HAWK Fakultät Ressourcenmanagement Göttingen

# Module Handbook

## MEng Business Administration and Engineering

**Examination regulations version 2022**

**Last updated: 28.06.2022**

**Note: All modules take one semester to complete!**

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| **Module name** | | **WING Master Module 1**<br>**Quality management I:**<br>**Quality management methods and techniques** |
| **Application** | | MEng Business Administration and Engineering |
| **Learning goals / Competencies** | | Students<br><br>- know the tasks of quality management in the company.<br>- are able to systematically plan and record quality features of products, processes and organizations.<br><br>- know the quality tools and methods and are able to apply them.<br>- are familiar with the statistical procedures of quality assurance and are able to plan, analyze and evaluate measurement results.<br><br>- know quality management systems and their areas of application for internal and external audits.<br><br>- are able to assess the requirements of important industrial sectors in terms of business organization and their management requirements in practice.<br><br>- are familiar with the approach of Total Quality Management (TQM) and Total Sustainability Management (TSM). |
| **Course contents** | | - Problem solving methods and elementary quality tools<br>- Basic principles of lean quality and the Japanese quality philosophy<br>- Failure Mode and Effect Analysis (FMEA)<br>- Statistical methods used in quality management<br>- Quality management systems<br>- Total Quality Management (TQM) and Sustainability Management<br>- Six Sigma |
| **Forms of teaching and learning** | | - Seminar teaching<br>- Practical exercises in the innovation laboratory for factory and process management<br>- Field trip |
| **Module language** | | German |
| **Prerequisites** | | **Formal**: none<br>**Contents:** Basic principles of quality management |
| **Examination** | | Written exam, 2 h |
| **Credits** | | 5 |
| **Work-load** | **Course attendance** | 60 |
| | **Home study** | 90 |
| **Special focus on Home study** | | - Application of the lecture contents in the context of group work<br>- Preparation and follow-up on the lecture contents<br>- Study of literature |
| **Module is on offer in:** | | In the summer semester (1st semester) |
| **Responsible for module** | | Prof. Dr.-Ing. Thomas Harms |
| **Teaching staff** | | Prof. Dr.-Ing. Thomas Harms |

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| **Module name** | | **WING Master Module 2**<br>**Energy efficiency and energy law** |
| **Application** | | MEng Business Administration and Engineering |
| **Learning goals / Competencies** | | Students<br>- are familiar with concepts for increasing energy efficiency in various sectors.<br>- are able to identify potential for increasing efficiency in companies of different sizes and industries with different design characteristics.<br>- are able to optimize operational processes with regard to the use of energy in practice-relevant overall contexts and to examine the use of alternative material and energy flows.<br>- are able to evaluate energy efficiency measures in existing production systems in economic, ecological and social dimensions based on entrepreneurial strategies and operational framework conditions.<br>- are able to independently develop practical approaches to improve energy efficiency in different industries.<br>- have developed an understanding of applicable techniques and methods and their limitations.<br>- are able to assess the legal necessity and eligibility of selected measures for energy saving, energy efficiency, combined heat and power generation, use of renewable energies and energy consulting. |
| **Course contents** | | **Energy efficiency**<br>- Energy efficiency: Definitions, indicators, impact and effects<br>- Market transformation and political instruments<br>- Increasing efficiency in industrial power plants<br>- Combined heat and power generation<br>- Rational use of energy in electrical applications Pumps, lighting, ventilation technology, information and communication technology<br>- Energy efficiency in buildings<br>- Energy efficiency in building services<br>- Industrial waste heat, heat extraction, technologies, potentials and barriers, heat generation<br>- Energy efficiency in heat supply Low-temperature district heating systems<br>**Energy law**<br>- Electricity Tax Act/Energy Tax Act<br>- Promotion of combined heat and power generation in accordance with the KWKG<br>- The promotion of electricity generation from renewable energies under the EEG<br>- Obligation to use renewable energies in the heating/cooling sector and efficiency requirements for buildings under the Building Energy Act<br>- Energy services according to the EDL-G |
| **Forms of teaching and learning** | | Seminar teaching, exercises, group work |
| **Module language** | | German |
| **Prerequisites** | | **Formal**: none<br>**Contents:** Basic principles of energy system technology |
| **Examination** | | Written exam, 2 h (70%) and seminar paper (30%) |
| **Credits** | | 5 |
| **Work-load** | **Course attendance** | 60 |
| | **Home study** | 90 |

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| **Special focus on Home study** | - Application of the lecture contents in the context of group work<br>- Follow-up on the lecture contents<br>- Study of literature |
| **Module is on offer in:** | In the summer semester |
| **Responsible for module** | Prof. Dr. Holler |
| **Teaching staff** | Prof. Dr. Holler, Prof. Dr. Klein |

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| **Module name** | | **WING Master Module 3**<br>**Product development** |
| **Application** | | MEng Business Administration and Engineering |
| **Learning goals / Competencies** | | Students<br>- are able to apply the basic methods of the product development process.<br>- are able to explain creativity techniques and apply them to projects.<br>- are able to systematically plan and organize development projects.<br>- are able to evaluate concepts in a structured way.<br>- are able to present their own ideas and results in front of a group.<br>- are confident in their ability to use the CAD tool CREO.<br>- are able to explore competitive situations in business games. |
| **Course contents** | | - Methods of product planning<br>- Methods of the organization of development projects<br>- Methods of concept finding<br>- Methods of concept evaluation<br>- Methods of industrialization |
| **Forms of teaching and learning** | | Seminar teaching, exercises, case studies |
| **Module language** | | German |
| **Prerequisites** | | **Formal**: none<br>**Contents:** Theory of construction/CAD |
| **Examination** | | Written exam, 1 h (80%) and lab work CAD (20%) |
| **Credits** | | 5 |
| **Work-load** | **Course attendance** | 60 |
| | **Home study** | 90 |
| **Special focus on Home study** | | - Follow-up on the lecture contents<br>- Study of literature |
| **Module is on offer in:** | | In the summer semester |
| **Responsible for module** | | Prof. Dr. Frey |
| **Teaching staff** | | Prof. Dr. Frey, Dipl.-Ing. Bachmann, Dipl.-Ing. (FH) Mollus |

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| **Module name** | | **WING Master Module 4**<br>**Manufacturing technologies and manufacturing organization** |
| **Application** | | MEng Business Administration and Engineering |
| **Learning goals / Competencies** | | Students are able to<br>- analyze relevant company-specific current manufacturing processes.<br>- represent the processes of manufacturing engineering systems in their conception.<br>- to combine the conceptual processes presented in production-specific manufacturing technologies and to classify their technical and economic significance.<br>- to organize themselves independently in the work group, to systematically and purposefully bring about work results and to present these in a professional and structured manner.<br>- to design their solution processes on their own responsibility and to recognize alternative courses of action when solving complex tasks. |
| **Course contents** | | - Additive Manufacturing<br>- Measuring machine and process capability<br>- Preventive Maintenance<br>- Robotics in manufacturing (collaborating robots)<br>- Standardization<br>- Workplace design (safety, machinery directive, CE, ergonomics)<br>- Industry 4.0<br>- International manufacturing concepts (Completely Knocked Down CKD, MKD, SKD, CBU) |
| **Forms of teaching and learning** | | Lecture, seminar teaching, exercises, group work |
| **Module language** | | German |
| **Prerequisites** | | **Formal:** Attendance is compulsory for this module (predominantly seminar character)<br>**Contents:** Technical mechanics, manufacturing technology |
| **Examination** | | Written exam (50%) and presentation (50%) |
| **Credits** | | 5 |
| **Work-load** | **Course attendance** | 60 |
| | **Home study** | 90 |
| **Special focus on Home study** | | - Application of the lecture contents in the context of group work<br>- Follow-up on the lecture contents<br>- Preparation of the presentation<br>- Study of literature |
| **Module is on offer in:** | | In the summer semester (1st semester) |
| **Responsible for module** | | Prof. Dr. Podolsky |
| **Teaching staff** | | Prof. Dr. Podolsky, Prof. Dr. Bussmann |

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| **Module name** | | **WING Master Module 5**<br>**Controlling** |
| **Application** | | MEng Business Administration and Engineering |
| **Learning goals / Competencies** | | Students<br>- understand the most important tasks of controlling and are also able to apply complex controlling instruments in the areas of information supply, planning, control and steering of a company to concrete case studies.<br>- are able to analyze problems and business decisions, question propagated concepts, make a well-founded assessment of the corresponding decision-making in practice and/or develop optimized recommendations for action. |
| **Course contents** | | - Basic principles (including scientific classification, corporate governance and principal-agent theory)<br>- Information supply and control on the basis of a balanced scorecard with the help of balance sheet, working capital, success, profitability, cash flow and value orientation<br>- Planning and control<br>- Operative planning system<br>- Budget controlling<br>- Activity-based cost accounting<br>- Project planning and control<br>- Target costing |
| **Forms of teaching and learning** | | Seminar teaching, exercises, case studies |
| **Module language** | | German |
| **Prerequisites** | | **Formal**: none<br>**Contents:** Basic principles of business administration, cost and revenue accounting, investment appraisal and financial management |
| **Examination** | | Written exam, 2 h |
| **Credits** | | 5 |
| **Work-load** | **Course attendance** | 60 |
| | **Home study** | 90 |
| **Special focus on Home study** | | - Independent completion of exercises provided<br>- Follow-up on case studies<br>- Study of literature |
| **Module is on offer in:** | | In the summer semester |
| **Responsible for module** | | Prof. Dr. Horsch |
| **Teaching staff** | | Prof. Dr. Horsch |

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| **Module name** | **WING Master Module 6**<br>**Strategic planning and control** |
| **Application** | MEng Business Administration and Engineering |
| **Learning goals / Competencies** | Students<br>- understand the main tasks and objectives of strategic management and are able to apply methods for strategic analysis.<br><br>- are familiar with the components of a strategy and different types of strategy.<br>- are able to explain the interaction between vision/strategy, organization and culture.<br><br>- are able to develop strategic initiatives.<br>- know and understand the many options for how strategies are able to emerge and evolve in organizations.<br><br>- are able to derive the influence of corporate culture on the success of a strategy and translate it into leadership approaches.<br><br>- are able to deduce the challenges of strategy implementation and learn methods of successfully countering them.<br><br>- Students are familiar with the essential SCM concepts, terms and systems thinking and know the various subfields of SCM and the underlying optimization problems.<br><br>- Students apply concepts and tools to analyze logistics process chains.<br><br>- Students use methods of location planning and evaluation and design structures for global production networks.<br><br>- The students recognize the possibilities of globalization as opportunities and risks for companies as well as the environment and society in the concrete field of value creation.<br><br>- Students are able to develop a concept of sustainable supply chain management.<br><br>- Students understand how to evaluate the efficiency of supply chains using performance management approaches.<br><br>- Students are able to classify risks in the supply chain and apply approaches to risk assessment and control.<br><br>- Students are able to assess the design difficulties of cross-enterprise SCM. |
| **Course contents** | **Strategic Management**<br>- Basic principles of strategic management<br>- Strategic analysis<br>- Identification of strategy options and strategy formulation<br>- Strategy implementation<br>- Technology management<br>- Corporate culture<br>- Strategic leadership<br><br>**Supply Chain Management**<br>- SCM goals and strategies<br>- Bullwhip effect and solution approaches<br>- Functions in the supply chain: Source, make, deliver<br>- Global production conditions<br>- Location assessment and selection<br>- Design of global production networks |

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| | | - Supply chain management<br>- Performance management to steer the supply chain<br>- Complexity and risk management<br>Digital supply chain transformation<br>- Sustainable supply chain management |
| **Forms of teaching and learning** | | Seminar teaching, exercises, case studies |
| **Module language** | | German |
| **Prerequisites** | | **Formal**: none<br>**Contents:** Basic principles of business administration, materials and production management |
| **Examination** | | Written exam, 2 h |
| **Credits** | | 5 |
| **Work-load** | **Course attendance** | 60 |
| | **Home study** | 90 |
| **Special focus on Home study** | | - Independent completion of exercises provided<br>- Follow-up on case studies<br>- Study of literature |
| **Module is on offer in:** | | In the summer semester |
| **Responsible for module** | | Prof. Dr. Brüseke |
| **Teaching staff** | | Prof. Dr. Brüseke, Prof. Dr. Wagner |

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| **Module name** | | **WING Master Module 7**<br>**Quality management II:**<br>**Quality management in individual industrial sectors** |
| **Application** | | MEng Business Administration and Engineering |
| **Learning goals / Competencies** | | Students<br>- are able to apply the quality management methods they have learned in concrete practical situations.<br>- are able to research a company's quality data and assess it by using the tools available.<br>- are able to find optimization possibilities for an operational quality management and to further develop the existing instruments.<br>- are able to plan, implement and evaluate improvement activities in organizations.<br>- are able to use statistical quality assurance procedures in a targeted manner and to analyze and evaluate measurement results.<br>- know the essential legal standards of product and manufacturer liability and are able to assess the legal consequences on the basis of concrete cases.<br>- are familiar with risk and crisis management in the operational environment and are able to conceptualize it. |
| **Course contents** | | - Quality management in the product and production realization process<br>- Quality management in the automotive and automotive supplier industry<br>- Overview: Quality management in various industries<br>- Projects and quality<br>- Quality management for services<br>- Quality and costs<br>- Quality information and CAQ systems against the background of Industry 4.0 and digitalization<br>- Quality management and the law |
| **Forms of teaching and learning** | | - Seminar teaching<br>- Practical exercises in the innovation laboratory for factory and process management<br>- Field trip |
| **Module language** | | German |
| **Prerequisites** | | **Formal**: none<br>**Contents:** Basic principles of quality management |
| **Examination** | | Project work |
| **Credits** | | 6 |
| **Work-load** | **Course attendance** | 60 |
| | **Home study** | 120 |
| **Special focus on Home study** | | - Application of the lecture contents in the context of group work<br>- Follow-up on the lecture contents<br>- Study of literature |

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| **Module is on offer in:** | Winter semester |
| **Responsible for module** | Prof. Dr.-Ing. Thomas Harms |
| **Teaching staff** | Prof. Dr.-Ing. Thomas Harms |

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| **Module name** | | **WING Master Module 8**<br>**Energy management** |
| **Application** | | MEng Business Administration and Engineering |
| **Learning goals / Competencies** | | Students<br>- know the basic principles and requirements of an energy management system.<br>- possess the knowledge and understanding to identify and articulate energy procurement challenges for businesses.<br>- are able to apply various basic methods of calculating the economic efficiency of a company's energy costs.<br>- are able to research and evaluate a company's energy data.<br>- are able to develop a concept for operational energy data management.<br>- are able to combine theory and practice to solve specialized, practical problems in operational energy management. |
| **Course contents** | | Part 1: Basic principles and requirements<br>- Energy management systems based on DIN EN ISO 50001:2011<br>Part II: Basic economic conditions<br>- Energy procurement for companies<br>- Contracting: Energy supply contracting, savings contracting and other types of contracting<br>- Profitability calculations: Life cycle costs, electricity and heat production costs, CO2 avoidance costs, static and dynamic methods, sensitivity analyses<br>Part III: Technology and practical application<br>- Energy data management<br>- Recording/measurement of energy and material flows, efficiencies and energy costs<br>- Evaluation/analysis of energy data by data preparation, technical and economic key figures, balancing<br>- Monitoring by means of energy controlling, target/actual comparison<br>- Measurement concepts based on data transmission, data storage, visualization |
| **Forms of teaching and learning** | | Seminar teaching, exercises, group work |
| **Module language** | | German |
| **Prerequisites** | | **Formal**: none<br>**Contents:** Basic principles of energy system technology |
| **Examination** | | Project work |
| **Credits** | | 6 |
| **Work-load** | **Course attendance** | 60 |
| | **Home study** | 120 |
| **Special focus on Home study** | | - Application of the lecture contents in the context of project work<br>Preparation of the presentation<br>- Follow-up on the lecture contents<br>- Study of literature |

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| **Module is on offer in:** | Winter semester |
| **Responsible for module** | Prof. Dr. Holler |
| **Teaching staff** | Prof. Dr. Holler |

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| **Module name** | | **WING Master Module 9**<br>**Production management** |
| **Application** | | MEng Business Administration and Engineering |
| **Learning goals / Competencies** | | Students<br>- know the essential objectives of production management.<br>- recognize the importance of effective production management and the influence on the design of supply chains.<br>- develop the ability to analyze and evaluate logistical relationships in production using descriptive models.<br>- develop the ability to describe and evaluate the possibilities for influencing changes in logistics performance in production using impact models.<br>- independently optimize complex production systems in terms of efficiency and logistical performance. |
| **Course contents** | | - Strategic issues in production management<br>- Organization of production<br>- Areas of design in the supply chain<br>- Logistical models: Production<br>- Logistical models: Warehouse, completion and shipping<br>- Production planning<br>- Manufacturing control<br>- Production controlling<br>- Industry 4.0 |
| **Forms of teaching and learning** | | Seminar teaching, exercises, case studies, business games, presentations |
| **Module language** | | German |
| **Prerequisites** | | **Formal**: none<br>**Contents:** Materials and production management, basic principles of business administration |
| **Examination** | | Written exam, 2 h |
| **Credits** | | 6 |
| **Work-load** | **Course attendance** | 60 |
| | **Home study** | 120 |
| **Special focus on Home study** | | - Independent processing of case studies provided<br>- Preparation and follow-up for the case studies<br>- Practical exercises in the innovation laboratory for factory and process management<br>- Study of literature |
| **Module is on offer in:** | | Winter semester |
| **Responsible for module** | | Prof. Dr.-Ing. Wagner |
| **Teaching staff** | | Prof. Dr.-Ing. Wagner |

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| **Module name** | | **WING Master Module 10**<br>**Compulsory elective occupational science:** |
| **Application** | | MEng Business Administration and Engineering |
| **Learning goals / Competencies** | | Students<br>- are familiar with the basic technical, organizational and social design features of work processes.<br>- are able to analyze and evaluate the physical influences in workplace design.<br>- are able to plan and design workplaces.<br>- are able to develop workflows and evaluate them in terms of time.<br>- know remuneration models and are able to evaluate them in terms of costs for work processes.<br>- are able to analyze and evaluate work processes and workplaces from an ergonomic perspective. |
| **Course contents** | | - Approaches and models used in occupational science<br>- Characteristics of persons and forms of work (e.g. human strength)<br>- Examples of workplace design from different industries<br>- information-related workplace design (e.g. displays, screens)<br>- psychological workplace design (e.g. SOR model)<br>- Time management<br>- Working hours and remuneration<br>- The individual and the group in work organization<br>- Safety, ergonomics and health |
| **Forms of teaching and learning** | | Seminar-based teaching in the innovation laboratory for factory and process management, exercises, group seminar work. |
| **Module language** | | German |
| **Prerequisites** | | **Formal:** Attendance is compulsory for this course (mainly seminar character in the Innovation Laboratory for Factory and Process Management).<br>**Contents:** Production organization, quality management |
| **Examination** | | Written exam, 1 h |
| **Credits** | | 3 |
| **Work-load** | **Course attendance** | 30 |
| | **Home study** | 60 |
| **Special focus on Home study** | | - Independent completion of exercises provided<br>- Preparation and follow-up for the case studies<br>- Study of literature |
| **Module is on offer in:** | | In the summer semester |
| **Responsible for module** | | Prof. Dr.-Ing. Harms |
| **Teaching staff** | | Prof. Dr.-Ing. Harms |

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| **Module name** | | **WING Master Module 10**<br>**Compulsory elective Services production** |
| **Application** | | MEng Business Administration and Engineering |
| **Learning goals / Competencies** | | Students<br><br>- know the special features of services and their characteristics.<br>- know the operational organization of services, are able to analyze, evaluate and plan them.<br><br>- are able to develop process chains for services production.<br>- are able to assess requirements for organizational charts / job descriptions.<br>- know the management options of service companies and are able to develop and evaluate business management key performance indicators. |
| **Course contents** | | - Characteristics of technical and general service production<br>- Customer requirements for services<br>- Service strategies in different industries<br>- Service engineering<br>- Services production and process chains<br>- Services marketing<br>- Employees in service companies<br>- Service quality<br>- Service 4.0 |
| **Forms of teaching and learning** | | Seminar teaching, exercises, group seminar work |
| **Module language** | | German |
| **Prerequisites** | | **Formal:** Attendance is compulsory for this course (mainly seminar character).<br><br>**Contents:** Basic principles of quality, environmental and occupational health and safety management, business and environmental law, basic principles of business administration |
| **Examination** | | Oral examination |
| **Credits** | | 3 |
| **Work-load** | **Course attendance** | 30 |
| | **Home study** | 60 |
| **Special focus on Home study** | | - Independent completion of exercises provided<br>- Preparation and follow-up for the case studies<br>- Study of literature |
| **Module is on offer in:** | | Winter semester |
| **Responsible for module** | | Prof. Dr.-Ing. Harms |
| **Teaching staff** | | Prof. Dr.-Ing. Harms |

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| **Module name** | | **WING Master Module 10**<br>**Compulsory elective District Heating Systems** |
| **Application** | | MEng Business Administration and Engineering |
| **Learning goals / Competencies** | | Students …<br>- know the concept of district heating systems.<br>- learn about the potential for urban waste heat recovery in EU27.<br>- identify why awareness is important (of the possibility to recover urban waste heat) and how it can be done.<br>- analyze technical solutions for waste heat reuse in European cities.<br>- analyze transformation strategies for district heating systems. |
| **Course contents** | | - Introduction of district heating<br>- The role of urban waste heat recovery in district heating and the mapping of waste heat potential<br>- The stakeholder and value chain of the urban waste heat recovery, its bankability and the business models<br>- The ReUseHeat demonstrator in Madrid involving heat recovery from service sector (hospital), the technical characteristics of the recovery system and the lessons learnt<br>- The experiences, challenges and lessons learnt from the ReUseHeat project case on heat recovery from underground transport infrastructure<br>- The ReUseHeat demonstrator involving waste heat recovery from a datacenter in (hospital), the technical characteristics of the recovery system and the lessons learnt<br>- REWARDHeat Serious game: Smart networks integrating renewable and waste energy source |
| **Forms of teaching and learning** | | Seminar teaching, business management game |
| **Module language** | | English |
| **Prerequisites** | | **Formal**: none<br>**Contents:** Basic principles of energy supply |
| **Examination** | | Term paper (12-15 pages) |
| **Credits** | | 3 |
| **Work-load** | **Course attendance** | 30 |
| | **Home study** | 60 |
| **Special focus on Home study** | | - Preparation and follow-up on the lecture contents<br>- Study of literature<br>- Writing of term paper |
| **Module is on offer in:** | | In the summer semester |
| **Responsible for module** | | Prof. Dr. Holler |
| **Teaching staff** | | Prof. Dr. Holler, Dr. Dmitry Romanov,<br>Dr. Kristina Lygnerud (Halmstad University, Sweden) |

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| **Module name** | | **WING Master Module 10**<br>**Compulsory elective Factory planning** |
| **Application** | | MEng Business Administration and Engineering |
| **Learning goals / Competencies** | | - The students are able to classify the most important aspects of planning a factory.<br>- The students distinguish between the main functions and resources of a factory that need to be planned and dimensioned.<br>- Based on a product idea they have designed themselves, students develop an end-to-end factory concept for the economical manufacture of the product.<br>- Students are able to compare several alternative concepts with regard to their economic efficiency.<br>- Students draft a business plan that includes the factory and product concept and deliver it in a presentation. |
| **Course contents** | | - Project planning<br>- Product planning<br>- Make-or-buy decisions<br>- Principles of production planning and control<br>- Employee planning<br>- Space and building planning<br>- Location planning<br>- Drawing up a business plan |
| **Forms of teaching and learning** | | Seminar teaching, group seminar work |
| **Module language** | | German |
| **Prerequisites** | | **Formal:** Attendance is compulsory for this course (mainly seminar character).<br>**Contents:** Materials and production management, basic business administration, basic logistics |
| **Examination** | | Seminar paper |
| **Credits** | | 3 |
| **Work-load** | **Course attendance** | 30 |
| | **Home study** | 60 |
| **Special focus on Home study** | | - Independent group work to answer the weekly questions and the seminar paper with elaboration<br>- Study of literature |
| **Module is on offer in:** | | In the summer semester |
| **Responsible for module** | | Prof. Dr.-Ing. Wagner |
| **Teaching staff** | | Prof. Dr.-Ing. Wagner |

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| **Module name** | | **WING Master Module 10**<br>**Compulsory elective Formula Student** |
| **Application** | | MEng Business Administration and Engineering |
| **Learning goals / Competencies** | | Students<br><br>- deepen their basic knowledge of engineering by combining theory, experiment and simulation in a problem-oriented manner and implementing the solutions constructively, taking into account economic restrictions.<br><br>- work together in groups to develop solutions, which are then executed as a real vehicle during the seminar and laboratory work.<br><br>- expand their skills to work in application-oriented projects.<br>- improve teamwork and communication.<br>- present results in a structured way (also in English).<br>- gain international experience.<br>- gain self-confidence. |
| **Course contents** | | - A vehicle is developed and built by a project team and presented by the team in competitions.<br><br>- Students<br>- develop an assembly or a function<br>- implement or build this function / assembly<br>- lead a subteam<br>- document assembly or teamwork<br>- present the work and results in the team and/or at competitions<br>- Technical content: Automotive engineering, electrical engineering, project management, business administration<br><br>- As an alternative to the technical development of the vehicle, students can take on and present tasks in management, controlling, marketing or similar. |
| **Forms of teaching and learning** | | Seminar teaching, practical lab work |
| **Module language** | | German and English |
| **Prerequisites** | | **Formal**: none<br>**Contents:** Basic knowledge of at least one of the following subjects: fluid mechanics, thermodynamics, engineering mechanics, design, electrical engineering, computer science, control engineering, business administration and corporate management |
| **Examination** | | Seminar paper |
| **Credits** | | 3 |
| **Work-load** | **Course attendance** | 30 |
| | **Home study** | 60 |
| **Special focus on** | | - Preparation of the seminar paper and presentation |

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| **Home study** | - Implementation of a defined task in the project |
| **Module is on offer in:** | In the summer semester and winter semester |
| **Responsible for module** | Prof. Dr. Bußmann |
| **Teaching staff** | Prof. Dr. Bußmann, Prof. Dr. Linkugel |

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| **Module name** | | **WING Master Module 10**<br>**Compulsory elective Innovation management** |
| **Application** | | MEng Business Administration and Engineering |
| **Learning goals / Competencies** | | Students<br>- are familiar with the term innovation and describe different types of innovations.<br>- understand the main reasons and objectives of innovation management.<br>- understand the key challenges of innovation management for companies.<br>- learn about different innovation processes and are able to judge when which process can be useful. |
| **Course contents** | | - Basic principles of innovation management<br>- Success factors of innovations, resistances, promoters, interface management<br>- Innovation processes (front and backend)<br>- Methods and tools: e.g. Design-Thinking, Canvas, World-Cafe, Bar Camp, De Bono<br>- Innovation culture<br>- Innovation organization<br>- Implementing innovations in projects |
| **Forms of teaching and learning** | | Seminar teaching, exercises, case studies, group work |
| **Module language** | | German |
| **Prerequisites** | | **Formal**: none<br>**Contents:** Project management |
| **Examination** | | Seminar paper |
| **Credits** | | 3 |
| **Work-load** | **Course attendance** | 30 |
| | **Home study** | 60 |
| **Special focus on Home study** | | - Study of literature<br>- Follow-up on case studies<br>- Independent completion of exercises provided |
| **Module is on offer in:** | | Winter semester |
| **Responsible for module** | | Prof. Dr. Brüseke |
| **Teaching staff** | | Prof. Dr. Brüseke |

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| **Module name** | | **WING Master Module 10**<br>**Compulsory elective Supply Chain Management Case Study seminar** |
| **Application** | | MEng Business Administration and Engineering |
| **Learning goals / Competencies** | | - Students explore a selected critical supply chain management topic in depth<br>and have acquired relevant knowledge of challenges and approaches to solving any problems involved<br>.<br>- Students learn to hypothesize and scientifically prove or disprove these hypotheses.<br>- Students practice writing an academic paper in preparation for their Master's thesis.<br>- Students apply a creative technique and host a workshop with fellow students.<br>- Students practice their presentation skills by presenting their findings. |
| **Course contents** | | - Bullwhip effect and information asymmetry<br>- Global optimum<br>- Management of uncertainties: End customer information is valuable<br>- Industry 4.0<br>- Intercultural management<br>- Big data<br>- Block chain<br>- Sustainability<br>- Local value-added strategies (3D printing) |
| **Forms of teaching and learning** | | Seminar teaching, blended learning |
| **Module language** | | German |
| **Prerequisites** | | **Formal**: none<br>**Contents:** Good knowledge of logistics as well as motivation to actively participate in discussions and deal with issues in a socially critical manner |
| **Examination** | | Seminar paper |
| **Credits** | | 3 |
| **Work-load** | **Course attendance** | 30 |
| | **Home study** | 60 |
| **Special focus on Home study** | | - Independent processing of selected case studies<br>- Academic research/writing |
| **Module is on offer in:** | | Winter semester |
| **Responsible for module** | | Prof. Dr.-Ing. Wagner |
| **Teaching staff** | | Prof. Dr.-Ing. Wagner, Dipl.-Wirt.-Inf. Michalak |

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| **Module name** | | **WING Master Module 10**<br>**Transformation processes in organizations** |
| **Application** | | MEng Business Administration and Engineering |
| **Learning goals / Competencies** | | Students<br>- understand the current challenges of companies and organizations as a basis, for example, for their own (leadership) actions.<br>- have an understanding of transformation as a process in organizations and society.<br>- analyze the interrelationships of transformation at various levels, taking into account the handling of values as well as the mindset of individuals and organizations.<br>- independently apply the pyramidal presentation method during the course and conduct self-reflection. |
| **Course contents** | | - We are living in a time of upheaval. It is all about the critical examination of society, politics, companies and organizations ... and possibly also of (the behavior of) one's own person.<br>- Impulses on current topics, e.g., VUCA-World, Agile Transformation, Reinventing Organizations, job satisfaction, welfare economics<br>- Pyramidal Presentation: Objective, procedure, tips & tricks with exercises<br>- Presentation and discussion of individual topics |
| **Forms of teaching and learning** | | Impulses, discussion, individual/group work, presentation, self-reflection |
| **Module language** | | German |
| **Prerequisites** | | **Formal:** Compulsory attendance<br>**Contents:** Willingness to deal with the above-mentioned approaches on a professional/personal level |
| **Examination** | | Presentation |
| **Credits** | | 3 |
| **Work-load** | **Course attendance** | 30 |
| | **Home study** | 60 |
| **Special focus on Home study** | | - Independent completion of exercises provided<br>- Study of literature<br>- Elaboration and preparation of the presentation |
| **Module is on offer in:** | | In the summer semester |
| **Responsible for module** | | Prof. Dr. Brüseke |
| **Teaching staff** | | Prof. Dr. Brüseke |

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| **Module name** | | **WING Master Module 10**<br>**Compulsory elective Business administration** |
| **Application** | | MEng Business Administration and Engineering |
| **Learning goals / Competencies** | | Students<br>- understand the main reasons and objectives of business administration.<br>- understand the key challenges of business administration. |
| **Course contents** | | - Basic principles of business administration<br>- Corporate organization<br>- Corporate responsibility especially in times of climate change (ethics vs. profitability, sustainability, corporate social responsibility (CSR))<br>- Leadership in transition: Leadership styles, HR/personnel management<br>- Corporate policy<br>- Corporate culture |
| **Forms of teaching and learning** | | Seminar teaching, exercises, case studies, group work |
| **Module language** | | German |
| **Prerequisites** | | **Formal**: none<br>**Contents**: none |
| **Examination** | | Seminar paper |
| **Credits** | | 3 |
| **Work-load** | **Course attendance** | 30 |
| | **Home study** | 60 |
| **Special focus on Home study** | | - Study of literature<br>- Follow-up on case studies<br>- Independent completion of exercises provided |
| **Module is on offer in:** | | Winter semester |
| **Responsible for module** | | Prof. Dr. Brüseke |
| **Teaching staff** | | Prof. Dr. Brüseke |

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| **Module name** | | **WING Master Module 11**<br>**Practical training project** |
| **Application** | | MEng Business Administration and Engineering |
| **Learning goals / Competencies** | | - Ability to work on a four-week project and thus<br>independently organize, manage and complete the project<br>- Application and verification of theoretical knowledge in practice<br>- Ability for team work and conflict resolution<br>- Carrying out a project in cooperation with a company<br>Students evaluate the current operational situation and develop recommendations for action to improve it. |
| **Course contents** | | - Carrying out a project, with a practice partner<br>- The topic of the project includes a subject from the areas of quality management or energy management.<br>- The project is carried out by a team of 3-5 students.<br>- The project team applies the project management methods to their project and reports back to the project seminar at regular intervals.<br>- Preparation of a final project report and presentation of the results with the practice partner |
| **Forms of teaching and learning** | | Coaching<br>The project team is supervised during their work on the project. |
| **Module language** | | German |
| **Prerequisites** | | **Formal**: none<br>**Contents:** Recommendation: previous completion of Modules 1-10 |
| **Examination** | | Project work |
| **Credits** | | 5 |
| **Work-load** | **Course attendance** | 15 |
| | **Home study** | 135 |
| **Special focus on Home study** | | - Completion of a project report<br>- Presentation of the interim findings in a Master's seminar |
| **Module is on offer in:** | | Every semester |
| **Responsible for module** | | Dean of Studies |
| **Teaching staff** | | Diverse |

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| **Module name** | | **WING Master Module 12**<br>**Master's thesis** |
| **Application** | | MEng Business Administration and Engineering |
| **Learning goals / Competencies** | | The Master's thesis is the student's own research<br><br>or development project, in the subject area of the course of study (see also § 19 para. 1 General Part of the Examination Regulations).<br><br>The final thesis should demonstrate that the student is able to work independently on a defined economic and/or engineering topic in an appropriate and results-oriented manner using scientific methods.<br><br>Students should be able to present results coherently and reflect on them in a self-critical manner.<br><br>Students apply project, self, and time management methods to meet the specified completion deadline.<br><br>The Master's thesis includes:<br>- Literature research, presentation and critical discussion of relevant academic opinions<br><br>- Presentation of the individual research approach<br>- Independent development of new approaches to solving a scientific problem<br><br>- Presentation of the procedure and the results in the form of a paper<br>- Presentation of the main results in an understandable form as well as critical discussion of the results<br><br>- When setting the task, care must be taken to ensure that the student's own creative contribution is secured by working on the topic. |
| **Course contents** | | Individual:<br>Topics from the field of Engineering |
| **Forms of teaching and learning** | | Coaching<br>While the student is writing the Master's thesis, supervision is provided by the first and second examiners of the thesis (Section 19 (5) General Part of the Examination Regulations). |
| **Module language** | | German or English |
| **Prerequisites** | | **Formal:** Proof of at least 45 credits<br>**Contents:** Recommendation: previous completion of Modules 1-11 |
| **Examination** | | Completion of the Master's thesis and colloquia |
| **Credits** | | 25 |
| **Work-load** | **Course attendance** | 0 |
| | **Home study** | 750 |
| **Special focus on Home study** | | Work on the topic, regular progress reports and discussion of the interim findings in a Master's seminar |
| **Module is on offer in:** | | Every semester |
| **Responsible for module** | | Dean of Studies |

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| **Teaching staff** | Diverse |