize the variety and the broad perspective of this growing

business.

050332 – Advanced Lean Methods

Short Name: AdvLeanMeth
Type: Lecture
Semester: 4
Credit Points: 2.5 ECTS
Prerequisites: None
Corequisites: None
Tutorial: No

Course contents This course deals with the implementation and amplification of the 20th century lean methods in modern manufacturing processes. These include: elimination of waste, one piece flow, pull principle, value stream mapping, 6 sigma and zero defects. The course provides a theoretical overview of these methods as well as enables students to learn how to apply them in practice.

050252 – Supply Chain Management

Short Name: SupplyChainMan
Type: Lecture
Semester: 6
Credit Points: 2.5 ECTS
Prerequisites: 050101 and 050102
Corequisites: None
Tutorial: No

Course contents This course will particularly bundle theoretical methods for solving logistics problems in networks with practical examples from industry. Approaches in supply chain design will be presented as well. Students work intensively in groups on several case studies; thus they are able to apply the knowledge, which they acquired in their courses and internships, on real cases.

930351 – Law of Transportation, Forwarding and Logistics

Short Name: LawTFL
Type: Lecture
Semester: 6
Credit Points: 5 ECTS
Prerequisites: None
Corequisites: None
Tutorial: No

Course contents This course will deal with the legal aspects of transportation, forwarding and logistics. After an outline of several aspects of international and national trade law which includes the formation of contracts, incorporation of general conditions in general and the law of sales contracts, we will focus on national law of transportation, logistics and freight forwarding. Thereafter the international conventions for the carriage of goods by sea, by air and by land including multimodal carriage will be

subject of the course. Since logistics is a manifold area we will have to include several aspects like law of warehousing and the assembling of products. At last, we will focus on the law of other contracts which are necessarily connected with the transport/logistics, e. g. insurance (marine and liability insurance), agency, construction and long term contracts, product liability. Of course the student should be aware that the legal entities acting in the logistic business have different legal structures. Therefore, an outlook to the company law will be given. Professionals might get in contact with labour law, that is why an introduction should be given also to this. The course will end with an outline of the international private law (conflicts of law), juris-diction, litigation and arbitration. Of course the student should be aware that the legal entities acting in the logistic business have different legal structures. Therefore, an outlook to the company law with connected aspects will be given.

4.3 Management and Economics

930201 – Introduction to Economics

| | |
|-----------------------|-----------------|
| <i>Short Name:</i> | Intro.Economics |
| <i>Type:</i> | Lecture |
| <i>Semester:</i> | 1 |
| <i>Credit Points:</i> | 5 ECTS |
| <i>Prerequisites:</i> | None |
| <i>Corequisites:</i> | None |
| <i>Tutorial:</i> | Yes |

Course contents The course **Introduction to Economics** introduces students to the institution of the market. It reconstructs the micro-logic of market exchanges at the level of individual market participants (microeconomics), analyzes the resulting macro-patterns at the level of market aggregates (macroeconomics), and looks into the role that governments play in defining, shaping, and destroying market relations.

930221 – Managerial and Financial Accounting

| | |
|-----------------------|----------------|
| <i>Short Name:</i> | Accounting MLM |
| <i>Type:</i> | Lecture |
| <i>Semester:</i> | 2 |
| <i>Credit Points:</i> | 5 ECTS |
| <i>Prerequisites:</i> | None |
| <i>Corequisites:</i> | None |
| <i>Tutorial:</i> | No |

Course contents Physical movements of goods leave a financial trail. **Accounting** is the art of capturing this trail and transforming it into meaningful information for management and other stakeholders. This course provides an introduction to accounting principles. It focuses on measuring the financial position and performance of a firm, on reporting cash flows and on analyzing financial statements. It consists of modules on strategic and operative planning as well as on controlling (target setting, feedback and feed-forward control, balanced scorecard). Cost allocation, full costing and cost-volume-profit analysis are the focus of managerial accounting.

910301 – International Economics

Short Name: Int.Econ.
Type: Lecture
Semester: 3
Credit Points: 5 ECTS
Prerequisites: None
Corequisites: None
Tutorial: No

Course contents The economic space of the market and the political space of the nation state have never coincided perfectly and the process of globalization has increased the gap. This lecture looks at the economic factors driving this process, in particular at the determinants of international trade, international factor movements, and the foreign exchange market. It examines the emergence of multinational corporations, and analyzes their role in international markets and national politics. It also considers the interaction between global markets and national development.

032311 – Global Leadership

Short Name: Global Leader
Type: Lecture
Semester: 3
Credit Points: 5 ECTS
Prerequisites: None
Corequisites: None
Tutorial: No

Course contents Leadership is an essential instrument for managing the increasingly diverse workforce in a globalized world. Tailored knowledge on how to make use of this challenge and turn it into an asset is of major importance for scholars, practitioners and managers in almost all professions around the world. In line with these demands, this course offers interdisciplinary approaches and empirical findings on successful leadership and explicitly takes into account the impact that different cultures as well as workforce diversity have on the leadership outcomes. The course covers a variety of theoretical and applied topics and takes account of recent human resource management as well as corporate and societal challenges to private, public and nongovernmental organizations. Besides covering historical trends, new leadership paradigms as well as effective cross-cultural applications, particular emphasis is given to the effective management of diverse teams and multicultural workforces. The courses theories are grounded in psychological, behavioral and cultural theories that are applied to specific organizational challenges including those being posed by internationalization and multiculturalism.

032311 – Marketing

Short Name: Marketing
Type: Seminar
Semester: 3
Credit Points: 5 ECTS
Prerequisites: None
Corequisites: None
Tutorial: No

Course contents This course covers a set of diverse practices that connect firms to their relevant markets. This course introduces the principal marketing decision-making areas known as the four "Ps": product, price, promotion and place. Actual decisions on these parameters depend on how firms communicate with, and learn from, their customers who may be private consumers (B2C) or other firms (B2B) buying goods as well as services. Students learn that marketing strategies are also shaped by how firms' marketing is integrated with other business functions, by the behaviors of competitors and partner firms, and by the values, needs, and standards in the firms' environment. Marketing plays a key role in firms' internationalization strategies and, building on many practical examples, the course familiarizes students with issues around foreign market entry, globalization and localization of marketing policies, and coordination within multinationals.

930241 – Finance

Short Name: Finance MLM

Type: Seminar

Semester: 4

Credit Points: 5 ECTS

Prerequisites: None

Corequisites: None

Tutorial: No

Course contents Corporate **Finance** is crucial to the growth of all firms. This is even more so in a global environment that is characterized by liquidity shortages and turmoil in capital markets. This course will provide students with the basics of corporate finance. It will introduce to the analytical tools and the necessary techniques for the financial management of a firm. Students will discuss these techniques in various contexts: the modern theories of corporate finance, corporate governance, value and capital budgeting, risk and return, capital structure and dividend policy, finance decisions as well as long term and short term financial planning.

930312 – Firms and Markets

Short Name: Firms/Markets

Type: Lecture

Semester: 4

Credit Points: 5 ECTS

Prerequisites: None

Corequisites: None

Tutorial: No

Course contents The seminar **Firms and Markets** continues the analysis of the market. It asks why in market economies, not all economic transactions take place within the market. Why are some transactions moved outside of the market and coordinated hierarchically within business firms? The seminar examines both the internal organization and management of business firms and their external behavior. The topics covered include the economics of transaction costs, agency theory, elementary game theory, competitive advantage, strategy formation, and strategic pricing.

930211 – Organization

| | |
|-----------------------|--------------|
| <i>Short Name:</i> | Organization |
| <i>Type:</i> | Seminar |
| <i>Semester:</i> | 4 |
| <i>Credit Points:</i> | 5 ECTS |
| <i>Prerequisites:</i> | None |
| <i>Corequisites:</i> | None |
| <i>Tutorial:</i> | No |

Course contents The course **Organization** will show: Organizing is a key management activity and organizations are both the context and the object of managerial work. This course introduces students to fundamental ideas on why organizations exist, how people behave in organizations, how organizations can be designed and changed strategically, and how they evolve in their environments. Managers also need to build and maintain inter-organizational relationships in projects, alliances, networks, supply chains and partnerships with various other organizations and in increasingly international contexts. The course covers classical principles of the division and integration of labor within and across firms. It also fosters a critical perspective on organizing as an ongoing creative, collective and contested practice that entails limitations for managerial control. Through project work, students learn what it means to be part of, and responsible for, contemporary organizations.

930361 – Managing Strategies and Innovations in Logistics

| | |
|-----------------------|-------------|
| <i>Short Name:</i> | StratInnMan |
| <i>Type:</i> | Lecture |
| <i>Semester:</i> | 6 |
| <i>Credit Points:</i> | 5 ECTS |
| <i>Prerequisites:</i> | None |
| <i>Corequisites:</i> | None |
| <i>Tutorial:</i> | No |

Course contents This course intends to offer the students opportunities to acquire the necessary knowledge, to develop a comprehensive understanding, and to leverage the competencies, which are needed for a strategic innovation management in logistics. Hence, the course aims for the integration of innovations and strategies into the logistics management. Therefore, the course combines a service marketing perspective with the innovation management process. This includes the identification and analysis of problems of logistics service products and processes, the generation and collection of ideas for solving the given problems, the strategic evaluation of technology-based alternatives, the approaches for the implementation of a selected technology in products and processes, the marketing of innovations and their contribution to the competitive advantage of a company (i.e. a logistics service provider). Additionally, drivers of innovations and their diffusion process will be discussed. On the background of innovations and their management the strategic options of quality leadership vs. cost leadership will be outlined for the strategic purposes of logistics service companies. Therefore, a combination of lectures, case studies, and textbook analyses (self-study) set up the didactical framework.

4.4 Engineering and ICT

050131 – Fundamental of Engineering Design

Short Name: FunED
Type: Lecture
Semester: 1
Credit Points: 2.5 ECTS
Prerequisites: None
Corequisites: None
Tutorial: No

Course contents This course will provide a general understanding of innovation and development management and the processes and methods used to develop and design machines with its context to logistics engineering. Basic aspects of development methods will be explained: Development processes including specification, conceptual design and detailed design as well as different types of modular approaches and development levels will be trained. The use and need of design standards DIN/ISO, patents/IP and CAD systems will be shown.

050262 – Basics of Manufacturing Technology

Short Name: ManuTech
Type: Lecture
Semester: 1
Credit Points: 2.5 ECTS
Prerequisites: None
Corequisites: None
Tutorial: No

Course contents This course aims to provide students with a board view of operations within the factory and consists of 5 main themes. After briefly introducing basics of manufacturing technology and processes such as casting, milling and welding, the course will move on to topics in operations management including manufacturing process flow, inventory management, ordering, machine scheduling and forecasting.

400902 – Strength of Materials

Short Name: StrengthMaterials
Type: Lecture
Semester: 2
Credit Points: 5 ECTS
Prerequisites: None
Corequisites: None
Tutorial: No

Course contents This course is intended to provide the theory and application of the fundamental principles of mechanics and strength of materials. A goal of this course is to develop the students' ability to identify and analyze situations where the strength or the stability of a structure is critical. The scope of analyses and design will cover various structures and different types of loads.

350111 – Natural Science Lab Unit Programming in Python I

Short Name: NatSciLabPyI
Type: Lab
Semester: 1
Credit Points: 2.5 ECTS
Prerequisites: None
Corequisites: None
Tutorial: No

Course contents This lab is a first introduction to programming using the programming language Python. The course covers fundamental programming constructs and simple algorithms in a hands-on manner.

350112 – Natural Science Lab Unit Programming in Python II

Short Name: NatSciLabPyII
Type: Lab
Semester: 2
Credit Points: 2.5 ECTS
Prerequisites: None
Corequisites: None
Tutorial: No

Course contents This lab unit is a continuation of the first semester lab Programming in Python I. It covers advanced topics of Python programming such as object oriented programming, advanced data structures, file handling, debugging techniques and problem solving using frameworks.

350112 – Material Handling

Short Name: MatHandling
Type: Lecture
Semester: 4
Credit Points: 2.5 ECTS
Prerequisites: None
Corequisites: None
Tutorial: No

Course contents This course concentrates on the presentation of intralogistics systems and technologies such as cranes, robots, conveying and feed systems etc. Layout planning of factories integrating these material-handling technologies will be covered as well.

350112 – Process Modeling and Simulation

| | |
|-----------------------|-------------|
| <i>Short Name:</i> | PM |
| <i>Type:</i> | Lecture/Lab |
| <i>Semester:</i> | 4 |
| <i>Credit Points:</i> | 2.5 ECTS |
| <i>Prerequisites:</i> | None |
| <i>Corequisites:</i> | None |
| <i>Tutorial:</i> | No |

Course contents Process understanding is the most important issue in logistics. Without knowing processes, there is no clue how to improve them. In the course **Process Modeling and Simulation**, various concepts of process modeling will be introduced as well as modeling methods and modeling languages. One method of process modeling will be treated in details to demonstrate the ability how the process modeling can support the logistician in the optimization. Various exercises and simulation examples will be practiced both in class and as homework with real process modeling and simulation tool (e.g. Softwaretool PlantDesign).

120201 – ESM III A (Advanced Linear Algebra, Stochastic Processes)

| | |
|-----------------------|---------|
| <i>Short Name:</i> | ESM3A |
| <i>Type:</i> | Lecture |
| <i>Semester:</i> | 3 |
| <i>Credit Points:</i> | 5 ECTS |
| <i>Prerequisites:</i> | None |
| <i>Corequisites:</i> | None |
| <i>Tutorial:</i> | No |

Course contents This course is offered for students who would like to learn more advanced topics from linear algebra and probability than were covered in second semester mathematics. It covers the Jordan normal form, LU and QR decomposition, idea of pivoting, singular value decomposition with application; function of one random variable (moments, characteristic function), bivariate distributions, moments (joint moments, conditional expectation), mean square estimation (basic concepts and prediction leading to concept of filter), Markov chains, stochastic convergence and limit theorems, random number generation, stationarity and ergodicity of Markov chains.

350101 – General Information and Communication Technology I

| | |
|-----------------------|----------|
| <i>Short Name:</i> | GenICT I |
| <i>Type:</i> | Lecture |
| <i>Semester:</i> | 3 |
| <i>Credit Points:</i> | 5 ECTS |
| <i>Prerequisites:</i> | None |
| <i>Corequisites:</i> | None |
| <i>Tutorial:</i> | No |

Course contents This course introduces fundamental concepts underlying today's information and communication technology. The course is designed to provide an applied introduction to Computer

Science concepts and information and communication technology. The course starts with introducing basic computer science terms and concepts and different programming paradigms. Afterwards, the basic components of computer systems will be introduced as well as Boolean logic, number representations, character sets their representation, and structured document formats. Finally, some key concepts of theoretical computer science such as complexity, correctness, and computability will be introduced.

350102 – General Information and Communication Technology II

Short Name: GenICT II
Type: Lecture
Semester: 4
Credit Points: 5 ECTS
Prerequisites: None
Corequisites: None
Tutorial: No

Course contents This course introduces fundamental concepts underlying today's information and communication technology. The course is designed to provide an applied introduction to Computer Science concepts and information and communication technology. The course starts with introducing basic computer science terms and concepts and different programming paradigms. Afterwards, the basic components of computer systems will be introduced as well as Boolean logic, number representations, character sets their representation, and structured document formats. Finally, some key concepts of theoretical computer science such as complexity, correctness, and computability will be introduced.

050242 – Basic Principles of Modeling Dynamics in Logistics

Short Name: ModelDynLog
Type: Lecture
Semester: 4
Credit Points: 5 ECTS
Prerequisites: None
Corequisites: None
Tutorial: No

Course contents Dynamical systems often behave in a counter-intuitive fashion and are, therefore, complicated to predict, to organize and to regulate. The counter-intuitive behavior comes from nonlinear interactions between the system components. The course **Basic Principles of Modeling Dynamics in Logistics** provides a nutshell view on nonlinear dynamics, leading to a toolbox for understanding and simulating complex situations. Starting from high-school level mathematics (basic calculus, probabilities, etc.) this course will introduce ideas from nonlinear dynamics and illustrate, how this perspective has lead to breakthroughs in identifying the organizing principles behind dynamical observations. The basic questions we will discuss have an immediate appeal to logistics: Why can a single feedback loop lead to oscillations? When does a chain of processes become unstable? What are the limits for accurate predictions in nonlinear systems? Topics include the stability analysis in systems of ordinary differential equations; conditions for oscillations; deterministic chaos; agent-based models and cellular automata; dynamic processes on networks. In all these cases it will be shown, how the abstract theoretical concepts are linked with explicit observations and how these concepts can help understand processes in logistics.

050222 – Intermodal Logistics

| | |
|-----------------------|----------|
| <i>Short Name:</i> | InterLog |
| <i>Type:</i> | Lecture |
| <i>Semester:</i> | 4 |
| <i>Credit Points:</i> | 5 ECTS |
| <i>Prerequisites:</i> | None |
| <i>Corequisites:</i> | None |
| <i>Tutorial:</i> | No |

Course contents **Intermodal Logistics** have become significant and a challenging job for the logisticians. The definition, concept, roles and its processes will be elaborated in this course. Many modes of transport will be treated in-depth and analyzed for the optimum utilization in the logistics chain to have the optimized intermodal logistics process as well as the concern and relevance of this issue in regards to environment, security and safety for the transportation.

080202 – Operations Research

| | |
|-----------------------|----------------------------|
| <i>Short Name:</i> | OR |
| <i>Type:</i> | Lecture |
| <i>Semester:</i> | 4 |
| <i>Credit Points:</i> | 5 ECTS |
| <i>Prerequisites:</i> | 120101 and 120102 / 120112 |
| <i>Corequisites:</i> | None |
| <i>Tutorial:</i> | No |

Course contents **Operations research** is an interdisciplinary mathematical science that focuses on the effective use of technology by organizations.

Employing techniques such as mathematical modeling, statistical analysis, and mathematical optimization, operations research finds optimal or near-optimal solutions to complex decision-making problems. Operations Research is concerned with determining the maximum (of profit, performance, or yield) or minimum (of loss, risk, or cost) of some real-world objective.

Familiarity with a programming language (e.g., Python, C++, etc.) is desirable for this course.

4.5 Academic Projects

050301 – Guided Industrial Project

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|-----------------------|---------|
| <i>Short Name:</i> | GIP |
| <i>Type:</i> | Project |
| <i>Semester:</i> | 5 |
| <i>Credit Points:</i> | 20 ECTS |
| <i>Prerequisites:</i> | None |
| <i>Corequisites:</i> | None |
| <i>Tutorial:</i> | No |

Course contents The Guided Industrial Project is a 4-6 month long internship and takes place in the summer break between the second and the third year and the fall semester (5th semester).

The following requirements have to be fulfilled:

- minimum duration: 16 weeks,
- can be split into 2 x 8 weeks on demand,
- 20 ECTS credits are required,
- students can do a six month internship according to the individual negotiation, but additional credits are not given,
- For GIP in German companies it is mandatory to be in sovereign command of the German language,
- tuition fee is to be paid during this period, financial aid continues,
- students have to inform CSC about payments,
- room and board can be reimbursed on demand if students stay in foreign countries for their internships,
- guided industrial projects (GIP) are administered by the office of career services:
 - Students organize their internships with the help of CSC (Career Service Center - <http://www.jacobs-university.de/career-services/internship>)
 - The same workflow as for the other Bachelor internships is applied to International Logistics as well
 - The GIP has to be approved before starting the GIP by the study program coordinator of the International Logistics study program
 - Grading info (pass/fail): report, certificate, poster presentation
 - The CSC sets up a GIP pool (companies)
 - CSC encourages students to enter their profiles to a database which can be used by faculty and companies to acquire internships
 - Please refer to the GIP guidelines (see https://www.jacobs-university.de/_gplogistics/education/GIP)

050372 – BSc Thesis Seminar

| | |
|-----------------------|---------|
| <i>Short Name:</i> | 050372 |
| <i>Type:</i> | Project |
| <i>Semester:</i> | 6 |
| <i>Credit Points:</i> | 10 ECTS |
| <i>Prerequisites:</i> | None |
| <i>Corequisites:</i> | None |
| <i>Tutorial:</i> | No |

Course contents The bachelor thesis in logistics represents an important document for the job application process. It shows the ability of a student to analyze and solve a single problem based on an aimed usage of scientific instruments, a critical reflection of the status quo in scientific literature, and an original development his/her own ideas. Therefore, the necessary quality standards need to be fulfilled. A minimum of 30 pages (excluding all indexes and appendix) is required. The topic of the thesis can be related with a real logistics problem in a company. Guidelines of the bachelor thesis within the Bachelor Study Program International Logistics will be published separately.

4.6 Transdisciplinary Education

– Language Courses

Short Name:

Type: Seminar

Semester: 1-6

Credit Points: 10 ECTS

Prerequisites: None

Corequisites: None

Tutorial: No

Course contents Although Jacobs University is international in its orientation and has chosen English as the primary language of instruction and campus communication, all foreign students are encouraged to take the opportunity to learn the language of their host country: Learning German or improving the language skills already acquired is not only an additional qualification to round off the resume, but it is the (only) way to gain a deeper insight into German culture and to take part in it by using the media and communicating with Germans on and outside campus. At the same time being able to speak and understand German makes everyday life easier, more enjoyable, and much more interesting.

Especially for the students of International Logistics it is strongly recommended to learn German. For a successful application for a Guided Industrial Project in Germany it is mandatory to be in sovereign command of the German language.

Learning French, Spanish or Chinese improving the language skills already acquired is an additional qualification to round off the language proficiency of the Logistics student. Jacobs University offers Spanish and French language courses for all learners, for the absolute beginners as well as for highly advanced learners.

Students in Logistics may count up to 10 ECTS credit points in these courses against the 180 ECTS credit points necessary for graduation.

– University Studies Courses

Short Name: USC

Type: Lecture

Semester: 1-6

Credit Points: 15 ECTS

Prerequisites: None

Corequisites: None

Tutorial: No

Course contents As problems resulting from recent technological and social change are becoming more complex, they more and more often require transdisciplinary approaches to be dealt with. In University Studies Courses (USCs) professors of both Schools cooperate in a transdisciplinary fashion to deal with complex, overarching research questions. Students learn how to approach an academic problem from different angles and perspectives and how to find solutions by combining methods and knowledge from different disciplines. In this section the USCs most suitable for the International Logistics major are compiled. This does not mean that the student cannot choose other USCs, for these the course descriptions can be found online.

