Course Handbook Industrial Engineering Bachelor

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Chairman of Examination	Prof. Dr. Udo Venitz
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Industrial Engineering Bachelor - mandatory courses (overview)

Module name (EN)	**Code**	**Semester**	**Hours per semester week / Teaching method**	**ECTS**	**Module coordinator**
Automation Engineering	WIBASc515	5	2V+2PA	5	Prof. Dr. Frank Kneip
Business Informatics / Operations Research	WIBASc455	4	2V+1U+1P	5	Prof. Dr. Daniel F. Abawi
Colloquium	WIBASc735	7	-	3	Studienleitung
Commercial and Private Law	WIBASc425	4	2V+2U	5	Prof. Dr. Holger Buck
Computer Science / Programming	WIBASc355	3	1V+1U+2PA	5	Prof. Dr. Daniel F. Abawi
Controlling und Accounting	WIBASc415	4	2V+2U	5	Prof. Dr. Andy Junker
Cost Accounting	WIBASc315	3	2V+2U	5	Prof. Dr. Stefan Georg

Design Technology / CAD	WIBASc345	3	2V+1U+1PA	5	Prof. Dr. Dirk Hübner
Electrical Engineering	WIBASc445	4	2V+2U	5	Prof. Dr. Rudolf Friedrich
Engineering Mechanics I	WIBASc235	2	2V+2U	5	Prof. Dr. Michael Krämer
Engineering Mechanics II	WIBASc335	3	2V+2U	5	Prof. Dr. Michael Krämer
English I	WIBASc365	3	2V+2U	5	Prof. Dr. Thomas Tinnefeld
English II	WIBASc465	4	2V+2U	5	Prof. Dr. Thomas Tinnefeld
Fundamentals of Economics	WIBASc135	1	2V+2U	5	Prof. Dr. Uwe Leprich
Industrial Management	WIBASc125	1	2V+2U	5	Prof. Dr. Udo Venitz
Introduction to Scientific Work (with seminar)	WIBASc535	5	1V+3S	5	Prof. Dr.-Ing. Christian Köhler
Investment/Financing	WIBASc325	3	2V+2U	5	Prof. Dr. Andy Junker
Manufacturing Engineering	WIBASc245	2	2V+2U	5	Prof. Dr.-Ing. Dieter Arendes
Materials Engineering	WIBASc155	1	2V+2U	5	Prof. Dr.-Ing. Dieter Arendes

Mathematics I	WIBASc165	1	4V+2U	5	Prof. Dr. Frank Kneip
Mathematics II	WIBASc265	2	4V+2U	5	Prof. Dr. Frank Kneip
Physics	WIBASc145	1	2V+2U	5	Prof. Dr. Rudolf Friedrich
Principles of Business Administration I (BWL I)	WIBASc115	1	2V+2U	5	Prof. Dr. Andy Junker
Procurement Logistics and Technical Sales and Distribution	WIBASc225	2	2V+2U	5	Prof. Dr. Udo Venitz
Project Management and Communication	WIBASc545	5	1SU+1V+2U	5	Prof. Dr. Michael Krämer
Statistics	WIBASc255	2	2V+2U	5	Prof. Dr. Susan Pulham
Thermodynamics	WIBASc435	4	2V+2U	5	Prof. Dr. Frank Ulrich Rückert
WIBASc525 - Compulsory Elective Module / Specialization	WIBASc525	5	2V+5U+5PA	15	Studienleitung
WIBASc615 - Work Experience Phase (1st half)	WIBASc615	6	-	15	Studienleitung
WIBASc625 - Compulsory Elective Module / Specialization	WIBASc625	6	2V+5U+5PA	15	Studienleitung

WIBASc715 - Work Experience Phase (2nd half)	WIBASc715	7	-	15	Studienleitung
WIBASc725 - Bachelor Thesis	WIBASc725	7	-	12	Studienleitung

(32 modules)

Industrial Engineering Bachelor - optional courses (overview)

Module name (EN)	Code	Semester	Hours per semester week / Teaching method	ECTS	Module coordinator
Business Planning (Seminar)	WIBASc-525-625-W5	6	2SU+2S	5	Prof. Dr. Stefan Georg
CAD in CATIA - The Basics	WIBASc525-625-Ing13	5	1V+1U	3	Prof. Dr. Dirk Hübner
Complementary Basics of Engineering	WIBASc-525-625-Ing16	5	2SU+2S	5	Alexander Hamman, M.Sc.
Consulting (Seminar, English)	WIBASc-525-625-W6	6	1SU+1S	3	Prof. Dr. Udo Venitz
Contemporary Issues in Business Information Systems (Seminar)	WIBASc-525-625-FÜ34	6	1V+1S international course	3	Prof. Dr. Daniel F. Abawi
Corporate Taxation	WIBASc-525-625-W4	5	1V+1U	3	Prof. Dr. Andy Junker
Current Problems in Energy Supply (Seminar)	WIBASc-525-625-W3	6	1SU+1S	3	Prof. Dr. Uwe Leprich
Current Topics and Challenges in Business Enterprises (Seminar)	WIBASc-525-625-W12	6	2SU+2V	5	Dipl.-Betr.W. Peter Huber

Current Topics in (Business) Informatics (Seminar)	WIBASc-525-625-FÜ16	6	1SU+1S	3	Prof. Dr. Daniel F. Abawi
Decision theory	WIBASc-525-625-FÜ22	5	1V+1U	3	Prof. Dr. Susan Pulham
Fluid Dynamics	WIBASc-525-625-Ing21	5	2V+2U	5	Prof. Dr. Frank Ulrich Rückert
Fluid Energy Machines	WIBASc-525-625-Ing19	5	1V+1U	3	Prof. Dr. Frank Ulrich Rückert
Integrated Production Systems	WIBASc-525-625-Ing2	5	1V+1U	3	Prof. Dr.-Ing. Dieter Arendes
International Project Week	WIBASc525-625-FÜ31	5	2PA international course	2	Prof. Dr. Frank Kneip
Introduction to Energy Technology	WIBASc-525-625-Ing9	5	1V+1U	3	Prof. Dr. Rudolf Friedrich
Introduction to Six Sigma	WIBASc-525-625-FÜ29	5	1V+1U	3	Prof. Dr.-Ing. Christian Köhler
Introduction to the Energy Industry	WIBASc-525-625-W1	5	1V+1U	3	Prof. Dr. Uwe Leprich
Leadership and Team Management	WIBASc-525-625-FÜ38	5	2V+2U	5	Prof. Dr. Petra Garnjost
Machine tools	WIBASc-525-625-Ing14	5	1V+1U	3	Prof. Dr.-Ing. Christian Köhler

Maintenance Planning (Seminar)	WIBASc-525-625-Ing3	6	1SU+1S	3	Prof. Dr. Michael Krämer
Mathematics III	WIBASc525-625-FÜ27	5	2V+2U	5	Prof. Dr. Frank Kneip
Moderation and Leadership (Seminar)	WIBASc-525-625-FÜ7	6	2S	3	Prof. Dr. Udo Venitz
Network Model Renewable Energies	WIBASc-525-625-Ing17	5	1V+1U+2PA	5	Prof. Dr. Rudolf Friedrich
Operations Research II	WIBASc-525-625-FÜ14	5	1V+1U	3	Prof. Dr. Daniel F. Abawi
Planning a Production Plant	WIBASc-525-625-FÜ26	5	2V+2PA	5	Prof. Dr. Michael Krämer
Principles of Supply Networks and Systems	WIBASc-525-625-Ing10	5	1V+1U	3	Prof. Dr. Rudolf Friedrich
Process Management	WIBASc-525-625-FÜ1	5	1V+1U	3	Prof. Dr. Michael Krämer
Production Planning (Seminar)	WIBASc-525-625-Ing1	6	1U+1P	3	Prof. Dr.-Ing. Dieter Arendes
Production Project	WIBASc-525-625-FÜ30	6	2PA	3	Prof. Dr.-Ing. Dieter Arendes
Quality Techniques (Seminar, English)	WIBASc-525-625-Ing4	6	2SU	3	Prof. Dr. Udo Venitz

Research Seminar	WIBASc-525-625-FÜ33	5	2SU+2S	5	Prof. Dr.-Ing. Christian Köhler
Simulation	WIBASc-525-625-FÜ23	4	1V+1U	3	Prof. Dr. Frank Kneip
Simulation II	WIBASc-525-625-FÜ19	5	1V+1U	3	Prof. Dr. Frank Kneip
Starting a Business - "5 Euro-Business"	WIBASc-525-625-FÜ21	5	2SU+2F	5	Prof. Dr. Stefan Georg
Technical Sales and Distribution (Seminar)	WIBASc525-625-W11	6	1SU+1S	3	Prof. Dr.-Ing. Christian Köhler
Technology and Innovation Management (English)	WIBASc-525-625-FÜ36	-	4PA	5	Prof. Dr.-Ing. Christian Köhler
Using Mathematical Software	WIBASc-525-625-FÜ12	5	1V+1U	3	Prof. Dr. Frank Kneip
Utility Network Calculation and Planning	WIBASc525-625-Ing11	5	1V+1U	3	Prof. Dr. Rudolf Friedrich
Valuation (English)	WIBASc-525-625-W7	5	1V+1U	3	Prof. Dr. Andy Junker

(39 modules)

Industrial Engineering Bachelor - mandatory courses

Automation Engineering

Module name (EN): Automation Engineering
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc515
Hours per semester week / Teaching method: 2V+2PA (4 hours per week)
ECTS credits: 5
Semester: 5
Mandatory course: yes
Language of instruction: German
Assessment: Written exam
Curricular relevance: WIBASc515 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 5, mandatory course
Workload: 60 class hours (= 45 clock hours) over a 15-week period. The total student study time is 150 hours (equivalent to 5 ECTS credits). There are therefore 105 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
WIBASc145 Physics
WIBASc165 Mathematics I
WIBASc245 Manufacturing Engineering
WIBASc255 Statistics
WIBASc265 Mathematics II
WIBASc345 Design Technology / CAD
WIBASc355 Computer Science / Programming
WIBASc445 Electrical Engineering
[*updated 31.12.2019*]

Recommended as prerequisite for:
WIBASc-525-625-Ing27
[*updated 31.01.2020*]

Module coordinator:
Prof. Dr. Frank Kneip

Lecturer:
Prof. Dr. Frank Kneip
[*updated 31.12.2019*]

Learning outcomes:
After successfully completing this module students will:
_ have learned the basics of control engineering for linear, time-invariant control systems.
_ can describe and characterize suitable systems by combining basic transfer functions.
_ have the ability to evaluate a given linear and time-invariant system in terms of stability.
_ be able to select a known controller type for a given system and justify their choice, and
_ be able to apply a tuning procedure for the selected controller and parameterize the controller.
_ be familiar with saturation of control variables and their effects, as well as have insight into the subject of nonlinear systems, feedforward control and iterative learning controllers.
_ have the ability to apply what they have learned in the Matlab/Simulink simulation environment and in connection with Lego Mindstorms NXT and Labview for predefined systems.
[*updated 02.07.2019*]

Module content:
1. Principles of feedforward and feedback control
- Basic principle feedforward and feedback control
- Controllers, controlled systems, sensor and actuator technology
- Areas of application and requirements

2. System description and stability
- Linear time-invariant systems
- Description in the time domain
- Description in the frequency domain
- Basic transfer functions
- Parallel and series connection of transfer functions
- Step response
- Frequency response, root locus, Bode plot
- Stability of linear systems

3. Types of controllers
- Basic types of controllers: P-, I-, PI-, PD-, PID controllers
- Characteristics and areas of application of different types of controllers

4. Controller design
- Objectives of a controller strategy
- Tuning rules:
- Tuning according to Ziegler and Nichols
- Tuning according to Chien, Hrones and Reswick
- Tuning according to the T-Sum Rule
- Pole placement
- Dimensioning with Bode plots

5. Further topics:
- Saturation of control variables, anti-wind-up
- Disturbances and tolerances
- Nonlinear systems
- Feedforward (control)
- Iterative learning controllers

Experiments and simulations:
- Simulation-supported tests in Matlab/Simulink
- Lab experiments with Lego Mindstorms NXT and Labview

[*updated 02.07.2019*]

Teaching methods/Media:
Lecture with integrated exercises and experiments, presentation, lecture notes, blackboard, PC, Matlab/Simulink, Labview, Lego Mindstorms NXT
[*updated 02.07.2019*]

Recommended or required reading:

_ Lunze, J.: Regelungstechnik 1; 9. Auflage, Springer Verlag, 2013
_ Unbehauen, H.: Regelungstechnik 1; 15. Auflage, Vieweg+Teubner Verlag, 2008
_ Reuter, M., Zacher, S.: Regelungstechnik für Ingenieure; 12. Auflage, Vieweg+Teubner Verlag, 2008
_ Tröster, F.: Steuerungs- und Regelungstechnik für Ingenieure; 3. Auflage, Oldenbourg Verlag, 2011
_ Roddeck, W.: Einführung in die Mechatronik; 4. Auflage, Vieweg+Teubner Verlag, 2012
_ Bode, H.: Systeme der Regelungstechnik mit Matlab und Simulink _ Analyse und Simulation; Oldenbourg Verlag, 2010
_ Gasperi, M.: Labview for Lego Mindstorms NXT; National Technology & Science Press, 2008
_ RRZN Handbuch: Matlab/Simulink; 4. Auflage, 2012

[*updated 02.07.2019*]

Business Informatics / Operations Research

Module name (EN): Business Informatics / Operations Research
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc455
Hours per semester week / Teaching method: 2V+1U+1P (4 hours per week)
ECTS credits: 5
Semester: 4
Mandatory course: yes
Language of instruction: German
Assessment: Written exam
Curricular relevance: WIBASc455 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 4, mandatory course
Workload: 60 class hours (= 45 clock hours) over a 15-week period. The total student study time is 150 hours (equivalent to 5 ECTS credits). There are therefore 105 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): WIBASc355 Computer Science / Programming [*updated 20.01.2020*]
Recommended as prerequisite for: WIBASc-525-625-FÜ12 Using Mathematical Software WIBASc-525-625-FÜ14 Operations Research II WIBASc-525-625-FÜ16 Current Topics in (Business) Informatics (Seminar) WIBASc-525-625-FÜ34 Contemporary Issues in Business Information Systems (Seminar) [*updated 11.02.2020*]

Module coordinator:
Prof. Dr. Daniel F. Abawi

Lecturer:
Prof. Dr. Daniel F. Abawi
[*updated 20.01.2020*]

Learning outcomes:
Business Informatics:
After successfully completing this module students will:
_ be able to outline the basic subject areas of business informatics
_ be able to describe how business informatics is connected to related disciplines
_ be able to explain and classify the embedding of IT systems in an organization, its technology and with regard to a company´s strategic goals
_ be able to visualize processes by means of common notations and classify these notations with regard to their intended use
_ be able to explain the basic application types of database systems, ERP, decision support systems, workflow and information management systems and differentiate between their application

Operations Research:
After successfully completing this module students will be able to:
_ describe numerous application areas of Operations Research, in particular linear optimization
_ demonstrate the role of OR methods for decision-making in practice
_ independently create mathematical models for LPs
_ identify and apply suitable solution methods
_ use the Microsoft Excel optimization tool Solver to create and solve smaller optimization models and interpret the solution.
_ Create a project plan using the precedence diagram model
Problems from the field of industrial engineering will be used as application examples so that students can apply the knowledge they acquire in the lecture to practical situations.
[*updated 13.09.2018*]

Module content:
Business Informatics:
1. Why information systems?
2. History of business informatics
3. Database systems and data organization
4. Enterprise resource planning systems
5. Business process management tools
6. Modeling processes
7. Analytical information systems
8. Current trends

Operations Research (OR):
1. The origin and history of OR
2. Classifying decision models
3. The characteristics of OR
4. Linear programming in general / simplex algorithm
a. Modeling and mathematical formulation
b. Graphical solutions
c. Simplex algorithm
d. Dual simplex algorithm
e. Special cases and degeneracy
f. Reduced costs and shadow prices
5. Transportation problem
a. Mathematical formulation
b. North-West Corner Rule
c. Matrix Minimum Method
d. Vogel´s Approximation Method
e. Stepping Stone Method
f. Linear assignment problems
6. Networks and graphs
a. Minimum spanning tree
b. Shortest paths
c. Maximum flow problem
7. Selected case studies from operations research, e.g. stock-keeping, depreciation, replacement procurement etc.
8. Precedence diagram model
9. Introduction to and use of the Microsoft Excel optimization tool Solver
[*updated 13.09.2018*]

Teaching methods/Media:
Business Informatics:
Projector, slides, exercises

Operations Research:
Projector, slides, exercises.
[*updated 13.09.2018*]

Recommended or required reading:
Business Informatics:
_ Laudon, K. C.; Laudon, J. P.; Schoder, D.: Wirtschaftsinformatik, 2. Auflage, Pearson Studium Verlag, 2009.
_ Thome, R.: Grundzüge der Wirtschaftsinformatik: Integration der Informationsverarbeitung in die Organisation von Unternehmen. Pearson Studium Verlag, 1. Auflage, 2006.
_ Abts, D.;Mülder, W.: Grundkurs Wirtschaftsinformatik: Eine kompakte und praxisorientierte Einführung, Vieweg+Teubner Verlag; 7. Auflage, 2011.
_ Scheer, A. W.: Wirtschaftsinformatik _ Studienausgabe; 2. Auflage, Springer Verlag, 1998
_ Scheer, A.-W.: Wirtschaftsinformatik _ Referenzmodelle für industrielle Geschäftsprozesse, 7. Auflage, Springer Verlag, 1997

Operations Research:
_ Domschke, W./Drexl, A.: Einführung in Operations Research, 8. Auflage, Springer Verlag 2011
_ Domschke, W./Drexl, A./Klein, R./Scholl, A./Voß, S.: Übungen und Fallbeispiele zum Operations Research, 7. Auflage, Springer Verlag 2011
_ Gohout, Wolfgang: Operations Research _ Einige ausgewählte Gebiete der linearen und nichtlinearen Optimierung, 4. Auflage, Oldenbourg Verlag, 2009
_ Zimmermann/Stache: Operations Research _ Quantitative Methoden zur Entscheidungsvorbereitung, 10. Auflage, Oldenbourg Verlag 2001

Further recommendations regarding literature or for example, web articles will be made by the lecturer in the course.
[*updated 13.09.2018*]

Colloquium

Module name (EN): Colloquium
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc735
Hours per semester week / Teaching method: -
ECTS credits: 3
Semester: 7
Mandatory course: yes
Language of instruction: German
Assessment: Oral examination
Curricular relevance: WIBASc735 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 7, mandatory course
Workload: The total student study time for this course is 90 hours.
Recommended prerequisites (modules): None.
Recommended as prerequisite for:
Module coordinator: Studienleitung
Lecturer: Studienleitung [*updated 08.05.2012*]

Learning outcomes:
The colloquium is an examination requirement. It shows that students are able to present the problem analyzed in their Bachelor thesis in a concise manner and defend it to the participants of the colloquium within the given time of 30 minutes.
Students will present their topic and how it was dealt with, position themselves with regard to their solution and justify this solution in a discussion.
In principle, it is possible to hold the colloquium as an open event, so that, among other things, representatives of the companies that have made it possible for the student to work on their Bachelor topic, but also representatives of the press, can participate in the colloquium. In this way, the industrial engineering group can also contribute to the public debate. The colloquium can also take place in the company that selected the topic of the Bachelor thesis.
[*updated 13.09.2018*]

Module content:
The content depends on the topic of the Bachelor thesis.
[*updated 13.09.2018*]

Teaching methods/Media:
Beamer presentation (However, it is possible to deviate from this if a different type of presentation is more suited to a specific topic).
[*updated 13.09.2018*]

Recommended or required reading:

[*updated 13.09.2018*]

Commercial and Private Law

Module name (EN): Commercial and Private Law
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc425
Hours per semester week / Teaching method: 2V+2U (4 hours per week)
ECTS credits: 5
Semester: 4
Mandatory course: yes
Language of instruction: German
Assessment: Written exam
Curricular relevance: WIBASc425 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 4, mandatory course
Workload: 60 class hours (= 45 clock hours) over a 15-week period. The total student study time is 150 hours (equivalent to 5 ECTS credits). There are therefore 105 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): None.
Recommended as prerequisite for: WIBASc-525-625-W12 Current Topics and Challenges in Business Enterprises (Seminar) [*updated 11.02.2020*]
Module coordinator: Prof. Dr. Holger Buck

Lecturer:
Prof. Dr. Holger Buck
Lehrbeauftragte
[*updated 10.02.2020*]

Learning outcomes:
After successfully completing this module students will:
_ be familiar with the most important basics of German commercial private law for industrial engineers
_ understand the function and mechanisms of civil law
_ be able to apply legal texts independently, interpret each regulation and relate them to one another
_ understand the relevance of regulations for operational practice
_ be able to develop proposals for solutions to specific cases in private commercial law by classifying the problem,
subsuming the facts in correspondence with the relevant regulations and deriving the result therefrom
_ be able to review the results based on general legal value judgements
[*updated 02.07.2019*]

Module content:
1. Basic concepts of the legal system
2. Contract and contractual freedom as central elements of legal transactions between companies
3. Concluding contracts (e.g. contractual obligations and transfer of ownership, form, representation); principles of GTC law
4. Fulfilment of contracts and defective performance
5. Important types of contracts in the manufacturing industry (purchase contract, contract for work and services)
6. Commercial law (commercial register, merchant, company, procuration, commercial transactions in the manufacturing industry) and
corporate law (partnerships and corporations)
[*updated 02.07.2019*]

Teaching methods/Media:
Lecture and tutorial with exercises and case solution; blackboard, projector
[*updated 02.07.2019*]

Recommended or required reading:
_ Ann, C., Hauck, R. & Obergfell, E. I.: Wirtschaftsprivatrecht kompakt, Vahlen München, latest edition
_ Führich, E.: Wirtschaftsprivatrecht, Vahlen, München, latest edition
_ Führich, E. & Werdan, I.: Wirtschaftsprivatrecht in Fällen und Fragen, Vahlen, München, latest edition
_ Kallwass, P. & Abels, P.: Privatrecht, Vahlen, München, latest edition
_ Klunzinger, E.: Übungen im Privatrecht, Vahlen München, latest edition
_ Schade, L.: Handels- und Gesellschaftsrecht, C.F. Müller. Heidelberg, latest edition
[*updated 02.07.2019*]

Computer Science / Programming

Module name (EN): Computer Science / Programming
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc355
Hours per semester week / Teaching method: 1V+1U+2PA (4 hours per week)
ECTS credits: 5
Semester: 3
Mandatory course: yes
Language of instruction: German
Assessment: Written exam for Computer Science (40%) + project for Programming (60%)
Curricular relevance: WIBASc355 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 3, mandatory course
Workload: 60 class hours (= 45 clock hours) over a 15-week period. The total student study time is 150 hours (equivalent to 5 ECTS credits). There are therefore 105 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): None.

Recommended as prerequisite for:
WIBASc-525-625-FÜ16 Current Topics in (Business) Informatics (Seminar)
WIBASc-525-625-FÜ19 Simulation II
WIBASc-525-625-FÜ23 Simulation
WIBASc-525-625-FÜ34 Contemporary Issues in Business Information Systems (Seminar)
WIBASc-525-625-Ing27
WIBASc455 Business Informatics / Operations Research
WIBASc515 Automation Engineering
WIBASc525-625-Ing22
[*updated 11.02.2020*]

Module coordinator:
Prof. Dr. Daniel F. Abawi

Lecturer:
Prof. Dr. Daniel F. Abawi
[*updated 20.01.2020*]

Learning outcomes:
Principles of Computer Science:
After successfully completing this module students will:
_ have basic knowledge of computer science, with a focus on _practical computer science_
_ understand the basic structure of programs
_ be able to explain how to transform a business problem into an algorithm, from modeling to its technical implementation

Programming:
After successfully completing this module students will:
_ be able to independently provide solutions for computer science tasks
be proficient in the object-oriented language Java, as well as UML for modelling and implementing a business scenario
[*updated 13.09.2018*]

Module content:
Principles of Computer Science:
1. History and sub-areas of computer science
2. Storing and interpreting information / encodings
a. Positional number systems
b. Computing with dual numbers
c. Data compression
d. Fault-tolerant codes
3. From program to machine program
4. Programming languages
a. Data types and operators
b. Control structures
c. Propositional logic
d. Object orientation
5. Data structures and algorithms
6. Computer networks and the WWW
7. Software engineering
a. UML diagrams (static and dynamic behaviour of information systems)
b. Process models

Programming:
Basics
1. Objects and classes
2. Data types and basic operators
3. Class definitions and inheritance
4. Object interaction
5. Control structures
6. Using class libraries
7. Class design
8. Structured design of simple programs
9. Elements of software engineering
10. Documentation and tools for teamwork
11. Case study and project
[*updated 13.09.2018*]

Teaching methods/Media:
Principles of Computer Science:
Projector, slides, exercises, lecture notes

Programming:
Projector, slides (lecture notes), independent and guided exercises and sample solutions. Only open source software will be used.
[*updated 13.09.2018*]

Recommended or required reading:
Principles of Computer Science:
_ Herold, H.; Lurz, B.; Wohlrab, J.: Grundlagen der Informatik, Pearson Studium Verlag, 2011
_ Hartmut, Ernst: Grundkurs Informatik, 4. Auflage, Vieweg+Teubner Verlag, 2008
_ Rechenberg, P./ Pomberger, G.: Informatik-Handbuch, 4. Auflage, Carl Hanser Verlag, 2006

Programming:
_ Ullenboom, Christian: Java ist auch eine Insel, 10. Auflage, Galileo OpenBook 2011
_ Barnes, D.J., Kölling, M.: Java lernen mit BlueJ, 4. Auflage, Pearson Studium Verlag, 2009
_ Herold, H.; Lurz, B.; Wohlrab, J.: Grundlagen der Informatik, Pearson Studium Verlag, 2011
_ Rechenberg, P./ Pomberger, G.: Informatik-Handbuch, 4. Auflage, Carl Hanser Verlag, 2006
_ Your own lecture notes.

Further recommendations regarding literature or for example, web articles will be made by the lecturer in the course.
[*updated 13.09.2018*]

Controlling und Accounting

Module name (EN): Controlling und Accounting
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc415
Hours per semester week / Teaching method: 2V+2U (4 hours per week)
ECTS credits: 5
Semester: 4
Mandatory course: yes
Language of instruction: German
Assessment: Written exam
Curricular relevance: WIBASc415 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 4, mandatory course
Workload: 60 class hours (= 45 clock hours) over a 15-week period. The total student study time is 150 hours (equivalent to 5 ECTS credits). There are therefore 105 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): WIBASc115 Principles of Business Administration I (BWL I) WIBASc315 Cost Accounting [*updated 20.01.2020*]
Recommended as prerequisite for:
Module coordinator: Prof. Dr. Andy Junker

Lecturer:
Prof. Dr. Stefan Georg
Prof. Dr. Andy Junker
Lehrbeauftragte
[*updated 20.01.2020*]

Learning outcomes:
Controlling:
After successfully completing this module students will:
_ have mastered the goals and tasks of controlling
_ be able to read and create reports
_ be familiar with the structure of liquidity statements and budgeting
_ be able to describe controlling instruments and interpret the significance of key figures
_ be able to describe the structure of a balanced scorecard and create individual perspectives of a balanced scorecard

Accounting:
After successfully completing this module students will:
_ have basic knowledge of German accounting
_ understand the relationships between accounting, balance sheets and earning reports
_ understand when an asset/liability should be balanced and at what value
_ be able to apply the knowledge acquired in this course to analyze a financial statement
_ be able to describe significant differences to international and consolidated accounting
[*updated 02.07.2019*]

Module content:
Controlling:
1. Objectives of controlling
2. Controlling in the framework of company activities
3. Basic controlling tasks
4. Information systems/reporting and liquidity planning
5. Planning tools/budgeting and special areas of application of contribution margin accounting
6. Control instruments/key figures and key figure systems
7. Management instruments/balanced scorecard

The basic theory of all the above aspects will be presented and practiced on the basis of small tasks.

Accounting:
1. Principles of proper accounting
2. Do you balance?
3. Which value do you balance?
4. Where do you balance?
5. Structure of an earnings report
6. Notes
7. Main features of an annual account policy and analysis
8. Main features of consolidated accounting and international accounting
[*updated 02.07.2019*]

Teaching methods/Media:
Controlling:
Regularly revised lecture notes will be available for this course: Georg, S.: Anwendungsorientiertes Controlling, 2. Auflage, Mandarin-Verlag 2011.

Accounting:
A regularly revised script and exercises will be available for this course.
[*updated 02.07.2019*]

Recommended or required reading:
Controlling:
_ Britzelmaier: Wertorientierte Unternehmensführung, 2009.
_ Georg: Die Balanced Scorecard als Controlling- und Managementsystem, Aachen 1999.
_ Georg: Controlling im Mittelstand, Aachen 2003.
_ Horváth.: Controlling, 11. Auflage, München 2009.
_ Jung: Arbeitsbuch Controlling, München 2010.
_ Reichmann: Controlling mit Kennzahlen und Managementberichten, 5. Auflage, München 1997.
_ Vollmuth.: Controlling-Instrumente von A-Z,5. Auflage, München 2000.
_ Ziegenbein: Controlling, 9. Auflage, 2007.

Accounting:
_ Baetge, Jörg; Kirsch, Hans-Jürgen; Thiele, Stefan: Bilanzen, 11. Aufl., Idw-Verlag, Düsseldorf 2011
_ Bieg, Hartmut; Kussmaul, Heinz: Externes Rechnungswesen, 6. Aufl., Oldenbourg Wissenschaftsverlag, München 2012
_ Federmann, Rudolf: Bilanzierung nach Handelsrecht, Steuerrecht und IAS/IFRS, 12. Aufl., Berlin 2010
_ Wöhe, Günter/Kußmaul, Heinz: Grundzüge der Buchführung und Bilanztechnik, 8. Aufl., Verlag Vahlen München 2012.
[*updated 02.07.2019*]

Cost Accounting

Module name (EN): Cost Accounting
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc315
Hours per semester week / Teaching method: 2V+2U (4 hours per week)
ECTS credits: 5
Semester: 3
Mandatory course: yes
Language of instruction: German
Assessment: Written exam
Curricular relevance: WIBASc315 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 3, mandatory course
Workload: 60 class hours (= 45 clock hours) over a 15-week period. The total student study time is 150 hours (equivalent to 5 ECTS credits). There are therefore 105 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): WIBASc115 Principles of Business Administration I (BWL I) [*updated 30.12.2019*]
Recommended as prerequisite for: WIBASc-525-625-FÜ26 Planning a Production Plant WIBASc-525-625-FÜ36 Technology and Innovation Management (English) WIBASc-525-625-Ing24 WIBASc-525-625-W5 Business Planning (Seminar) WIBASc415 Controlling und Accounting [*updated 11.02.2020*]

Module coordinator:
Prof. Dr. Stefan Georg

Lecturer:
Prof. Dr. Stefan Georg
[*updated 30.12.2019*]

Learning outcomes:
After successfully completing this module students will:
_ know and understand the tasks and structure of operational cost accounting.
_ be able to solve (simple) problems within the cost accounting system.
_ be able to systematize cost elements and calculate the costs of the central cost elements.
_ be able to allocate internal costs and create cost estimates using different costing methods,
_ be able to carry out simple and multi-level contribution margin accounting and present their results.
[*updated 23.08.2018*]

Module content:
1. - Basic concepts of accounting
2. The role of cost accounting in a company
3. Settlement principles
4. Structure of cost accounting systems
5. Cost element accounting (in particular personnel costs, material costs, depreciation)
6. Cost center accounting (especially internal cost allocation)
7. Cost object accounting (in particular overhead costing, couple costing, price calculation)
8. Contribution costing (single-level and multi-level structure)
9. Other cost accounting systems

The theoretical aspects of all topics will be presented and practiced in numerous exercises.
[*updated 23.08.2018*]

Teaching methods/Media:
Regularly revised lecture notes will be published for this course. Georg, S.: Kosten- und Leistungsrechnung kompakt, Aachen 2011
[*updated 23.08.2018*]

Recommended or required reading:
_ Deimel, K. /Isemann, R./Müller, S.: Kosten- und Erlösrechnung, 2006
_ Fandel/Heuft/Paff/Pitz: Kostenrechnung, 3. Auflage, 2009.
_ Haberstock, L.: Kostenrechnung I, Berlin 2008.
_ Langenbeck, J.: Kosten- und Leistungsrechnung, 2. Auflage, 2011.
_ Olfert, K.: Kostenrechnung, 16. Auflage, 2008.
_ Plinke, W: Industrielle Kostenrechnung, 7. Auflage, 2007.
_ Schmidt, A.: Kostenrechnung, 5. Auflage, 2008.
[*updated 23.08.2018*]

Design Technology / CAD

Module name (EN): Design Technology / CAD
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc345
Hours per semester week / Teaching method: 2V+1U+1PA (4 hours per week)
ECTS credits: 5
Semester: 3
Mandatory course: yes
Language of instruction: German
Assessment: Written exam on Design Technology (70%) + CAD project (30%)
Curricular relevance: WIBASc345 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 3, mandatory course
Workload: 60 class hours (= 45 clock hours) over a 15-week period. The total student study time is 150 hours (equivalent to 5 ECTS credits). There are therefore 105 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): WIBASc145 Physics WIBASc155 Materials Engineering WIBASc165 Mathematics I WIBASc235 Engineering Mechanics I WIBASc245 Manufacturing Engineering WIBASc265 Mathematics II [*updated 01.02.2020*]

Recommended as prerequisite for:
WIBASc-525-625-FÜ32 Technology and Innovation Management
WIBASc-525-625-FÜ36 Technology and Innovation Management (English)
WIBASc-525-625-Ing14 Machine tools
WIBASc-525-625-Ing8 Elements of Technical Products
WIBASc515 Automation Engineering
WIBASc525-625-Ing13 CAD in CATIA - The Basics
[*updated 11.02.2020*]

Module coordinator:
Prof. Dr. Dirk Hübner

Lecturer:
Prof. Dr. Dirk Hübner
[*updated 01.02.2020*]

Learning outcomes:
After successfully completing this module students will:
_ be familiar with design methodology and technology
_ be able to read technical drawings
_ be proficient in drawing and dimensioning simple technical components with CAD
_ be able to name the properties and areas of application of important machine elements
_ be proficient in the calculation of selected machine elements
[*updated 13.09.2018*]

Module content:
1. Introduction, design principles and methodology
2. Standards, tolerances and fits, surfaces
3. Reading technical drawings
4. Introduction to CAD
5. Strength calculations on shafts and axles
6. Overview of properties, areas of application and calculation bases of selected machine elements Shaft-hub connections, screws, springs

[*updated 13.09.2018*]

Teaching methods/Media:
Design Technology:
Lecture notes will be available as a set of slides.
[*updated 13.09.2018*]

Recommended or required reading:
Design Technology:
_ Muhs, D./ Wittel, H./ Becker, M./ Jannasch, D./ Voßiek, J./ Roloff/ Matek: Maschinenelemente, 20. Auflage, Vieweg+Teubner Verlag, 2011
_ Decker, K.-H-; Kabus, K.: Maschinenelemente, 18. Auflage, Hanser Fachbuchverlag, 2011
_ Hesser, W.; Hoischen, H.: Technisches Zeichnen: Grundlagen, Normen, Beispiele, Darstellende Geometrie, Cornelsen Verlag, 2011
_ Grote, K.-H-; Feldhusen, J.: Dubbel: Taschenbuch für den Maschinenbau, Springer Berlin Heidelberg, 2011
[*updated 13.09.2018*]

Electrical Engineering

Module name (EN): Electrical Engineering
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc445
Hours per semester week / Teaching method: 2V+2U (4 hours per week)
ECTS credits: 5
Semester: 4
Mandatory course: yes
Language of instruction: German
Assessment: Written exam
Curricular relevance: WIBASc445 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 4, mandatory course
Workload: 60 class hours (= 45 clock hours) over a 15-week period. The total student study time is 150 hours (equivalent to 5 ECTS credits). There are therefore 105 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): WIBASc145 Physics WIBASc155 Materials Engineering WIBASc165 Mathematics I WIBASc265 Mathematics II [*updated 10.02.2020*]

Recommended as prerequisite for:
WIBASc-525-625-Ing10 Principles of Supply Networks and Systems
WIBASc-525-625-Ing25
WIBASc-525-625-Ing9 Introduction to Energy Technology
WIBASc515 Automation Engineering
WIBASc525-625-Ing22
[*updated 11.02.2020*]

Module coordinator:
Prof. Dr. Rudolf Friedrich

Lecturer:
Prof. Dr. Rudolf Friedrich
[*updated 10.02.2020*]

Learning outcomes:
After successfully completing this module, students will have received a well-founded overview of the basics of electrical engineering and the most important basics and principles for industrial engineers.
- They will be able to describe and calculate electric and electromagnetic fields mathematically.
- They will know the various electrical components and be able to describe them in terms of design and function.
- They will be able to calculate networks in terms of voltages, currents and power.
- They will be able to calculate DC and AC circuits.
- Students will know about the dangers of electricity.
- And lastly, they will be familiar with different protection systems and network forms.

[*updated 13.09.2018*]

Module content:
1. Electrostatic field
2. Electromagnetic field
3. Components for electrical engineering
   - Resistor
   - Capacitor
   - Coil
   - Diode
   - Transistor
4. Basics of electrical machines
5. Electrical network analysis and circuit technology
6. Electrical metrology

[*updated 13.09.2018*]

Teaching methods/Media:
Lecture and exercise with solution. Lecture notes will be provided: Educational films and DVDs will be used during the course.
We will work with educational films and DVDs.
[*updated 13.09.2018*]

Recommended or required reading:
_ Bosse, G.: Grundlagen der Elektrotechnik I+II+III, 3. Auflage, Springer Verlag, 1996
_ Haubrich, Hans-Jürgen: Elektrische Energieversorgungssysteme - Skript _Elektrische Anlagen I_, Verlag der Augustinus Bhg, 1997
_ Lindner, H./ Brauer, H./ Lehmann, C: Taschenbuch der Elektrotechnik und Elektronik, 9. Auflage, Hanser Verlag, 2008
_ Schrüfer, E.: Elekrische Messtechnik, 9. Auflage, Hanser Verlag, 2007
[*updated 13.09.2018*]

Engineering Mechanics I

Module name (EN): Engineering Mechanics I
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc235
Hours per semester week / Teaching method: 2V+2U (4 hours per week)
ECTS credits: 5
Semester: 2
Mandatory course: yes
Language of instruction: German
Assessment: Written exam
Curricular relevance: WIBASc235 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 2, mandatory course
Workload: 60 class hours (= 45 clock hours) over a 15-week period. The total student study time is 150 hours (equivalent to 5 ECTS credits). There are therefore 105 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): WIBASc145 Physics [*updated 11.02.2020*]
Recommended as prerequisite for: WIBASc-525-625-Ing14 Machine tools WIBASc-525-625-Ing8 Elements of Technical Products WIBASc335 Engineering Mechanics II WIBASc345 Design Technology / CAD [*updated 11.02.2020*]

Module coordinator:
Prof. Dr. Michael Krämer

Lecturer:
Prof. Dr. Michael Krämer
Torsten Schmidt
[*updated 11.02.2020*]

Learning outcomes:
After successfully completing this module students will:
_ be able to recognize forces and force effects and represent them in graphs and mathematically.
_ be able to derive equilibrium conditions and determine bearing forces and moments.
_ be able to determine the internal force and moment effects for given external forces.
_ know the physical principles of friction and be able to determine under which conditions a system with frictional forces is stable.
[*updated 02.07.2019*]

Module content:
Statics:
1. Force concept, force and moment effects on the basis of Newton´s axioms
2. graphic and mathematical determination of resulting forces and moments
3. Applications with central and flat force systems, e.g. bearing forces
4. Normal forces, shear forces, internal moment effect
5. Beams, two-part systems and trusses
6. Friction
7. Centroid
[*updated 02.07.2019*]

Teaching methods/Media:
Regularly revised lecture notes will be passed out.
[*updated 02.07.2019*]

Recommended or required reading:
_ Holzmann, G./ Meyer H./ Schumpich G.: Technische Mechanik, Statik; 12. Auflage, Vieweg+Teubner Verlag, 2009
_ Böge, A.: Technische Mechanik _ Statik-Dynamik-Fluidmechanik-Festigkeitslehre; 28. Auflage, Vieweg+Teubner-Verlag, 2009
_ Gross, D./ Hauger, W./ Schröder, J./ Wall, W.: Technische Mechanik 1 - Statik; 11. Auflage, Springer Verlag, 2011
_ Böge, A./ Schlemmer, W.: Aufgabensammlung zur Mechanik und Festigkeitslehre, 17. Auflage, Vieweg Verlag, 2003
[*updated 02.07.2019*]

Engineering Mechanics II

Module name (EN): Engineering Mechanics II
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc335
Hours per semester week / Teaching method: 2V+2U (4 hours per week)
ECTS credits: 5
Semester: 3
Mandatory course: yes
Language of instruction: German
Assessment: Written exam
Curricular relevance: WIBASc335 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 3, mandatory course
Workload: 60 class hours (= 45 clock hours) over a 15-week period. The total student study time is 150 hours (equivalent to 5 ECTS credits). There are therefore 105 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): WIBASc235 Engineering Mechanics I [*updated 11.02.2020*]
Recommended as prerequisite for: WIBASc-525-625-Ing14 Machine tools WIBASc-525-625-Ing8 Elements of Technical Products [*updated 11.02.2020*]

Module coordinator:
Prof. Dr. Michael Krämer

Lecturer:
Prof. Dr. Michael Krämer
Torsten Schmidt
[*updated 11.02.2020*]

Learning outcomes:
After successfully completing this module students will:
_ be able to deduce which internal force and moment effects from external loads act on a structural component and determine the effective stresses that result from these.
_ be able to recognize which stresses result in which deformations and can calculate these.
_ be able to determine whether a structural component can withstand a given load resp. be able to dimension it sufficiently.
[*updated 13.09.2018*]

Module content:
Strength of Materials:
1. Effects of internal forces on materials: Stress (normal stress, tangential stress)
2. Theory of Elasticity: elastic deformation of structural components (bending of straight bars, shearing, twisting)
3. Uniaxial and biaxial stress states; fracture hypotheses
[*updated 13.09.2018*]

Teaching methods/Media:
Regularly revised lecture notes will be passed out.
[*updated 13.09.2018*]

Recommended or required reading:
_ Holzmann, G./ Meyer H./ Schumpich G.: Technische Mechanik, Festigkeitslehre, 9. Auflage, Teubner Verlag, 2006
_ Böge, A.: Technische Mechanik _ Statik-Dynamik-Fluidmechanik-Festigkeitslehre; 28. Auflage, Vieweg+Teubner-Verlag, 2009
_ Gross, D./ Hauger, W./ Schröder, J./ Wall, W.: Technische Mechanik 2 _ Elastostatik, 9. Auflage, Springer-Verlag, 2007
[*updated 13.09.2018*]

English I

Module name (EN): English I
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc365
Hours per semester week / Teaching method: 2V+2U (4 hours per week)
ECTS credits: 5
Semester: 3
Mandatory course: yes
Language of instruction: English
Assessment: Written exam
Curricular relevance: WIBASc365 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 3, mandatory course
Workload: 60 class hours (= 45 clock hours) over a 15-week period. The total student study time is 150 hours (equivalent to 5 ECTS credits). There are therefore 105 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): None.

Recommended as prerequisite for:
WIBASc-525-625-FÜ33 Research Seminar
WIBASc-525-625-FÜ36 Technology and Innovation Management (English)
WIBASc-525-625-FÜ39
WIBASc-525-625-Ing16 Complementary Basics of Engineering
WIBASc-525-625-Ing19 Fluid Energy Machines
WIBASc-525-625-Ing21 Fluid Dynamics
WIBASc-525-625-Ing27
WIBASc-525-625-Ing4 Quality Techniques (Seminar, English)
WIBASc-525-625-W6 Consulting (Seminar, English)
WIBASc465 English II
WIBASc525-625-W11 Technical Sales and Distribution (Seminar)
[*updated 11.02.2020*]

Module coordinator:
Prof. Dr. Thomas Tinnefeld

Lecturer:
Corinna Huth
[*updated 20.01.2020*]

Learning outcomes:
After successfully completing this module students will:
_ have extensive foreign language communication skills with consolidated and developed knowledge in the field of technical terminology in the most important professional fields of activity
_ be proficient in the essential grammatical structures of English, some of them with a technical focus
_ have expanded their basic general vocabulary to include relevant technical terms
_ be able to understand simple to moderately difficult texts in general language with partial technical and business language orientation
_ have strengthened their understanding of technically and economically relevant oral texts
_ have acquired the ability to use the target language during professional activity in a country where the target language is spoken by way of conversation and comprehension exercises on an idiomatic basis
[*updated 13.09.2018*]

Module content:

_ (Inter)culturally relevant and current topics, with a focus on dealing with typical business situations, e.g.:

- Business trips
- Preparation of business meetings
- Conversation training

_ Writing business documents
_ Consideration of all four language skills (speaking, writing, listening, reading)
_ Specialized vocabulary and grammar
_ Functional linguistic mediation

[*updated 13.09.2018*]

Teaching methods/Media:

_ Lecturer presentation phases
_ Group and plenary discussions
_ Partner work
_ Multimedia language lab
_ Presentations and short talks by students

[*updated 13.09.2018*]

Recommended or required reading:

_ Teaching materials compiled by the lecturer
_ PowerPoint presentations by the lecturer or equivalent visualization forms
_ Lecturer´s learning platform
_ Grammars and exercise books recommended in the course
_ Internet resources

[*updated 13.09.2018*]

English II

Module name (EN): English II
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc465
Hours per semester week / Teaching method: 2V+2U (4 hours per week)
ECTS credits: 5
Semester: 4
Mandatory course: yes
Language of instruction: English
Assessment: Written exam
Curricular relevance: WIBASc465 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 4, mandatory course
Workload: 60 class hours (= 45 clock hours) over a 15-week period. The total student study time is 150 hours (equivalent to 5 ECTS credits). There are therefore 105 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): WIBASc365 English I [*updated 20.01.2020*]

Recommended as prerequisite for:
WIBASc-525-625-FÜ33 Research Seminar
WIBASc-525-625-FÜ36 Technology and Innovation Management (English)
WIBASc-525-625-FÜ39
WIBASc-525-625-Ing16 Complementary Basics of Engineering
WIBASc-525-625-Ing4 Quality Techniques (Seminar, English)
WIBASc-525-625-W6 Consulting (Seminar, English)
WIBASc525-625-W11 Technical Sales and Distribution (Seminar)
[*updated 11.02.2020*]

Module coordinator:
Prof. Dr. Thomas Tinnefeld

Lecturer:
Corinna Huth
[*updated 20.01.2020*]

Learning outcomes:
After successfully completing this module students will:
_ have advanced written communication skills in the foreign language, as well as extended knowledge of technical terminology in the most important professional fields of activity
_ be able to understand complicated texts with economic or technical content
_ have deepened their knowledge of English grammatical structures, mainly in a specialist field
_ be able to understand intercultural business communication through case studies based on role-playing, conversation and comprehension exercises on an idiomatic basis
_ have deepened and expanded their oral communication skills in an exclusively English learning atmosphere through active participation in discussions and talks at an intermediate to high level.
[*updated 13.09.2018*]

Module content:
_ Perfecting their knowledge about (inter)culturally relevant, current topics that help one successfully deal with typical business events, such as:
- Presentations
- Intercultural business communication
- Technical and business English in practice

_ Consideration of all four language skills (speaking, writing, listening, reading)
_ Consolidation of specialized vocabulary and linguistic structures, as well as specialized grammar exercises
[*updated 13.09.2018*]

Teaching methods/Media:

_ Lecturer presentation phases
_ Group and plenary discussions
_ Partner work
_ Multimedia language lab
_ Presentations and short talks by students

[*updated 13.09.2018*]

Recommended or required reading:

_ Teaching materials compiled by the lecturer
_ PowerPoint presentations by the lecturer or equivalent visualization forms
_ Lecturer´s learning platform
_ Grammars and exercise books recommended in the course
_ Internet resources

[*updated 13.09.2018*]

Fundamentals of Economics

Module name (EN): Fundamentals of Economics
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc135
Hours per semester week / Teaching method: 2V+2U (4 hours per week)
ECTS credits: 5
Semester: 1
Mandatory course: yes
Language of instruction: German
Assessment: Written exam
Curricular relevance: WIBASc135 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 1, mandatory course
Workload: 60 class hours (= 45 clock hours) over a 15-week period. The total student study time is 150 hours (equivalent to 5 ECTS credits). There are therefore 105 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): None.
Recommended as prerequisite for: WIBASc-525-625-W12 Current Topics and Challenges in Business Enterprises (Seminar) [*updated 11.02.2020*]
Module coordinator: Prof. Dr. Uwe Leprich

Lecturer:
Prof. Dr. Uwe Leprich
[*updated 02.01.2020*]

Learning outcomes:
After successfully completing this module students will:
_ have mastered the general economic approach to practical problems
_ be able to explain the theoretical foundations of economic theory and critically examine their assumptions
_ have an overview of economic policy fields and be able to sort economic questions/problems accordingly
_ be proficient in national accounts figures, including selected key figures
_ be able to identify instabilities in the economy and propose solutions for eliminating them
[*updated 02.07.2019*]

Module content:
Part A. Basic economics and its theories
1. Introduction: What is economics?
2. Basic economic questions and concepts

Part B. Economic theory of markets
3. Principles of the Neoclassical Microeconomic Theory
4. Criticism of the Neoclassical Microeconomic Theory

Part C. Regulatory policy in the market economy
5. Competition policy
6. Environmental policy

Part D. Macroeconomic accounting
7. National accounts (NA)

Part E. Stability policy in the market economy
8. Stability policy objectives and their indicators
9. Stability policy instruments and approaches
a. Monetary policy
b. Asset and distribution policy

Part F. Foreign Trade
10. Principles of foreign trade and globalization

Students will research solutions to selected tasks and present them orally. Worksheets.
[*updated 02.07.2019*]

Teaching methods/Media:
A detailed outline with references and a set of slides will be provided for this module.
[*updated 02.07.2019*]

Recommended or required reading:

_ Baßeler, Ulrich/Heinrich, Jürgen/Utecht, Burkhard: Grundlagen und Probleme der Volkswirtschaft; 19. Auflage, Schäffer-Poeschel, Stuttgart 2010

_ Bofinger, Peter: Grundzüge der Volkswirtschaftslehre. Eine Einführung in die Wissenschaft von Märkten, 3. Auflage, Pearson Studium, 2010

_ Flassbeck, Heiner: 50 einfache Dinge, die Sie über unsere Wirtschaft wissen sollten, Piper Verlag, Frankfurt/M. 2006

_ Rogall, Holger: Nachhaltige Ökonomie. Ökonomische Theorie und Praxis einer Nachhaltigen Entwicklung, Metropolis Verlag, Marburg 2011

[*updated 02.07.2019*]

Industrial Management

Module name (EN): Industrial Management
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc125
Hours per semester week / Teaching method: 2V+2U (4 hours per week)
ECTS credits: 5
Semester: 1
Mandatory course: yes
Language of instruction: German
Assessment: Written exam
Curricular relevance: WIBASc125 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 1, mandatory course
Workload: 60 class hours (= 45 clock hours) over a 15-week period. The total student study time is 150 hours (equivalent to 5 ECTS credits). There are therefore 105 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): None.
Recommended as prerequisite for: WIBASc-525-625-FÜ32 Technology and Innovation Management WIBASc-525-625-Ing4 Quality Techniques (Seminar, English) WIBASc-525-625-W12 Current Topics and Challenges in Business Enterprises (Seminar) WIBASc225 Procurement Logistics and Technical Sales and Distribution [*updated 11.02.2020*]

Module coordinator:
Prof. Dr. Udo Venitz

Lecturer:
Prof. Dr. Udo Venitz
[*updated 20.01.2020*]

Learning outcomes:
After successfully completing this module students will:
_ have acquired a systematic basic understanding of the diversity of the manufacturing industry.
_ be familiar with the original and planned production factors
_ and will be able to understand the interactions of the various subplans.
_ have mastered the fundamental interrelationships in ERP systems.
[*updated 02.07.2019*]

Module content:
1. Basics
2. Industrial site decisions
3. Organizational and decision-making problems in industrial operations
4. Organizational and production variants in the manufacturing industry
5. Location decisions
6. Commercial work in an industrial plant
7. Resources/plants
8. Materials/products
9. Work scheduling
10. Production planning and control and ERP systems

Exercises and case studies will be integrated into the module to illuminate various topics.
[*updated 02.07.2019*]

Teaching methods/Media:
A regularly revised PowerPoint presentation, also available to students as electronic lecture notes, will be used during the course of the module. On a case-by-case basis, video sequences will illustrate what has been learned in the course of the module.
[*updated 02.07.2019*]

Recommended or required reading:

_ Corsten, Hand/Gössinger, Ralf: Produktionswirtschaft; Oldenbourg Verlag; 12. Auflage; 2009
_ Dyckhoff, Harald/Spengler, Thomas: Produktionswirtschaft; 3. Auflage; Springer; Berlin/Heidelberg 2010
_ Ebel, Bernd: Produktionswirtschaft; 9. Auflage, Kiehl; 2009
_ Günther, Hans-Otto/Tempelmeier, Horst: Produktion und Logistik; 9. Auflage; Springer; Berlin/Heidelberg 2012
_ Nebl, Theodor: Produktionswirtschaft; Oldenbourg Verlag; 7. Auflage; 2011
_ Nolden, Rolf-Günther/Köner, Peter/Bizer, Ernst: Industriebetriebslehre; Bildungsverlag Eins; 14. Auflage; 2012
_ Oeldorf, G./Olfert, K.: Materialwirtschaft; 12. Auflage; Ludwigshafen 2008
_ Schneeweis, C.: Einführung in die Produktionswirtschaft; 8. Auflage; 2002
_ Weber, Helmut: Industriebetriebslehre; 3. Auflage; Springer; 1999
_ Wenzel/Fischer/Gerhard: Industriebetriebslehre; Hanser Verlag; 2001
_ Wiendahl, H.P.: Betriebsorganisation für Ingenieure; 7. Auflage; Hanser; 2009

[*updated 02.07.2019*]

Introduction to Scientific Work (with seminar)

Module name (EN): Introduction to Scientific Work (with seminar)
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc535
Hours per semester week / Teaching method: 1V+3S (4 hours per week)
ECTS credits: 5
Semester: 5
Mandatory course: yes
Language of instruction: German
Assessment: Paper with presentation
Curricular relevance: WIBASc535 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 5, mandatory course
Workload: 60 class hours (= 45 clock hours) over a 15-week period. The total student study time is 150 hours (equivalent to 5 ECTS credits). There are therefore 105 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): None.

Recommended as prerequisite for:
WIBASc-525-625-FÜ16 Current Topics in (Business) Informatics (Seminar)
WIBASc-525-625-FÜ34 Contemporary Issues in Business Information Systems (Seminar)
WIBASc-525-625-FÜ7 Moderation and Leadership (Seminar)
WIBASc-525-625-Ing1 Production Planning (Seminar)
WIBASc-525-625-Ing16 Complementary Basics of Engineering
WIBASc-525-625-Ing3 Maintenance Planning (Seminar)
WIBASc-525-625-Ing4 Quality Techniques (Seminar, English)
WIBASc-525-625-W12 Current Topics and Challenges in Business Enterprises (Seminar)
WIBASc-525-625-W3 Current Problems in Energy Supply (Seminar)
WIBASc-525-625-W5 Business Planning (Seminar)
WIBASc-525-625-W6 Consulting (Seminar, English)
WIBASc525-625-W11 Technical Sales and Distribution (Seminar)
[*updated 11.02.2020*]

Module coordinator:
Prof. Dr.-Ing. Christian Köhler

Lecturer:
Prof. Dr.-Ing. Christian Köhler
[*updated 10.02.2020*]

Learning outcomes:
Introduction to Scientific Work
After successfully completing this module students will:
_ have mastered important learning and working techniques for studying
_ and thus have the ability to work independently.
_ have acquired time management skills.
_ have gained an overview of the usual citation techniques and be able to debate and discuss the topic of plagiarism.

Scientific Seminar
After successfully completing this module students will:
_ be able to independently write a scientific paper on a current topic followed by a presentation.
_ have mastered the use of citation and time management techniques.
_ be able to take a position on a specific topic or problem in their paper and justify their position.
_ be able to communicate and interact with other seminar participants during their presentation.
[*updated 13.09.2018*]

Module content:
Introduction to Scientific Work:
Overview of the citation regulations at the htw saar
Typical errors in scientific work
The optimal design of a scientific composition using a word processing program

Scientific Seminar:
Participants will read and work independently on a given topic and then present their findings in accordance with the principles of proper scientific work. The paper should apply techniques of scientific methodology. The short talk to be given after finishing the paper will promote communication skills and the ability to defend one´s own point of view.
[*updated 23.08.2018*]

Teaching methods/Media:
Introduction to Scientific Work:
Regularly revised citation rules will be passed out.

Scientific Seminar:
Paper with presentation
[*updated 23.08.2018*]

Recommended or required reading:

Introduction to Scientific Work:
_ Theisen, Manuel Rene: Wissenschaftliches Arbeiten, 15. Auflage, Vahlen, München, 2011
_ Zitationsordnung der Business School der HTW des Saarlandes

Scientific Seminar:
Current literature on individual student topics.
[*updated 23.08.2018*]

Investment/Financing

Module name (EN): Investment/Financing
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc325
Hours per semester week / Teaching method: 2V+2U (4 hours per week)
ECTS credits: 5
Semester: 3
Mandatory course: yes
Language of instruction: German
Assessment: Written exam
Curricular relevance: WIBASc325 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 3, mandatory course
Workload: 60 class hours (= 45 clock hours) over a 15-week period. The total student study time is 150 hours (equivalent to 5 ECTS credits). There are therefore 105 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): None.
Recommended as prerequisite for: WIBASc-525-625-FÜ26 Planning a Production Plant WIBASc-525-625-Ing24 WIBASc-525-625-W5 Business Planning (Seminar) [*updated 11.02.2020*]

Module coordinator:
Prof. Dr. Andy Junker

Lecturer:
Prof. Dr. Andy Junker
Dipl.-Betr.W. Peter Huber
[*updated 20.01.2020*]

Learning outcomes:
Investment
After successfully completing this module students will:
_ have a broad overview of the financially effective decision-making processes in companies.
_ be able to explain the reasons for financing and investment transactions and the periodization of incoming and outgoing payment series
_ have mastered the common methods of static and dynamic investment calculation procedures, as well as other procedures (consideration of tax, useful life, uncertainty) and can apply these to operational decision situations.
_ be able to compare advantageousness based on the respective prerequisites and conditions of use

Financing:
After successfully completing this module students will:
_ have a broad overview of the financially effective decision-making processes in companies. They will be familiar with the reasons for financing transactions and the periodization of incoming and outgoing payment series.
_ will be able to calculate comparisons
_ will be able to name the most important instruments of external and internal financing
_ will be able to choose between different ways of financing
Students will be familiar with legal and tax design options and are thus able to make financing decisions in standard company situations with confidence
[*updated 02.07.2019*]

Module content:
Investment
A. Introductory remarks
1. Terms
2. Financial decision criteria
B. Static investment calculation methods
1. Common characteristics of static methods
2. Cost comparison calculation
3. Profit comparison calculation
4. Profitability calculation
5. Static amortization calculation
C. Dynamic investment calculation methods
1. Principles of financial mathematics
2. Common characteristics of dynamic methods
3. Net present value (NPV) method
4. Annuity method
5. Internal rate of return (IRR)
6. Dynamic amortization calculation
D. Selected dynamic calculation methods
1. Compound methods
2. Determining the optimum life/the optimal replacement cycle
3. Consideration of taxes/depreciation of money in preinvestment analysis
4. Consideration of uncertainty

Financing:
1. Basic financial principles
2. Debt financing
2.1. Equity financing
2.1.1 of companies without access to the stock exchange
2.1.2. of companies with access to the stock exchange
2.2. External financing
2.2.1. Long-term external financing
2.2.2. Short-term external financing
2.3. Special forms
2.4. Derivative forms of equity and debt financing
3. Internal financing
3.1. Self-financing
3.2. Financing from depreciation and provisions
3.3. Financial planning and determining capital requirements
3.4. Financial analysis

The theoretical aspects of all topics will be presented and practiced in numerous exercises.
[*updated 02.07.2019*]

Teaching methods/Media:
Investment
Presentations will be held during the course. Lecture notes and practice exercises will be provided.

Financing:
Presentations will be held during the course. Lecture notes and practice exercises will be provided.
[*updated 02.07.2019*]

Recommended or required reading:
Investment
_ Bieg, Hartmut/Kußmaul, Heinz: Investition, 2. Auflage, Vahlen, München, 2009
_ Blohm, Hans; Lüder, Klaus; Schäfer, Christina: Investition, 9. Auflage, Vahlen, München, 2006
_ Kußmaul, Heinz: Betriebswirtschaftslehre für Existenzgründer, 7. Aufl., Oldenbourg Wissenschaftsverlag, München 2011
_ Olfert, K./Reichel, C.: Investition, 11. Auflage, Kiehl Verlag, Ludwigshafen 2009
_ Perridon, L./Steiner, M./Rathgeber, A.: Finanzwirtschaft der Unternehmung, 15. Auflage, Vahlen, München 2009

Financing:
_ Bieg, Hartmut/Kußmaul, Heinz: Finanzierung, 2. Auflage, Vahlen, München 2009
_ Hirth, H.: Grundzüge der Finanzierung und Investition, München 2005.
_ Kruschwitz, L./Husmann, S.: Finanzierung und Investition, 6. Auflage, Oldenbourg Wissenschaftsverlag, München 2012
_ Olfert, K.: Finanzierung, 15. Auflage, Kiehl Verlag, Ludwigshafen 2011
_ Perridon, L./Steiner, M./Rathgeber, A.: Finanzwirtschaft der Unternehmung, 15. Auflage, Vahlen, München 2009
[*updated 02.07.2019*]

Manufacturing Engineering

Module name (EN): Manufacturing Engineering
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc245
Hours per semester week / Teaching method: 2V+2U (4 hours per week)
ECTS credits: 5
Semester: 2
Mandatory course: yes
Language of instruction: German
Assessment: Written exam
Curricular relevance: WIBASc245 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 2, mandatory course
Workload: 60 class hours (= 45 clock hours) over a 15-week period. The total student study time is 150 hours (equivalent to 5 ECTS credits). There are therefore 105 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): WIBASc155 Materials Engineering [*updated 31.01.2020*]

Recommended as prerequisite for:
WIBASc-525-625-FÜ26 Planning a Production Plant
WIBASc-525-625-FÜ30 Production Project
WIBASc-525-625-Ing1 Production Planning (Seminar)
WIBASc-525-625-Ing14 Machine tools
WIBASc-525-625-Ing2 Integrated Production Systems
WIBASc-525-625-Ing24
WIBASc-525-625-Ing4 Quality Techniques (Seminar, English)
WIBASc-525-625-Ing8 Elements of Technical Products
WIBASc345 Design Technology / CAD
WIBASc515 Automation Engineering
WIBASc525-625-Ing22
[*updated 11.02.2020*]

Module coordinator:
Prof. Dr.-Ing. Dieter Arendes

Lecturer:
Prof. Dr.-Ing. Dieter Arendes
[*updated 20.01.2020*]

Learning outcomes:
After successfully completing this module students will:
_ be familiar with the most important manufacturing processes (German norm DIN 8580).
_ know about their special technological features (e.g. operating principles, process parameters, tool systems).
_ be able to name their economic areas of application.
_ be able to name their limits and technological areas of application.
_ be able to name typical processes for the production of selected products.
[*updated 02.07.2019*]

Module content:
_ Primary forming manufacturing processes, in particular casting
_ Sheet forming (bending, deep drawing, metal spinning, ...)
_ Bulk forming (forging, rolling, ...)
_ Stamping, autogenous cutting, EDM (electrical discharge machining)
_ Machining with geometrically determined cutting edge (turning, milling, drilling)
_ Machining with geometrically indeterminate cutting edge (grinding)
_ Introduction to joining, soldering, pressure and fusion welding processes
[*updated 02.07.2019*]

Teaching methods/Media:
Lecture with exercises, animations, FEM simulations, as well as educational and industrial videos.
Sample parts will be passed around for study during the course of the module.
Lecture notes as a collection of slides with questions and exercises.
[*updated 02.07.2019*]

Recommended or required reading:

_ Koether, R./ Rau, W.: Fertigungstechnik für Wirtschaftsingenieure; 4. Auflage, Carl Hanser Verlag, 2012

_ König, W./ Klocke F.: Fertigungsverfahren, mehrere Bände, VDI-Verlag GmbH, Düsseldorf.

_ Lange, K.: Lehrbuch der Umformtechnik, mehrere Bände; 2. Auflage, Springer Verlag, 2002

_ Spur, G./ Stöferle, Th.: Handbuch der Fertigungstechnik, mehrere Bände, Karl-Hanser-Verlag.

_ Awiszus, B.: Grundlagen der Fertigungstechnik Carl Hanser Verlag, 5. Auflage, 2012

_ Tschätsch, H.: Praxis der Zerspanungstechnik, Vieweg+Teubner Verlag, 10. Auflage, 2011

_ Pauksch, E, et al.: Zerspantechnik, 12. Auflage, Vieweg+Teubner 2008

_ Westkämper, E. / Warnecke H.-J.: Einführung in die Fertigungstechnik, Vieweg+Teubner Verlag; 8. Auflage, 2010

[*updated 02.07.2019*]

Materials Engineering

Module name (EN): Materials Engineering
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc155
Hours per semester week / Teaching method: 2V+2U (4 hours per week)
ECTS credits: 5
Semester: 1
Mandatory course: yes
Language of instruction: German
Assessment: Written exam
Curricular relevance: WIBASc155 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 1, mandatory course
Workload: 60 class hours (= 45 clock hours) over a 15-week period. The total student study time is 150 hours (equivalent to 5 ECTS credits). There are therefore 105 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): None.
Recommended as prerequisite for: WIBASc-525-625-Ing27 WIBASc-525-625-Ing8 Elements of Technical Products WIBASc-525-625-Ing9 Introduction to Energy Technology WIBASc245 Manufacturing Engineering WIBASc345 Design Technology / CAD WIBASc445 Electrical Engineering [*updated 10.02.2020*]

Module coordinator:
Prof. Dr.-Ing. Dieter Arendes

Lecturer:
Prof. Dr.-Ing. Dieter Arendes
Prof. Dr. Frank Ulrich Rückert
Torsten Schmidt
[*updated 19.12.2019*]

Learning outcomes:
After successfully completing this module students will:
_ have basic knowledge of materials engineering.
_ be able to describe typical methods of materials testing.
_ be able to explain the structure of important materials and estimate which properties result from this.
_ be familiar with typical engineering materials and their essential properties, especially steel, and can apply this knowledge in a technical discussion.
_ have an overview of the typical treatment and processing methods for materials and be able to evaluate them in terms of material properties and their integration in a process chain.
[*updated 02.07.2019*]

Module content:
_ Material properties and testing
_ Structure and properties of metals,
_ Alloys, especially iron-carbon alloys
_ Heat treatment of ferrous materials
_ Cast iron and steel (unalloyed/alloyed)
_ Introduction to non-ferrous metals
_ Introduction to Plastics and Composites
[*updated 02.07.2019*]

Teaching methods/Media:
Lecture with exercises, animations and demonstrations (tensile test).
Sample parts will be passed around during the course of the module.
Lecture notes as a collection of slides with questions and exercises.
[*updated 02.07.2019*]

Recommended or required reading:

_ Seidel, W. / Hahn, F.(besondere Empfehlung): Werkstofftechnik, 9. Auflage, Carl Hanser Verlag, 2012

_ Hornbogen, E. / Eggeler, G./Werner, E.: Werkstoffe, 10. Auflage, Springer Verlag, 2012

_ Ilschner, B. / Singer, R. F.: Werkstoffwissenschaften und Fertigungstechnik, 5. Auflage, Springer Verlag, 2010

_ Worch, H. / Pompe, W./Schatt, W.: Werkstoffwissenschaft, 10. Auflage, Wiley-VCH Verlag, 2011

_ Ruge, J. / Wohlfahrt, H.: Technologie der Werkstoffe, Vieweg+Teubner Verlag; 8. Auflage, 2007

_ Weißbach, W.: Werkstoffkunde _ Strukturen, Eigen-schaften, Prüfung, Vieweg+Teubner Verlag; 18. Auflage, 2012

[*updated 02.07.2019*]

Mathematics I

Module name (EN): Mathematics I
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc165
Hours per semester week / Teaching method: 4V+2U (6 hours per week)
ECTS credits: 5
Semester: 1
Mandatory course: yes
Language of instruction: German
Assessment: Written or oral examination. The type of examination will be announced on the notice board at the beginning of the course.
Curricular relevance: WIBASc165 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 1, mandatory course
Workload: 90 class hours (= 67.5 clock hours) over a 15-week period. The total student study time is 150 hours (equivalent to 5 ECTS credits). There are therefore 82.5 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): None.

Recommended as prerequisite for:
WIBASc-525-625-FÜ12 Using Mathematical Software
WIBASc-525-625-FÜ19 Simulation II
WIBASc-525-625-FÜ23 Simulation
WIBASc-525-625-Ing18
WIBASc-525-625-Ing19 Fluid Energy Machines
WIBASc-525-625-Ing21 Fluid Dynamics
WIBASc255 Statistics
WIBASc265 Mathematics II
WIBASc345 Design Technology / CAD
WIBASc435 Thermodynamics
WIBASc445 Electrical Engineering
WIBASc515 Automation Engineering
WIBASc525-625-FÜ27 Mathematics III
WIBASc525-625-Ing22
[*updated 11.02.2020*]

Module coordinator:
Prof. Dr. Frank Kneip

Lecturer:
Prof. Dr. Frank Kneip (lecture)
Prof. Dr. Frank Ulrich Rückert (lecture)
Michael Ohligschläger (exercise)
[*updated 19.12.2019*]

Learning outcomes:
After successfully completing this module students will:
_ be able to prove suitable statements by means of mathematical induction.
_ be able to analyze and name properties of mathematical sequences and selected function types.
_ have mastered the elementary techniques of differential and integral calculus.
_ be able to approximate functions by Taylor polynomials and assess the quality of their approximation.
_ have learned to mathematically model and solve physical-technical as well as economic problems and interpret the result.
[*updated 02.07.2019*]

Module content:

1. Mathematical induction
2. Number sequences and limits
3. Principles of functions (e.g. monotony, continuity, boundedness, limits)
4. Introduction to differential calculus
   a. Differentiability
   b. Technique of differentiation
5. Applications of differential calculus
   a. Modeling using examples
   b. Differential calculus in economics
   c. Physical-technical applications
   d. Extreme value tasks
6. Introduction to integral calculus
   a. Area calculation and definite integrals
   b. Fundamental theorem of calculus
   c. Indefinite integrals
   d. Improper integrals
   e. Integration techniques
   f. Solid of revolution
7. Applications of integral calculus
8. Taylor series, infinite series
9. Complex numbers

[*updated 02.07.2019*]

Teaching methods/Media:

Lecture:

_ Lecture at the blackboard, projector
_ Demonstrations with the Maple computer algebra system
_ Regularly revised lecture notes will be published for the module and additional written materials will be made available electronically.
_ Lecture notes and materials are available electronically.
_ Discussion forum on the Internet

Exercises

_ Exercises will be provided weekly and solved independently.
_ Mr. Ohligschläger will offer a voluntary tutorial in which the sample solutions of exercises will be discussed and worked on in teams.

Computers/software that will be used in the course and/or can and should be used by students for preparation and follow-up:

_ Programmable calculator
_ Maple computer algebra system

[*updated 02.07.2019*]

Recommended or required reading:

_ Papula, Lothar: Mathematik für Ingenieure und Naturwissenschaftler, Band 1, 13. Auflage, Vieweg + Teubner Verlag, 2011

_ Papula, Lothar: Mathematik für Ingenieure und Naturwissenschaftler _ Anwendungsbeispiele; 6. Auflage, Vieweg + Teubner Verlag, 2012

_ Meyberg, K./Vachenauer, P.: Höhere Mathematik 1; 6. Auflage, Springer Verlag, 2001

_ Neunzert, H./Eschmann, W.G. u.a.: Analysis 1; 3. Auflage, Springer Verlag, 1996

_ Leupold, W. u.a.: Mathematik _ Ein Studienbuch für Ingenieure, Band 1; 2. Auflage, Hanser Fachbuchverlag, 2003

_ Preuß W./Wenisch, G.: Lehr- und Übungsbuch Mathematik, Band 1; 3. Auflage, Hanser Fachbuchverlag, 2003

_ Preuß W./Wenisch, G.: Lehr- und Übungsbuch Mathematik, Band 2; 3. Auflage, Hanser Fachbuchverlag, 2003

_ Bartsch, Hans-Jochen: Taschenbuch mathematischer Formeln für Ingenieure und Naturwissenschaftler; 22. Auflage, Carl Hanser Verlag, 2011

_ Papula, Lothar: Mathematische Formelsammlung für Ingenieure und Naturwissenschaftler; 10. Auflage, Vieweg + Teubner Verlag, 2009

_ Teubner-Taschenbuch der Mathematik Bd.1; 2. Auflage, Vieweg + Teubner Verlag, 2003

[*updated 02.07.2019*]

Mathematics II

Module name (EN): Mathematics II
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc265
Hours per semester week / Teaching method: 4V+2U (6 hours per week)
ECTS credits: 5
Semester: 2
Mandatory course: yes
Language of instruction: German
Assessment: Written or oral examination. The type of examination will be announced at the beginning of the course.
Curricular relevance: WIBASc265 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 2, mandatory course
Workload: 90 class hours (= 67.5 clock hours) over a 15-week period. The total student study time is 150 hours (equivalent to 5 ECTS credits). There are therefore 82.5 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): WIBASc165 Mathematics I [*updated 20.01.2020*]

Recommended as prerequisite for:
WIBASc-525-625-FÜ12 Using Mathematical Software
WIBASc-525-625-FÜ19 Simulation II
WIBASc-525-625-FÜ23 Simulation
WIBASc345 Design Technology / CAD
WIBASc445 Electrical Engineering
WIBASc515 Automation Engineering
WIBASc525-625-FÜ27 Mathematics III
WIBASc525-625-Ing22
[*updated 11.02.2020*]

Module coordinator:
Prof. Dr. Frank Kneip

Lecturer:
Prof. Dr. Frank Kneip (lecture)
Prof. Dr. Frank Ulrich Rückert (lecture)
Michael Ohligschläger (exercise)
[*updated 20.01.2020*]

Learning outcomes:
_ After successfully completing this module, students will be able to solve theoretical, physical-technical and economic questions that are based on vector and matrix calculations.
_ They will be able to assess the solvability of linear systems of equations and name possible solutions.
_ Students will have mastered the technique of partial derivation of functions in marginals.
_ They will be able to analyze and solve selected differential equations.
_ And, they will have learned to mathematically model and solve physical-technical, as well as economic questions and interpret the results.
[*updated 02.07.2019*]

Module content:

1. Basics of vector analysis
a. Vector space, vectors
b. Linear independence
c. Coordinate transformation
d. Scalar and vector product
e. Lines and planes
f. Distance, angle and section calculations
g. Vector analysis applications

2. Functions in Rn

3. Basics of matrix calculation
a. Elementary matrix operations
b. Geometric transformations
c. Inverse matrix
d. Matrix calculation applications

4. Solving linear systems of equations
a. Gaussian elimination
b. Unique, ambiguous and unsolvable systems
c. Solvability criterion
d. Simultaneous solution of systems of equations
e. Inverse matrix

5. Differential calculus in Rn:
a. Partial derivatives
b. Applications of differential calculus in Rn

6. Differential equations

[*updated 02.07.2019*]

Teaching methods/Media:

Lecture:
_ Lecture at the blackboard, projector
_ Demonstrations with the Maple computer algebra system
_ Regularly revised lecture notes will be published for the module and additional written materials will be made available electronically.
_ Lecture notes and materials will be available electronically.
_ Discussion forum on the Internet

Exercises
_ Exercises will be provided weekly and solved independently.
_ Mr. Ohligschläger will conduct a voluntary practice session where students will be able to work on sample solutions to the exercises on the board and in teams.
Computers/software that will be used in the course and/or can and should be used by students for preparation and follow-up:

_ Programmable calculator
_ Computer algebra system Maple
[*updated 02.07.2019*]

Recommended or required reading:
_ Papula, Lothar: Mathematik für Ingenieure und Naturwissenschaftler, Band 1; 13. Auflage, Vieweg + Teubner Verlag, 2011
_ Papula, Lothar: Mathematik für Ingenieure und Naturwissenschaftler, Band 2; 13. Auflage, Vieweg + Teubner Verlag, 2011
_ Papula, Lothar: Mathematik für Ingenieure und Naturwissenschaftler _ Anwendungsbeispiele;
6. Auflage, Vieweg + Teubner Verlag, 2012
_ Leupold, W. u.a.: Mathematik _ Ein Studienbuch für Ingenieure, Band 2; 2. Auflage, Fachbuchverlag Leipzig - Hanser München, 2006
_ Meyberg, K./Vachenauer, P.: Höhere Mathematik 1; 6. Auflage, Springer Verlag, 2001
_ Neunzert, H./Eschmann, W.G. u.a.: Analysis 2; 3. Auflage, Springer Verlag, 1998
_ Preuß W./Wenisch, G.: Lehr- und Übungsbuch Mathematik, Band 2; 3. Auflage, Fachbuchverlag Leipzig - Hanser München, 2003
_ Preuß W./Wenisch, G.: Lehr- und Übungsbuch Mathematik, Band 3; 2. Auflage, Fachbuchverlag Leipzig - Hanser München, 2001
_ Bartsch, Hans-Jochen: Taschenbuch mathematischer Formeln für Ingenieure und Naturwissenschaftler; 22. Auflage, Carl Hanser Verlag, 2011
_ Papula, Lothar: Mathematische Formelsammlung für Ingenieure und Naturwissenschaftler; 10. Auflage, Vieweg + Teubner Verlag, 2009
_ Teubner-Taschenbuch der Mathematik Bd.1; 2. Auflage, Vieweg + Teubner Verlag, 2003
[*updated 02.07.2019*]

Physics

Module name (EN): Physics
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc145
Hours per semester week / Teaching method: 2V+2U (4 hours per week)
ECTS credits: 5
Semester: 1
Mandatory course: yes
Language of instruction: German
Assessment: Written exam (1 point can be achieved by calculating an exercise in advance)
Curricular relevance: WIBASc145 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 1, mandatory course
Workload: 60 class hours (= 45 clock hours) over a 15-week period. The total student study time is 150 hours (equivalent to 5 ECTS credits). There are therefore 105 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): None.

Recommended as prerequisite for:
WIBASc-525-625-FÜ19 Simulation II
WIBASc-525-625-FÜ23 Simulation
WIBASc-525-625-Ing18
WIBASc-525-625-Ing19 Fluid Energy Machines
WIBASc-525-625-Ing21 Fluid Dynamics
WIBASc-525-625-Ing8 Elements of Technical Products
WIBASc-525-625-Ing9 Introduction to Energy Technology
WIBASc235 Engineering Mechanics I
WIBASc345 Design Technology / CAD
WIBASc435 Thermodynamics
WIBASc445 Electrical Engineering
WIBASc515 Automation Engineering
WIBASc525-625-Ing22
[*updated 11.02.2020*]

Module coordinator:
Prof. Dr. Rudolf Friedrich

Lecturer:
Prof. Dr. Rudolf Friedrich
Prof. Dr. Frank Ulrich Rückert
Torsten Schmidt
[*updated 10.02.2020*]

Learning outcomes:
- After successfully completing this module, students will be familiar with basic physical relationships (mechanics).
- They will understand physics in engineering practice and in everyday life.
- Students will be able to transfer the acquired knowledge to other engineering subjects.
- They will be able to describe complex motions mathematically.
- They will be able to set up force and energy balances in order to assess technical systems.

[*updated 02.07.2019*]

Module content:
1. Sizes and units
2. Kinematics of point masses
3. Dynamics of mass points
4. Work, energy, power
5. Collision processes
6. Circular motion
7. Mechanical oscillations

[*updated 02.07.2019*]

Teaching methods/Media:
Printed lecture notes (regularly revised), blackboard with additional practical examples, exercise sheets
[*updated 02.07.2019*]

Recommended or required reading:
_ Hering, E./ Martin, R./ Stohrer, M.: Physik für Ingenieure, 11. Auflage, VDI-Verlag, 2012
_ Hilscher, H. (1998): Physikalische Freihandexperimente, Band 1+2, Aulis Verlag Deubner.
_ Lindner, H.: Physik für Ingenieure, 18. Auflage, Carl Henser Verlag, 2010
_ Tipler / Mosca / Pelte: Physik für Wissenschaftler und Ingenieure, 6. Auflage, Spektrum Akademischer Verlag, 2009
[*updated 02.07.2019*]

Principles of Business Administration I (BWL I)

Module name (EN): Principles of Business Administration I (BWL I)
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc115
Hours per semester week / Teaching method: 2V+2U (4 hours per week)
ECTS credits: 5
Semester: 1
Mandatory course: yes
Language of instruction: German
Assessment: Written exam
Curricular relevance: WIBASc115 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 1, mandatory course
Workload: 60 class hours (= 45 clock hours) over a 15-week period. The total student study time is 150 hours (equivalent to 5 ECTS credits). There are therefore 105 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): None.

Recommended as prerequisite for:
WIBASc-525-625-FÜ20 Market Segmentation and Other Marketing and Market Research Questions in Practice (Seminar)
WIBASc-525-625-FÜ21 Starting a Business - "5 Euro-Business"
WIBASc-525-625-FÜ26 Planning a Production Plant
WIBASc-525-625-FÜ32 Technology and Innovation Management
WIBASc-525-625-FÜ7 Moderation and Leadership (Seminar)
WIBASc-525-625-Ing24
WIBASc-525-625-W12 Current Topics and Challenges in Business Enterprises (Seminar)
WIBASc-525-625-W5 Business Planning (Seminar)
WIBASc-525-625-W6 Consulting (Seminar, English)
WIBASc215
WIBASc225 Procurement Logistics and Technical Sales and Distribution
WIBASc315 Cost Accounting
WIBASc415 Controlling und Accounting
[*updated 11.02.2020*]

Module coordinator:
Prof. Dr. Andy Junker

Lecturer:
Lehrbeauftragte
Stefanie Scherer
[*updated 20.01.2020*]

Learning outcomes:
After successfully completing this module students will:
_ be able to reflect upon the basic concepts of business administration and have an overview of the sub-areas of this discipline.
_ have a basic understanding of entrepreneurial thinking and actions in the areas of production and cost theory, bookkeeping, accounting, legal forms, marketing and organization.
_ have mastered basic concepts in the sub-areas of production and cost theory, as well as bookkeeping, accounting, legal forms, marketing and organization.
_ be able to use the concepts and tools learned in the various sub-areas to simple company examples.
_ be able to draw preliminary conclusions to simple business problems by using the concepts and tools learned.
[*updated 13.09.2018*]

Module content:
Entrepreneurial Thinking and Action
1. The economic principle
2. Basics (the concept and structure of business administration, classification within the scientific system, economic principle), operation and enterprise
3. Basic terms and concepts from the field of business administration (money and circulation of goods, stock and flow)
4. Shareholder and stakeholder value approach
5. Company types/sizes of companies
6. Medium-sized companies
7. Family-run businesses

Production and Cost Theory
1. Cost accounting and results accounts
2. Properties of production factors (substitutional, limitational, linear)
3. Production (different types), cost and production functions

Bookkeeping
1. Principles of proper accounting
2. Posting selected business transactions
3. Preparing annual financial statements

Accounting
1. Corporate accounting/basic terms
2. Principles of cost accounting
3. Cost elements, cost centers and cost unit accounting
4. Investment and financing within a company

Legal Forms
1. Description of the main types of legal forms
2. Advantages and disadvantages of different legal forms
3. Requirements for founding a business
4. Capital requirements

Marketing
1. Basics (development, development phases, market and market sizes, _)
2. Consumer purchasing behavior (influencing factors, purchasing decision process, types of CEPs)
3. Strategic marketing planning (planning process, analysis methods, marketing strategies, market segmentation, positioning)
4. Product policy (product innovation, product variation, product elimination, brand management)
5. Price policy (price formation, price change, price differentiation, price strategies)
6. Communication policy (media advertising, sales promotion, direct marketing, public relations, below the line_)

Organization
1. Basic concepts of business organization
2. Organizational structure (single-line and multi-line systems, matrix organisation, staff positions, management margins)
3. Process organization (sequence diagram, flowchart, bar chart, network plan, throughput times)
4. New forms of business organization (project organization, virtual teams, etc.)
5. Organizational development (value chain, business re-engineering)
[*updated 13.09.2018*]

Teaching methods/Media:
Individual topics will be illustrated and deepened by using real company examples and exercises. We will focus on using the concepts and tools learned. The course will be accompanied by a script with exercises.
[*updated 13.09.2018*]

Recommended or required reading:

_ Bierle, Klaus: Grundlagen der BWL, Band I (_Übersichtsdarstellungen_), 9. Auflage, Saarbrücken, 2002.
_ Bierle, Klaus: Grundlagen der BWL, Band II (_Aufgaben und Lösungen_), 9. Auflage, Saarbrücken, 2002
_ Olfert, Klaus; Horst-Joachim Rahn: Einführung in die Betriebswirtschaftslehre, 10. Auflage, Kiehl, Verlag NWB, 2010.
_ Schierenbeck, Henner, Wöhle, Claudia: Grundzüge der Betriebswirtschaftslehre, Verlag Oldenbourg, 2008.
_ Vahs, Dietmar, Jan Schäfer-Kunz: Einführung in die Betriebswirtschaft, Verlag Schäffer-Poeschel, 2007.
_ Wöhe, Günter: Einführung in die Allgemeine Betriebswirtschaftslehre, 24. Auflage, Verlag Vahlen, München 2010.
[*updated 13.09.2018*]

Procurement Logistics and Technical Sales and Distribution

Module name (EN): Procurement Logistics and Technical Sales and Distribution
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc225
Hours per semester week / Teaching method: 2V+2U (4 hours per week)
ECTS credits: 5
Semester: 2
Mandatory course: yes
Language of instruction: German
Assessment: Written exam
Curricular relevance: WIBASc225 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 2, mandatory course
Workload: 60 class hours (= 45 clock hours) over a 15-week period. The total student study time is 150 hours (equivalent to 5 ECTS credits). There are therefore 105 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): WIBASc115 Principles of Business Administration I (BWL I) WIBASc125 Industrial Management [*updated 20.01.2020*]

Recommended as prerequisite for:
WIBASc-525-625-FÜ20 Market Segmentation and Other Marketing and Market Research Questions in Practice (Seminar)
WIBASc-525-625-FÜ36 Technology and Innovation Management (English)
WIBASc-525-625-FÜ7 Moderation and Leadership (Seminar)
WIBASc525-625-W11 Technical Sales and Distribution (Seminar)
[*updated 11.02.2020*]

Module coordinator:
Prof. Dr. Udo Venitz

Lecturer:
Prof. Dr.-Ing. Christian Köhler
[*updated 20.01.2020*]

Learning outcomes:
Procurement Logistics:
After successfully completing this module students will:
_ be able to recognize the efficiency potential of logistics _ especially procurement logistics and make targeted use of it
_ have mastered common methods of conventional purchasing
_ understand the efficiency potential of JIT purchasing and can apply it
_ be competent enough to select and use the optimal mode of transport in procurement

Technical Sales and Distribution:
After successfully completing this module students will:
_ be familiar with the theoretical and practical principles of sales and distribution, as well as the empirical results of distribution research
_ have insight into the topic of sales and distribution based on a well-balanced mixture of theoretical knowledge and practical experience
_ be able to list characteristics of capital goods markets and determine the resulting implications for the strategic and operative orientation of sales and marketing
_ be able to draw on both generally applicable and industry-specific sales knowledge and apply the instruments and methods discussed.
[*updated 13.09.2018*]

Module content:
Procurement Logistics:
1. Basics
1.1 Terms
1.2 Success factors
2. Procurement logistics
2.1 Basics
2.2 Needs assessment
2.3 Procurement/Purchasing
2.4 Just-in-time procurement (JIT)
3. Transportation logistics
3.1 Own-account transport
3.2 Commercial freight transport
3.3 Rail
3.4 Inland vessels
3.5 Seagoing vessels
3.6 Air freight

Accompanying exercises and case studies on all topics

Technical Sales and Distribution:
1. Conceptual and theoretical prinicples of sales and distribution
2. Structuring and managing sales and distribution
3. Personal selling/Communication techniques
4. Business-to-business marketing and technical sales
5. Special challenges of industrial goods marketing
6. Preparing quotes, calculating and processing orders for technical goods

[*updated 13.09.2018*]

Teaching methods/Media:
Procurement Logistics:
A regularly revised PowerPoint presentation, also available to students as electronic lecture notes, will be used for the module. On a case-by-case basis, video sequences will illustrate what has been learned in the course of the module.

Technical Sales and Distribution:
A regularly revised PowerPoint presentation, also available to students as electronic lecture notes, will be used for the module. On a case-by-case basis, video sequences will illustrate what has been learned in the course of the module.
[*updated 13.09.2018*]

Recommended or required reading:

Procurement Logistics:

_ Arnold, D./Isermann, H./Kuhn, A.: Handbuch Logistik; 3. Auflage; Springer, 2008

_ Clausen, U./Vastag, A.: Handbuch der Verkehrs- und Transportlogistik; 2. Auflage, Springer, 2008

_ Ehrmann, H: Logistik; 6. Auflage; Kiehl Verlag; 2008

_ Gudehus, T: Logistik I und II; 3. Aufl.; Springer Verlag; 2006

_ Günther/Tempelmeier: Produktion und Logistik; 8. Auflage; Springer, 2009

_ Koether, R. u.a: Taschenbuch der Logistik; 3. Auflage; Hanser; 2008

_ Oelfke, W.: Speditionsbetriebslehre;39. Auflage; Bildungsverlag Eins; 2010

_ Pfohl, H.: Logistiksysteme; Betriebswirtschaftliche Grundlagen; 8. Auflage; Springer; 2009

_ Schulte, C.: Logistik; Vahlen; 5. Auflage; 2009

_ Wannenwetsch: Integrierte Materialwirtschaft und Logistik; Springer Verlag; 4. Auflage; 2009

_ Weber,J.: Logistikkostenrechnung; 3. Auflage; Springer Verlag; 2012

Technical Sales and Distribution:

_ Backhaus, K./Voeth, M.: Industriegütermarketing, 9. Auflage, Vahlen, 2009

_ Klimke, R./ Faber, M.: Erfogreicher Lösungsvertrieb; Gabler, 2008

_ Kuhlmann, E. (2001): Industrielles Vertriebsmanagement; 1. Auflage, Vahlen Verlag, 2001

_ Winkelmann, P.: Marketing und Vertrieb, 7. Auflage, Oldenbourg Wissenschaftsverlag, 2010

[*updated 13.09.2018*]

Project Management and Communication

Module name (EN): Project Management and Communication
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc545
Hours per semester week / Teaching method: 1SU+1V+2U (4 hours per week)
ECTS credits: 5
Semester: 5
Mandatory course: yes
Language of instruction: German
Assessment: Communication: presentation with written composition Project management: written composition with presentation (40%) and written exam (60%)
Curricular relevance: WIBASc545 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 5, mandatory course
Workload: 60 class hours (= 45 clock hours) over a 15-week period. The total student study time is 150 hours (equivalent to 5 ECTS credits). There are therefore 105 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): None.
Recommended as prerequisite for: WIBASc-525-625-FÜ36 Technology and Innovation Management (English) [*updated 11.02.2020*]
Module coordinator: Prof. Dr. Michael Krämer

Lecturer:
Prof. Dr. Michael Krämer
[*updated 20.01.2020*]

Learning outcomes:
Project management:
After successfully completing this module students will:
_ be able to structure, plan, monitor and control projects
_ be able to determine individual project steps (structured by phases), estimate the duration of each phase resp. step and define the interdependencies between activities
_ be able to plan and allocate resources
_ be able to apply current network techniques and the associated software tools

Communication:
After successfully completing this module students will:
_ be able to name and explain the central characteristics of communication
_ have mastered the advantages and disadvantages of different presentation styles and techniques through their own experience
_ have internalized different aspects of moderation
_ have the ability to distinguish the particularities of communication and presentation situations in the engineering environment from those of other environments and know how to deal with them appropriately in order to achieve their goals.
An excursion will be offered in connection with the course.
[*updated 13.09.2018*]

Module content:
Project management:
1. Project structure and project process organization
2. Project structure planning
3. Specifications and requirements
4. Estimation of effort and costs
5. Scheduling and process planning
6. Critical path method
7. Project monitoring and control
8. Investment projects
9. Project management software

Communication:
1. Principles of communication
2. Communication theories
3. Basics of rhetoric
4. Communication in the engineering environment
5. Body language
6. Presentation techniques
7. Moderation and mediation
[*updated 13.09.2018*]

Teaching methods/Media:
Project management:
Slides, lecture notes, software: MS project, blackboard

Communication:
Regularly revised lecture notes will be published for this course. DVDs and multimedia learning software will support the development of the learning content.
[*updated 13.09.2018*]

Recommended or required reading:
Project management:
_ Seibert, S.: Technisches Management, Teubner Verlag, 1998
_ Litke, H.D.: Projektmanagement, 5. Auflage, Hanser Verlag, 2007

Kommunikation (Auszug):
_ Seibert, J. W.: Visualisieren, Präsentieren, Moderieren, erw. 30. Aufl., Gabal 2012
_ Vogt, Gustav: Erfogreiche Rhetorik, 3. Auflage Oldenburg Verlag 2010
_ Molcho, Samy: Das ABC der Körpersprache, Ariston 2011
_ Ebel, H.F. / Bliefert, C. / Kellersohn, A.: Erfolgreich kommunizieren _ Ein Leitfaden für Ingenieure, 1. Auflage, Wiley VCH Verlag, 2000
_ Meinholz, Heinz et al.: Führungskraft Ingenieur, Teubner 2010
_ Tenopir; Carol, Communication Patterns of Engineers; John Wiley & Sons 2004
_ Watzlawick, P., et al., Menschliche Kommunikation, 12. Auflage, Huber 2011
_ Schulz von Thun, Friedemann et al., Miteinander reden - Kommunktionspsychologie für Führungskräfte; ROWOHLT 2008
_ Lecture notes
[*updated 13.09.2018*]

Statistics

Module name (EN): Statistics
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc255
Hours per semester week / Teaching method: 2V+2U (4 hours per week)
ECTS credits: 5
Semester: 2
Mandatory course: yes
Language of instruction: German
Assessment: Written or oral examination. The type of examination will be announced on the notice board at the beginning of the course.
Curricular relevance: WIBASc255 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 2, mandatory course
Workload: 60 class hours (= 45 clock hours) over a 15-week period. The total student study time is 150 hours (equivalent to 5 ECTS credits). There are therefore 105 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): WIBASc165 Mathematics I [*updated 10.02.2020*]

Recommended as prerequisite for:
WIBASc-525-625-FÜ12 Using Mathematical Software
WIBASc-525-625-FÜ15 Market Research
WIBASc-525-625-FÜ19 Simulation II
WIBASc-525-625-FÜ22 Decision theory
WIBASc-525-625-FÜ23 Simulation
WIBASc-525-625-FÜ29 Introduction to Six Sigma
WIBASc515 Automation Engineering
[*updated 11.02.2020*]

Module coordinator:
Prof. Dr. Susan Pulham

Lecturer:
Prof. Dr. Susan Pulham
[*updated 10.02.2020*]

Learning outcomes:
After successfully completing this module students will:
_ be able to process mass data with methods of descriptive statistics
_ know how to interpret the results of the above
_ be able to recognize stochastic situations as such and can model them by stochastic means
_ have acquired the ability to calculate probabilities, determine suitable distribution forms and calculate distribution parameters
_ have a basic understanding of inductive statistics, especially methods of estimating parameters and testing hypotheses
[*updated 02.07.2019*]

Module content:
1. Descriptive statistics:
_ Basic terms
_ One- and two-dimensional frequency distributions
_ Measures of location and measures of spread/dispersion
_ Calculating correlation and regression

2. Probability calculus
_ Basic terms: random experiment, events, probability
_ Modeling
_ Multi-stage random experiments
_ Conditional probability and independence
_ Random variables, expected value, variance, normal distribution and limit theorems

3. Basic elements of the inferential statistics
_ Problems of inferential statistics
_ Point and interval estimates
_ Hypothesis tests
[*updated 02.07.2019*]

Teaching methods/Media:
Excel files with sample material, press reports and statistical studies will be used. Regularly revised lecture notes will be available for this course.
[*updated 02.07.2019*]

Recommended or required reading:
_ Dietmaier, C.: Mathematik für Wirtschaftsingenieure, 1. Auflage, Carl Hanser Verlag, 2005
_ Eckstein, Peter: Statistik für Wirtschaftswissenschaftler, 3. Auflage, Gabler, Wiesbaden, 2011
_ Fischer, Gerd: Stochastik einmal anders; 1. Auflage, Vieweg+Teubner Verlag, Wiesbaden, 2005.
_ Henze, Norbert: Stochastik für Einsteiger; 9. Auflage, Vieweg Verlag, Wiesbaden, 2011.
_ Pulham, Susan: Statistik für Nicht-Mathematiker, Gabler, Wiesbaden, 2011
_ Sachs, Michael: Wahrscheinlichkeitsrechnung und Statistik für Ingenieurstudenten an Fachhochschulen; 3. Auflage, Carl Hanser Verlag, 2009
[*updated 02.07.2019*]

Thermodynamics

Module name (EN): Thermodynamics
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc435
Hours per semester week / Teaching method: 2V+2U (4 hours per week)
ECTS credits: 5
Semester: 4
Mandatory course: yes
Language of instruction: German
Assessment: Written exam (1 point can be achieved by calculating an exercise in advance)
Curricular relevance: WIBASc435 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 4, mandatory course
Workload: 60 class hours (= 45 clock hours) over a 15-week period. The total student study time is 150 hours (equivalent to 5 ECTS credits). There are therefore 105 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): WIBASc145 Physics WIBASc165 Mathematics I [*updated 01.02.2020*]
Recommended as prerequisite for: WIBASc-525-625-Ing10 Principles of Supply Networks and Systems WIBASc-525-625-Ing9 Introduction to Energy Technology [*updated 10.02.2020*]

Module coordinator:
Prof. Dr. Frank Ulrich Rückert

Lecturer:
Prof. Dr. Dirk Hübner
Prof. Dr. Frank Ulrich Rückert
[*updated 01.02.2020*]

Learning outcomes:
- After successfully completing this module, students will have a sound understanding of thermodynamics.
- They will have additional knowledge with regard to material and energy balancing.
- Students will be able to apply both the knowledge acquired in this course and the knowledge acquired regarding real power plant processes from the lecture "Einführung in die Energietechnik".
- They will be able to assess the efficiency of technical systems.
- They will be able to balance and evaluate technical processes using the 1st and 2nd laws of thermodynamics.
- They will have experience in handling thermal and caloric state variables.
- They will be familiar with different thermodynamic systems and can apply the different state changes to them.
- They will be able to describe and evaluate Carnot cycle processes with simple state changes

[*updated 13.09.2018*]

Module content:
1. State variables
2. Thermodynamic systems
3. Materials balance
4. Forms of energy
5. Energy balance (1st law of thermodynamics)
6. Reversibility and entropy (2nd law of thermodynamics)
7. Isobaric, isothermic, isochoric and isentropic state changes
8. Thermodynamic cycle
9. Vapor
10. Heat transfer
11. Combustion theory

[*updated 13.09.2018*]

Teaching methods/Media:
Printed lecture notes (regularly revised), blackboard with additional practical examples, exercise sheets.
[*updated 13.09.2018*]

Recommended or required reading:

_ Baehr, H.D./Kabelac, S.: Thermodynamik, 12. Auflage, Springer Verlag, 2012

_ Böckh/Cizman/Schlachter: Grundlagen der technischen Thermodynamik, Fortis Verlag, 1999

_ Bosnjakovic/Knoche: Technische Thermodynamik, Steinkopff, Darmstadt, 1992

_ Cerbe/Hoffmann: Einführung in die Thermodynamik, Hanser Verlag, 2002

_ Langeheinecke/Jany/Sapper: Thermodynamik für Ingenieure, Vieweg, 2004

[*updated 13.09.2018*]

WIBASc525 - Compulsory Elective Module / Specialization

Module name (EN): WIBASc525 - Compulsory Elective Module / Specialization
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc525
Hours per semester week / Teaching method: 2V+5U+5PA (12 hours per week)
ECTS credits: 15
Semester: 5
Mandatory course: yes
Language of instruction: German
Assessment: The type of examination will be announced at the beginning of the course by the lecturer.
Curricular relevance: WIBASc525 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 5, mandatory course
Workload: 180 class hours (= 135 clock hours) over a 15-week period. The total student study time is 450 hours (equivalent to 15 ECTS credits). There are therefore 315 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): None.
Recommended as prerequisite for:
Module coordinator: Studienleitung

Lecturer: Studienleitung
[*updated 08.05.2012*]

Learning outcomes:
See the list of compulsory elective courses in the catalog of compulsory elective courses. Each compulsory elective module may only be taken once.
[*updated 02.07.2019*]

Module content:
See the list of compulsory elective courses in the catalog of compulsory elective courses. Each compulsory elective module may only be taken once.
[*updated 02.07.2019*]

Teaching methods/Media:
See the list of compulsory elective courses in the catalog of compulsory elective courses. Each compulsory elective module may only be taken once.
[*updated 02.07.2019*]

Recommended or required reading:
See the list of compulsory elective courses in the catalog of compulsory elective courses. Each compulsory elective module may only be taken once.
[*updated 02.07.2019*]

WIBASc615 - Work Experience Phase (1st half)

Module name (EN): WIBASc615 - Work Experience Phase (1st half)
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc615
Hours per semester week / Teaching method: -
ECTS credits: 15
Semester: 6
Mandatory course: yes
Language of instruction: German
Assessment: Activity report
Curricular relevance: WIBASc615 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 6, mandatory course
Workload: The total student study time for this course is 450 hours.
Recommended prerequisites (modules): None.
Recommended as prerequisite for:
Module coordinator: Studienleitung
Lecturer: Studienleitung [*updated 08.05.2012*]

Learning outcomes:
After successfully completing this module students will:
_ be able to put their theoretical knowledge into practice in solving concrete problems.
_ be able to rethink what they have already learned and use it in practice.
_ have the ability to develop theories and solutions based on their knowledge.
_ have gained well-founded practical experience and can assert themselves in an operational environment.
[*updated 13.09.2018*]

Module content:
Procedure: The student must find an employer, either independently or with the support of the university, who will cooperate with him/her during the practical phase. The employment contract signed by the company must be submitted to the office responsible for internships/practical study at the respective faculty. In addition, the student must have a supervising professor whose name must also be passed on to the office responsible for internships/practical study at the respective faculty.

During the practical phase, the supervising professor serves as the student´s contact person.

At the end of the practical phase, the student must present the office responsible for internships/practical study at the respective faculty with an employer´s reference that will then be passed on to the supervising professor in copy. In addition, a five-page report on the completion of the practical study phase (consisting of WIBASc615 and WIBASc715) must be prepared. On the basis of the student assessment in the employer´s reference and the supervising professor´s impression, the supervising professor will then accept or reject the work performed as a practical phase.

The content depends on the individual task and should be coordinated between the student, the university professor and the company.
[*updated 13.09.2018*]

Teaching methods/Media:

[*updated 13.09.2018*]

Recommended or required reading:

[*updated 13.09.2018*]

WIBASc625 - Compulsory Elective Module / Specialization

Module name (EN): WIBASc625 - Compulsory Elective Module / Specialization
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc625
Hours per semester week / Teaching method: 2V+5U+5PA (12 hours per week)
ECTS credits: 15
Semester: 6
Mandatory course: yes
Language of instruction: German
Assessment: The type of examination will be announced at the beginning of the course by the lecturer.
Curricular relevance: WIBASc625 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 6, mandatory course
Workload: 180 class hours (= 135 clock hours) over a 15-week period. The total student study time is 450 hours (equivalent to 15 ECTS credits). There are therefore 315 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): None.
Recommended as prerequisite for:
Module coordinator: Studienleitung

Lecturer: Studienleitung
[*updated 08.05.2012*]

Learning outcomes:
See the list of compulsory elective courses in the catalog of compulsory elective courses. Each compulsory elective module may only be taken once.
[*updated 02.07.2019*]

Module content:
See the list of compulsory elective courses in the catalog of compulsory elective courses. Each compulsory elective module may only be taken once.
[*updated 02.07.2019*]

Teaching methods/Media:
See the list of compulsory elective courses in the catalog of compulsory elective courses. Each compulsory elective module may only be taken once.
[*updated 02.07.2019*]

Recommended or required reading:
See the list of compulsory elective courses in the catalog of compulsory elective courses. Each compulsory elective module may only be taken once.
[*updated 02.07.2019*]

WIBASc715 - Work Experience Phase (2nd half)

Module name (EN): WIBASc715 - Work Experience Phase (2nd half)
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc715
Hours per semester week / Teaching method: -
ECTS credits: 15
Semester: 7
Mandatory course: yes
Language of instruction: German
Assessment: Activity report
Curricular relevance: WIBASc715 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 7, mandatory course
Workload: The total student study time for this course is 450 hours.
Recommended prerequisites (modules): None.
Recommended as prerequisite for:
Module coordinator: Studienleitung
Lecturer: Studienleitung [*updated 08.05.2012*]

Learning outcomes:
After successfully completing this module students will:
_ be able to put their theoretical knowledge into practice by solving concrete problems.
_ be able to rethink what they have already learned and use it in practice.
_ have the ability to develop theories and solutions based on their knowledge.
_ have gained well-founded practical experience and can assert themselves in an operational environment.
[*updated 13.09.2018*]

Module content:
Procedure: The student must find an employer, either independently or with the support of the university, who will cooperate with him/her during the practical phase. The employment contract signed by the company must be submitted to the office responsible for internships/practical study at the respective faculty. In addition, the student must have a supervising professor, whose name must also be passed on to the office responsible for internships/practical study at the respective faculty.

During the practical phase, the supervising professor serves as the student´s contact person.

At the end of the practical phase, the student must present the office responsible for internships/practical study at the respective faculty with an employer´s reference that will then be passed on to the supervising professor in copy. In addition, a five-page report on the completion of the practical study phase (consisting of WIBASc615 and WIBASc715) must be prepared. On the basis of the student assessment in the employer´s reference and the supervising professor´s impression, the supervising professor will then accept or reject the work performed as a practical phase.

The content depends on the individual task and should be coordinated between the student, the university professor and the company.
[*updated 13.09.2018*]

Teaching methods/Media:

[*updated 13.09.2018*]

Recommended or required reading:

[*updated 13.09.2018*]

WIBASc725 - Bachelor Thesis

Module name (EN): WIBASc725 - Bachelor Thesis
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc725
Hours per semester week / Teaching method: -
ECTS credits: 12
Semester: 7
Mandatory course: yes
Language of instruction: German/English
Assessment: Bachelor Thesis
Curricular relevance: WIBASc725 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 7, mandatory course
Workload: The total student study time for this course is 360 hours.
Recommended prerequisites (modules): None.
Recommended as prerequisite for:
Module coordinator: Studienleitung
Lecturer: Studienleitung [*updated 08.05.2012*]

Learning outcomes:
The Bachelor thesis is a special academic achievement. It proves that a student is able to work independently and according to scientific methods on an industrial engineering problem within a given period of 3 months and to prepare a thesis.
The bachelor thesis is application-oriented in that the topics of the thesis are generally based on the contents of the practical phase. It is generally recommended that students write their Bachelor thesis in cooperation with the company in which they completed their practical phase.
In their theses, students describes how they arrived at their conclusion or solution, using the knowledge gained over the course of their studies. They sum up the theories and positions for their solution.
[*updated 13.09.2018*]

Module content:
Content will may vary depending on the respective topic. However, students must do justice to the contents of an industrial engineering course of study.
[*updated 13.09.2018*]

Teaching methods/Media:
The media used will depend on the respective topic.
In principle, the thesis must be submitted in duplicate in paper form and also in electronic form (e.g. CD, DVD; accepted electronic formats are PDF, Word document, OpenOffice document).

The basic rules of scientific work must be observed in the thesis.
[*updated 13.09.2018*]

Recommended or required reading:
The selection of required reading/literature will vary depending on the topic.
[*updated 13.09.2018*]

Industrial Engineering Bachelor - optional courses

Business Planning (Seminar)

Module name (EN): Business Planning (Seminar)
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc-525-625-W5
Hours per semester week / Teaching method: 2SU+2S (4 hours per week)
ECTS credits: 5
Semester: 6
Mandatory course: no
Language of instruction: German
Assessment: Project, class presentation
Curricular relevance: WIBASc-525-625-W5 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 6, optional course
Workload: 60 class hours (= 45 clock hours) over a 15-week period. The total student study time is 150 hours (equivalent to 5 ECTS credits). There are therefore 105 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): WIBASc115 Principles of Business Administration I (BWL I) WIBASc315 Cost Accounting WIBASc325 Investment/Financing WIBASc535 Introduction to Scientific Work (with seminar) [*updated 11.02.2020*]

Recommended as prerequisite for:

Module coordinator:
Prof. Dr. Stefan Georg

Lecturer:
Prof. Dr. Stefan Georg
[*updated 11.02.2020*]

Learning outcomes:
After successfully completing this module students will:
_ know the components of a business plan.
_ be able to develop a new business idea
_ be able to create a realistic business plan.
_ be able to show the connections between individual subplans.
_ be able to present their business plan in a presentation.
[*updated 23.08.2018*]

Module content:
1. Business idea, location, legal form
2. Organization and personnel planning
3. Market analysis and market entry concept
4. Marketing plan
5. Investment, capital requirements and financial plan
6. Sales, cost and profit plan
7. Liquidity plan
8. Opportunity and risk analysis (SWOT analysis)

[*updated 23.08.2018*]

Teaching methods/Media:
As a team, students will create their own business plan. This will be accompanied by lectures and support from the lecturer. In addition, students will become familiar with the wide range of information on business plans available on the Internet, with particular emphasis on what the Federal Ministry of Economics has to offer.
[*updated 23.08.2018*]

Recommended or required reading:

_ www.sog.saarland.de und www.existenzgruender.de

_ Unterlagen zum StartUp Business Plan Wettbewerb der Sparkassen (Documents on the StartUp Business Plan Competition from the Sparkasse)

_ Arnold, J.: Existenzgründung: Businessplan und Chancen, UVIS Verlag 2013

_ Georg, S.: Fragen und Antworten zur Existenzgründung, CreateSpace 2014

_ Lutz, A.;Bussler, Chr.: Die Business Plan-Mappe: 40 Beispiele aus der Praxis, Linde Verlag, 4. Auflage 2015

_ Vogelgesang, E.; Fink, Chr., Baumann, M.: Existenzgründung und Business Plan, Erich-Schmidt-Verlag, 2015

[*updated 23.08.2018*]

CAD in CATIA - The Basics

Module name (EN): CAD in CATIA - The Basics

Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013

Module code: WIBASc525-625-Ing13

Hours per semester week / Teaching method: 1V+1U (2 hours per week)

ECTS credits: 3

Semester: 5

Mandatory course: no

Language of instruction:
German

Assessment:
Written exam

Curricular relevance:
WIBAS-450/550-M2g Industrial Engineering, Bachelor, ASPO 01.10.2007, semester 5, optional course
WIBASc525-625-Ing13 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 5, optional course

Workload:
30 class hours (= 22.5 clock hours) over a 15-week period.
The total student study time is 90 hours (equivalent to 3 ECTS credits).
There are therefore 67.5 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
WIBASc345 Design Technology / CAD
[*updated 20.01.2020*]

Recommended as prerequisite for:

Module coordinator:
Prof. Dr. Dirk Hübner

Lecturer: Prof. Dr. Dirk Hübner
[*updated 10.01.2013*]

Learning outcomes:
After successfully completing this module, students will be familiar with the working environment of the CATIA V5 software. They will be able to reproduce individual parts and assemblies on the basis of technical drawings and design or produce new ones in virtual space. In doing so, they will apply basic systematic procedures and develop their own systematics. Students will be able to use the software to produce standard-compliant individual part and assembly drawings.
[*updated 02.07.2019*]

Module content:
1. The CATIA working environment
2. General information on the handling of the software
3. The PART DESIGN module (creation of individual parts)
4. The systematics of creating components in virtual 3D space
5. The ASSEMBLY DESIGN module (assembly production)
6. The systematics of arranging components in virtual 3D space
7. The DRAFTING module (drafting derivation and creation)
8. The systematics of creating drawings, full and partial sections, etc.
[*updated 02.07.2019*]

Teaching methods/Media:
Lecture (im PC lab) and exercises
[*updated 02.07.2019*]

Recommended or required reading:
- Einstieg in CATIA V5, m. CD-ROM Objektorientiert konstruieren in Übungen und Beispielen, 2011, 5., überarbeitete und erweiterte Auflage, X, 496 Seiten, mit farbigen Abbildungen, Maße: 1 x 1 cm, Kartoniert (TB), Deutsch Hanser Fachbuchverlag ISBN-10: 3446422749
ISBN-13: 9783446422742

- CATIA V5-Praktikum, Arbeitstechniken der parametrischen 3D-Konstruktion, Studium Technik, 178 schw.-w. Abb., 18 schw.-w. Tab., 2., überarb. u. erw. Aufl. 2004. 209 S. m. 178 Abb. 24 cm, Hrsg. v. Peter Köhler, Kartoniert - 2., überarb. u. erw. A.

- CAD/CAM mit Catia V5, NC-Programmierung, Postprocessing, Simulation von Michael Hoffmann, ISBN-10:3-446-42284-6, EAN:9783446422841, Erscheinungstermin:02.12.2010, Verlag:Hanser Fachbuchverlag, Auflage:2. überarbeitete Auflage
[*updated 02.07.2019*]

Complementary Basics of Engineering

Module name (EN): Complementary Basics of Engineering
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc-525-625-Ing16
Hours per semester week / Teaching method: 2SU+2S (4 hours per week)
ECTS credits: 5
Semester: 5
Mandatory course: no
Language of instruction: English
Assessment: Written composition with presentation
Curricular relevance: WIBAS-450/550-M2i Industrial Engineering, Bachelor, ASPO 01.10.2007, semester 4, optional course, technical WIBASc-525-625-Ing16 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 5, optional course, technical
Workload: 60 class hours (= 45 clock hours) over a 15-week period. The total student study time is 150 hours (equivalent to 5 ECTS credits). There are therefore 105 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): WIBASc365 English I WIBASc465 English II WIBASc535 Introduction to Scientific Work (with seminar) [*updated 11.02.2020*]
Recommended as prerequisite for:

Module coordinator:
Alexander Hamman, M.Sc.

Lecturer: Alexander Hamman, M.Sc.
[*updated 07.07.2015*]

Learning outcomes:
After successfully completing this module students will:
_ be able to independently write an English-language scientific term paper and give a presentation.
_ have mastered basic techniques for imparting new knowledge.
_ have command of a basic English technical vocabulary in various scientific and technical disciplines.
_ have gained enough experience with LaTeX to prepare scientific papers with a given template.
[*updated 23.08.2018*]

Module content:
Preparation for the seminar:
_ Introduction to LaTeX
_ Using BibTex
_ Information about the characteristics and problems of the LaTeX environment TeXnicCentre
_ Clarification of special framework conditions, especially with regard to American templates

Term paper:
Participants will read and work independently on a given topic and then present their findings in accordance with the principles of proper scientific work.

Module content:
Seminar topics include, among others:
_ Mechanical engineering
_ Electrical engineering
_ Civil engineering
_ Energy engineering
_ Environmental engineering or
_ Software engineering

All of the topics will be touched upon briefly in the course of the current curriculum.
[*updated 23.08.2018*]

Recommended or required reading:
_ Murray, N. / Beglar, D.: Writing dissertations and theses; Prentice Hall International (25. Juni 2009)
_ Schlosser, J.: Wissenschaftliche Arbeiten schreiben mit LaTeX; Heidelberg [u.a.]: mitp-Verl., 2014
_ Additional literature will be announced depending on the topics dealt with in the course.
[*updated 14.03.2018*]

Consulting (Seminar, English)

Module name (EN): Consulting (Seminar, English)

Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013

Module code: WIBASc-525-625-W6

Hours per semester week / Teaching method: 1SU+1S (2 hours per week)

ECTS credits: 3

Semester: 6

Mandatory course: no

Language of instruction:
English

Assessment:
Written composition with presentation

Curricular relevance:
WIBASc-525-625-W6 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 6, optional course

Workload:
30 class hours (= 22.5 clock hours) over a 15-week period.
The total student study time is 90 hours (equivalent to 3 ECTS credits).
There are therefore 67.5 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
WIBASc115 Principles of Business Administration I (BWL I)
WIBASc215
WIBASc365 English I
WIBASc465 English II
WIBASc535 Introduction to Scientific Work (with seminar)
[*updated 11.02.2020*]

Recommended as prerequisite for:

Module coordinator:
Prof. Dr. Udo Venitz

Lecturer:
Prof. Dr. Udo Venitz
[*updated 11.02.2020*]

Learning outcomes:
After successfully completing this module students will:
_ be able to independently research a specific topic from the field of consulting resp. a consulting sub-market.
_ be able to write English-language documentation and give a presentation (assistance will be available at the beginning of the course) by themselves on a subject assigned to them.
_ be able to demonstrate their communicative skills by presenting and discussing their subject in English in front of their fellow students and the lecturer.
_ be able to follow and understand specialized lectures in English and solve problems by asking questions in English. In addition, they will have acquired a good overview of national and international consulting.
[*updated 13.09.2018*]

Module content:
1. Types of consulting/consulting markets
2. Professional and personal requirements for consultants
3. Legal foundations of consulting
4. Consulting acquisition
5. Consulting
6. Fee models
7. Communication in the consultancy process
8. International consulting
9. A closer look at consulting sub-markets

[*updated 14.03.2018*]

Teaching methods/Media:
Participants will receive a summary of each topic from their fellow classmates.
Presentations will be carried out using a laptop and projector.
[*updated 14.03.2018*]

Recommended or required reading:
_ Canibol/Hossenfelder (Hrsg.): Lünendonk Handbuch 2012; 2012
_ Deelmann, Consulting in Zahlen; epubli Verlag, 2012
_ Niedereichholz, Ch.: Unternehmensberatung; Band 1 + 2; Oldenbourg Wissenschaftsverlag, 2010
_ Niedereichholz, C. + J: Das Beratungsunternehmen; Oldenbourg Wissenschaftsverlag; 2012
_ Wohlgemuth, A.: Unternehmensberatung; 11. Auflage, vdf Hochschulverlag, 2010
[*updated 14.03.2018*]

Contemporary Issues in Business Information Systems (Seminar)

Module name (EN): Contemporary Issues in Business Information Systems (Seminar)

Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013

Module code: WIBASc-525-625-FÜ34

Hours per semester week / Teaching method: 1V+1S (2 hours per week)

ECTS credits: 3

Semester: 6

Mandatory course: no

Language of instruction:
English

Assessment:
Written composition with presentation

Curricular relevance:
WIBASc-525-625-FÜ34 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 6, optional course, general subject
Suitable for exchange students (learning agreement)

Workload:
30 class hours (= 22.5 clock hours) over a 15-week period.
The total student study time is 90 hours (equivalent to 3 ECTS credits).
There are therefore 67.5 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
WIBASc355 Computer Science / Programming
WIBASc455 Business Informatics / Operations Research
WIBASc535 Introduction to Scientific Work (with seminar)
[*updated 11.02.2020*]

Recommended as prerequisite for:

Module coordinator:
Prof. Dr. Daniel F. Abawi

Lecturer:
Prof. Dr. Daniel F. Abawi
[*updated 11.02.2020*]

Learning outcomes:
[*still undocumented*]

Module content:
[*still undocumented*]

Recommended or required reading:
[*still undocumented*]

Corporate Taxation

Module name (EN): Corporate Taxation
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc-525-625-W4
Hours per semester week / Teaching method: 1V+1U (2 hours per week)
ECTS credits: 3
Semester: 5
Mandatory course: no
Language of instruction: German
Assessment: Written exam
Curricular relevance: WIBASc-525-625-W4 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 5, optional course
Workload: 30 class hours (= 22.5 clock hours) over a 15-week period. The total student study time is 90 hours (equivalent to 3 ECTS credits). There are therefore 67.5 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): None.
Recommended as prerequisite for:
Module coordinator: Prof. Dr. Andy Junker

Lecturer:
Prof. Dr. Andy Junker
[*updated 31.01.2020*]

Learning outcomes:
After successfully completing this module students will:
_ be familiar with the characteristics and justification of the most important German tax types.
_ have mastered the calculation of taxable income _ depending on the type of tax.
_ be able to calculate personal income tax.
_ Students will understand the differences in the taxation of partnerships and corporations and how to calculate a tax burden comparison.
_ In addtion, they will have a basic understanding of tax law.
[*updated 13.09.2018*]

Module content:
Coporate taxation:
1. Overview of the German tax system
2. Income tax
3. Corporate tax
4. Trade tax
5. Inheritance/gift tax
6. Property tax
7. Value added tax
8. Other tax types
9. Tax burden comparison

[*updated 13.09.2018*]

Teaching methods/Media:
Regularly revised lecture notes will be available.
[*updated 13.09.2018*]

Recommended or required reading:
_ Haberstock, L./Breithecker, V.: Einführung in die Betriebswirtschaftliche Steuerlehre, 14. Auflage, Verlag Erich Schmidt, 2008
_ Kußmaul, Heinz: Betriebswirtschaftliche Steuerlehre, 6. Auflage, Oldenbourg Wissenschaftsverlag, München 2010
_ Watrin, C./ Rose, G.: Betrieb und Steuer, 1. Buch: Ertragsteuern: Einkommensteuer, Körperschaftsteuer, Gewerbesteuer, 19. Auflage, Verlag Erich Schmidt, 2009
_ Wöhe, G./Döring, U.: Einführung in die Allgemeine Betriebswirtschaftslehre, 24. Auflage, Vahlen, München 2010
[*updated 13.09.2018*]

Current Problems in Energy Supply (Seminar)

Module name (EN): Current Problems in Energy Supply (Seminar)
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc-525-625-W3
Hours per semester week / Teaching method: 1SU+1S (2 hours per week)
ECTS credits: 3
Semester: 6
Mandatory course: no
Language of instruction: German
Assessment: Written composition with presentation
Curricular relevance: WIBASc-525-625-W3 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 6, optional course
Workload: 30 class hours (= 22.5 clock hours) over a 15-week period. The total student study time is 90 hours (equivalent to 3 ECTS credits). There are therefore 67.5 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): WIBASc-525-625-W1 Introduction to the Energy Industry WIBASc535 Introduction to Scientific Work (with seminar) [*updated 11.02.2020*]
Recommended as prerequisite for:
Module coordinator: Prof. Dr. Uwe Leprich

Lecturer:
Prof. Dr. Uwe Leprich
[*updated 11.02.2020*]

Learning outcomes:
After successfully completing this module students will:
_ be able to develop and discuss arguments, information and ideas pertaining to the energy industry and research the documents and literature necessary to do so.
_ be able to present the results of their research in a structured and comprehensible manner and document them in a paper in compliance with scientific standards.
_ be able to create a concise handout for their oral presentation making it easier for their listeners to understand their topic.
_ be able to defend their results in a scholarly discussion.
[*updated 13.09.2018*]

Module content:
The seminar will focus on selected areas of the energy industry, energy technology or regional energy structural policy and will be based on current issues. It will link energy technology and energy management issues and deepen the knowledge acquired in the other module components.
[*updated 13.09.2018*]

Teaching methods/Media:
Projector, video player
[*updated 13.09.2018*]

Recommended or required reading:
_ Erdmann, Georg/Zweifel, Peter: Energieökonomik - Theorie und Anwendungen, 2. Auflage, Springer Berlin/Heidelberg; 2010
_ Schiffer, Hans-Wilhelm: Energiemarkt Deutschland, 11. Auflage, Tüv Media-Verlag, Köln, 2010
_ Winje, Dietmar/Witt, Dietmar: Energiewirtschaft, Band II der Handbuchreihe Energieberatung/Energie-management, 1. Auflage, Springer, Berlin u.a., 1991
[*updated 13.09.2018*]

Current Topics and Challenges in Business Enterprises (Seminar)

Module name (EN): Current Topics and Challenges in Business Enterprises (Seminar)
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc-525-625-W12
Hours per semester week / Teaching method: 2SU+2V (4 hours per week)
ECTS credits: 5
Semester: 6
Mandatory course: no
Language of instruction: German
Assessment: Written composition with presentation
Curricular relevance: WIBASc-525-625-W12 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 6, optional course, general subject
Workload: 60 class hours (= 45 clock hours) over a 15-week period. The total student study time is 150 hours (equivalent to 5 ECTS credits). There are therefore 105 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): WIBASc115 Principles of Business Administration I (BWL I) WIBASc125 Industrial Management WIBASc135 Fundamentals of Economics WIBASc215 WIBASc425 Commercial and Private Law WIBASc535 Introduction to Scientific Work (with seminar) [*updated 11.02.2020*]

Recommended as prerequisite for:
Module coordinator: Dipl.-Betr.W. Peter Huber
Lecturer: Dipl.-Betr.W. Peter Huber [*updated 11.02.2020*]
Learning outcomes: [*still undocumented*]
Module content: [*still undocumented*]
Recommended or required reading: [*still undocumented*]

Current Topics in (Business) Informatics (Seminar)

Module name (EN): Current Topics in (Business) Informatics (Seminar)
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc-525-625-FÜ16
Hours per semester week / Teaching method: 1SU+1S (2 hours per week)
ECTS credits: 3
Semester: 6
Mandatory course: no
Language of instruction: German
Assessment: Term paper, presentation
Curricular relevance: WIBASc-525-625-FÜ16 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 6, optional course
Workload: 30 class hours (= 22.5 clock hours) over a 15-week period. The total student study time is 90 hours (equivalent to 3 ECTS credits). There are therefore 67.5 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): WIBASc355 Computer Science / Programming WIBASc455 Business Informatics / Operations Research WIBASc535 Introduction to Scientific Work (with seminar) [*updated 11.02.2020*]
Recommended as prerequisite for:

Module coordinator:
Prof. Dr. Daniel F. Abawi

Lecturer:
Prof. Dr. Daniel F. Abawi
[*updated 11.02.2020*]

Learning outcomes:
After successfully completing this module students will:
_ be familiar with approaches for working on a written scientific paper
_ be able to structure and organize a scientific paper adequately
_ be able to independently organize the execution of a written paper
_ be able to conduct a literature search on a scientific topic
_ be able to name the IT-based tools that are useful for writing scientific papers
_ have experience in communicating their results to an audience in a concise manner
[*updated 13.09.2018*]

Module content:
Current topics and questions from the field of business informatics and informatics with reference to companies, economy and society.

Students will receive assistance on how to prepare a scientific paper and formulate it in writing. IT-based tools will also be presented. Sources for literature research will be presented.

The term paper can be written in German or English.
[*updated 13.09.2018*]

Teaching methods/Media:
Projector, slides, examples for the term paper
[*updated 13.09.2018*]

Recommended or required reading:
Individual literature on selected topics will be named and made available to the participants (in English and German as an introduction to the topic and for research purposes).
[*updated 13.09.2018*]

Decision theory

Module name (EN): Decision theory
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc-525-625-FÜ22
Hours per semester week / Teaching method: 1V+1U (2 hours per week)
ECTS credits: 3
Semester: 5
Mandatory course: no
Language of instruction: German
Assessment: Written exam
Curricular relevance: WIBAS-450/550-M5m Industrial Engineering, Bachelor, ASPO 01.10.2007, semester 4, optional course WIBASc-525-625-FÜ22 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 5, optional course
Workload: 30 class hours (= 22.5 clock hours) over a 15-week period. The total student study time is 90 hours (equivalent to 3 ECTS credits). There are therefore 67.5 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): WIBASc255 Statistics [*updated 02.02.2020*]
Recommended as prerequisite for:

Module coordinator:
Prof. Dr. Susan Pulham

Lecturer:
Prof. Dr. Susan Pulham
[*updated 20.01.2020*]

Learning outcomes:
After successfully completing this module, students will have an overview of the current decision models of prescriptive decision theory. They will be familiar with the most important findings of descriptive decision theory, can name and explain them and can critically compare both theories. Students will be able to analyze real decision-making situations and understand and improve their own and other people´s behaviour. They will have the opportunity to make their own wrong decisions in an experimental environment and will be able to explain what they did wrong.
[*updated 13.09.2018*]

Module content:
Part A: Psychology
Chapter 1: The Cognitive Limitations of Man
Chapter 2: The Perception of New Information
Chapter 3: Access to Available Information in the Head
Chapter 4: Processing the Information
Chapter 5: Motivation and Emotion
Chapter 6: Groups and Masses
Part B: Relative Perception and Evaluation
Chapter 1: On the Path to Rationality
Chapter 2: Why People Evaluate Relatively and Why this is Often Unreasonable
Chapter 3: Why Probabilities are also Evaluated Relatively
Chapter 4: It is Possible Without an Irrational Relative Evaluation
[*updated 13.09.2018*]

Teaching methods/Media:
Lecture
Exercises
Experiments
[*updated 13.09.2018*]

Recommended or required reading:
Eisenführ, F./ Weber, M./ Langer, T.: Rationales Entscheiden (2010)
Kahneman, D./ Slovic, P./ Tversky, A.: Judgment under Uncertainty: Heuristics and Biases (1982)
Kahneman, D./ Tversky, A.: Choices, Values and Frames (2000)
Von Nitzsch, R./ Goldberg, J.: Behavioral Finance 4. Aufl. (2004)
Von Nitzsch, R.: Entscheidungslehre - Wie Menschen entscheiden und wie sie entscheiden sollten 5. Aufl. (2008)
-Von Nitzsch, R.: Entscheidungslehre: Der Weg zur besseren Entscheidung 3. Aufl. (2011)
Zimmermann, H.-J.: Operations Research, 2. Aufl. (2007)
[*updated 13.09.2018*]

Fluid Dynamics

Module name (EN): Fluid Dynamics
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc-525-625-Ing21
Hours per semester week / Teaching method: 2V+2U (4 hours per week)
ECTS credits: 5
Semester: 5
Mandatory course: no
Language of instruction: English
Assessment: Written exam
Curricular relevance: WIBASc-525-625-Ing21 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 5, optional course, general subject
Workload: 60 class hours (= 45 clock hours) over a 15-week period. The total student study time is 150 hours (equivalent to 5 ECTS credits). There are therefore 105 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): WIBASc145 Physics WIBASc165 Mathematics I WIBASc365 English I [*updated 31.01.2020*]
Recommended as prerequisite for:

Module coordinator:
Prof. Dr. Frank Ulrich Rückert

Lecturer:
Prof. Dr. Frank Ulrich Rückert
[*updated 20.01.2020*]

Learning outcomes:
Topics:
After successfully completing this module, students will know the basics of classical fluid dynamics theory.
- Students will be able to plan an innovative aircraft geometry in teams
- The fluid flow simulation of the prototype will be done using the ANSYS Workbench (CFX)
- Students will be able to identify problems in this area and formulate tasks independently
- Students will have had their first introductory training in working with the 3D computational fluid dynamics program ANSYS Workbench (CFX)

The main goal of this module is to teach students to classify the costs and benefits of a commercial flow simulation and to successfully assign and delegate tasks.
[*updated 13.09.2018*]

Module content:
Group work in project teams:
- Definition of the project structure and roles
- Planning tasks

The classical flow theory:
- Presentation of different wing profiles (NACA)
- Profile flow
- Euler and Bernoulli equation
- Mass maintenance
- Impulse maintenance; Navier-Stokes equations
- Two equations turbulence models
- Loss calculation, flow breakage

Basics of the ANSYS Workbench (CFX):
- Creation of a parameterized flow geometry
- Discretization of the geometry with grating grids
- Numerical solution of partial differential equations
- Visualization and interpretation of 3D flow results
- Documentation of the simulation results (Excel, Powerpoint)

Practical work:
- Generation of a prototype with a 3-D printer
- Preparation of an experimental plan (DOE)
- Conducting pilot tests in the wind tunnel
- Documentation of test results (Excel, Powerpoint)

Presentation and discussion of the results in a lecture with the group

[*updated 14.03.2018*]

Teaching methods/Media:
- Lecture with beamer
- Implementation of practical flow simulations with the ANSYS Workbench (CFX)
- Supervised computer exercises in the PC pool
- Presentation of solutions for the other participants
- Creation of a PowerPoint presentations and youtube video dipicting the results obtained

[*updated 14.03.2018*]

Recommended or required reading:

- Cengel, Yunus A.; Cimbala, John M.: "Fluid Mechanics Fundamentals and Applications"; Mc Graw Hill; Higher Education; 2010
- Peric, M., Ferziger, J. H.: "Computational Methods for Fluid Dynamics"; Springer-Verlag; 2004
- Rückert, Frank U.: "A short introduction to CFD" (english language); htw saar; 2017
- Chant, Christopher: "Flugzeug-Prototypen. Vom Senkrechtstarter zum Stealth-Bomber"; Stuttgart, Motorbuch, 1992
- Strybny, Jan: "Ohne Panik - Strömungsmechanik Lernbuch zur Prüfungsvorbereitung"; vieweg Verlag, 2003
- Siekmann, Helmut: "Strömungslehre - Grundlagen"; Springer Verlag, 2000
- Kalide, Wolfgang; "Einführung in die Technische Strömungslehre"; Hanser Verlag, 1984
- Bohl, Willi: "Technische Strömungslehre"; Vogel Buchverlag, 2002
- Noll, Berthold: "Numerische Strömungsmechanik - Grundlagen"; Springer-Verlag, 1993
- Spurk, Joseph H.: "Strömungslehre - Einführung in die Theorie und Praxis"; Springer-Verlag, 1992
- Sigloch, Herbert: "Technische Fluidmechanik"; Springer-Verlag, 2007

[*updated 14.03.2018*]

Fluid Energy Machines

Module name (EN): Fluid Energy Machines
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc-525-625-Ing19
Hours per semester week / Teaching method: 1V+1U (2 hours per week)
ECTS credits: 3
Semester: 5
Mandatory course: no
Language of instruction: English
Assessment: Written exam
Curricular relevance: WIBASc-525-625-Ing19 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 5, optional course, general subject
Workload: 30 class hours (= 22.5 clock hours) over a 15-week period. The total student study time is 90 hours (equivalent to 3 ECTS credits). There are therefore 67.5 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): WIBASc145 Physics WIBASc165 Mathematics I WIBASc365 English I [*updated 31.01.2020*]
Recommended as prerequisite for:
Module coordinator: Prof. Dr. Frank Ulrich Rückert
Lecturer: Prof. Dr. Frank Ulrich Rückert [*updated 20.01.2020*]

Learning outcomes:
After successfully completing this module, students will:
- understand the different types of fluid energy machines
- have achieved skills working with the program AMESim and modeling fluid energy machines
- have developed an AMESim model and be able to present their simulation results

[*updated 14.03.2018*]

Module content:
Content:
General principles of fluid energy machines:
- Classification of fluid energy machines
- Flow and displacement machines
- Definition of performance and efficiency

Simulation:
- Graphical programming of fluid energy machines with AMESim
- Modelling of cycle-processes in AMESim
- Comparison of different plant concepts

Fans, blowers and wind mills:
- Determination of flow
- Impeller and speed triangle
- Power transmission and the Euler equation

Water turbines:
- Overview of types
- Pelton turbine, Francis turbine and Kaplan turbine

Steam turbine and gas turbine:
- Steam power process, heat exchangers and nozzle design (stator)
- Gas turbine cycle, combustion chamber and heat transfer
- Operation and construction forms
- Degree of reaction
- Influence of number of blades and rotor design (diameter)

Pumps:
- Stroke piston pumps
- Pump control and parallel operation modes
- Pumps and circulation piston compressors
- Gear pumps

Thermal piston machines:
- One- and multistage compressors
- Steam engine
- Combustion engine

[*updated 13.09.2018*]

Teaching methods/Media:
Teaching methods and media:
- Lecture with video projector and whiteboard
- Simulation exercises in pc-pool with AMESim

[*updated 14.03.2018*]

Recommended or required reading:
- AMESim can be obtained by students free of charge from LMS (Siemens)

https://www.plm.automation.siemens.com/de_de/academic/resources/lms/amesim-student-registration.shtml

[*updated 14.03.2018*]

Integrated Production Systems

Module name (EN): Integrated Production Systems
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc-525-625-Ing2
Hours per semester week / Teaching method: 1V+1U (2 hours per week)
ECTS credits: 3
Semester: 5
Mandatory course: no
Language of instruction: German
Assessment: See notice board: written or oral examination
Curricular relevance: WIBASc-525-625-Ing2 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 5, optional course
Workload: 30 class hours (= 22.5 clock hours) over a 15-week period. The total student study time is 90 hours (equivalent to 3 ECTS credits). There are therefore 67.5 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): WIBASc245 Manufacturing Engineering [*updated 11.02.2020*]
Recommended as prerequisite for: WIBASc-525-625-FÜ30 Production Project [*updated 11.02.2020*]

Module coordinator:
Prof. Dr.-Ing. Dieter Arendes

Lecturer:
Prof. Dr.-Ing. Dieter Arendes
[*updated 11.02.2020*]

Learning outcomes:
After successfully completing this module students will:
_ be familiar with the principles and methods of integrated production systems.
_ be able to recognize and evaluate production principles, e.g. push or pull principle.
_ be able to map a simple value stream.
_ be familiar with the possibilities that various methods offer such as 5S, 5W, Jidoka, Poka Yoke, PDCA, OEE,... and will be able to apply them.
_ be able to design Kanban control loops and one-piece-flow production lines with the support of Six Sigma methodology for simple projects.
[*updated 13.09.2018*]

Module content:
_ Basics of production systems
_ Principles: pull principle, just in time, process orientation, transparency, and value stream mapping, flexibility (variants, quantities, life cycles) and Chaku Chaku lines
_ Methods: error prevention (Six Sigma, PokaYoke, TPM), continuous improvement, TPM
[*updated 13.09.2018*]

Teaching methods/Media:
Lecture with exercises, as well as videos from teaching and industry.
Lecture notes as a collection of slides, incl. questions and exercises.
[*updated 13.09.2018*]

Recommended or required reading:

_ Meran, R., John, A., Staudter, C., Roenpage, O., Lunau, S.: Six Sigma+Lean Toolset, Mindset zur erfolgreichen Umsetzung von Verbesserungsprojekten, Springer-Verlag Berlin Heidelberg, 2012

_ Erlach, K., Wertstromdesign: Der Weg zur schlanken Fabrik, Springer-Verlag Berlin Heidelberg, 2010

_ Brunner, F.J., Japanische Erfolgskonzepte, Hanser- Verlag, 2011

_ Rother, M., Die Kata des Weltmarktführers, Campus verlag, 2009

_ May, C.; Schumek, P., TPM _ Total Productive Management, CETPM Publishing, 2009

_ Dickmann, P., Schlanker Materialfluss, Springer-Verlag, 2007

_ Westkämper, E., Null-Fehler-Produktion in Prozessketten, Springer-Verlag, 1997

_ Shingo, S., Poka-Yoke, gfmt-Gesellschaft für Management und Technologie, 1991

_ Shingo, S., Das Erfolgsgeheimnis der Toyota Produktion, Verlag Moderne Industrie, 1993

_ Womack, J. P., Jones, D. T., Auf dem Weg zum perfekten Unternehmen, Heyne-Verlag, 1998

_ Eversheim, W., Gestaltung von Produktionssystemen, Springer-Verlag, 1999

[*updated 13.09.2018*]

International Project Week

Module name (EN): International Project Week

Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013

Module code: WIBASc525-625-FÜ31

Hours per semester week / Teaching method: 2PA (2 hours per week)

ECTS credits: 2

Semester: 5

Mandatory course: no

Language of instruction:
English

Assessment:
Project, presentation, graded

Curricular relevance:
EE-K2-538 Energy system technology / Renewable energies, Bachelor, ASPO 01.04.2015, semester 5, optional course, engineering, course inactive since 14.03.2018
MAB.4.2.1.12 Mechanical and Process Engineering, Bachelor, ASPO 01.10.2013, semester 3, optional course
MST.IPW Mechatronics and Sensor Technology, Bachelor, ASPO 01.10.2012, optional course, non-technical, course inactive since 07.10.2015
MST.IPW Mechatronics and Sensor Technology, Bachelor, ASPO 01.10.2019, optional course, non-technical, course inactive since 07.10.2015
PIBWN18 Applied Informatics, Bachelor, ASPO 01.10.2011, semester 5, optional course, not informatics specific
WIBASc525-625-FÜ31 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 5, optional course, general subject
MST.IPW Mechatronics and Sensor Technology, Bachelor, ASPO 01.10.2011, optional course, non-technical, course inactive since 07.10.2015
Suitable for exchange students (learning agreement)

Workload:
30 class hours (= 22.5 clock hours) over a 15-week period.
The total student study time is 60 hours (equivalent to 2 ECTS credits).
There are therefore 37.5 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:

Module coordinator:
Prof. Dr. Frank Kneip

Lecturer:
Prof. Dr. Frank Kneip
[*updated 11.02.2020*]

Learning outcomes:
The students will practice
- all the stages in the systematic development of a product and
- the presentation of their results in an oral presentation and a written report.

In a linguistically, socially and geographically unfamiliar environment, the students learn how to
- solve a problem under pressure within a given time frame and with other team members
- work efficiently
- identify and make use of each team member´s skills and competencies
- structure a task
- delegate subtasks to team members according to their competencies
- collect and evaluate information quickly
- make use of the knowledge and skills of group members from other subject areas
- be(come) an effective member of a heterogeneous group and experience various different methods and approaches.
[*updated 13.09.2018*]

Module content:
Teams of up to seven international students from different universities, nationalities, degree programs and semesters work together during this intensive project week at the htw saar or at any of our partner universities to solve a practical project task assigned by companies or an application-oriented research and development institute.

Starting with the presentation of the project task by a company representative, the students will go through all the main stages in the development of a product:
- Creating ideas
- Evaluating ideas
- Designing the product

Students must present their final product design to the competing teams, professors and company representatives. In addition to the presentation, they also have to write a project report.
[*updated 13.09.2018*]

Teaching methods/Media:
Supervised project work
[*updated 10.11.2016*]

Recommended or required reading:
A reading list will be provided for each project group.
[*updated 13.09.2018*]

Introduction to Energy Technology

Module name (EN): Introduction to Energy Technology
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc-525-625-Ing9
Hours per semester week / Teaching method: 1V+1U (2 hours per week)
ECTS credits: 3
Semester: 5
Mandatory course: no
Language of instruction: German
Assessment: Written exam
Curricular relevance: WIBASc-525-625-Ing9 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 5, optional course
Workload: 30 class hours (= 22.5 clock hours) over a 15-week period. The total student study time is 90 hours (equivalent to 3 ECTS credits). There are therefore 67.5 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): WIBASc145 Physics WIBASc155 Materials Engineering WIBASc435 Thermodynamics WIBASc445 Electrical Engineering [*updated 20.01.2020*]
Recommended as prerequisite for:

Module coordinator:
Prof. Dr. Rudolf Friedrich

Lecturer:
Prof. Dr. Rudolf Friedrich
[*updated 20.01.2020*]

Learning outcomes:
After successfully completing this module, students will be acquainted with the actual energy conversion processes in power plants.
- They will be familiar with the different primary energy sources and can assess the environmental impacts and risks associated with their use.
- Students will be familiar with various power plant technologies in terms of design, function and operating performance.
- They will be able to assess the advantages and disadvantages of different types of power plants for different supply scenarios.
- Lastly, students will be able to characterize the different types of regenerative energies.

[*updated 13.09.2018*]

Module content:
1. General conditions in power plant technology
2. Energy conversion in power plants
3. Thermal power plants
a. Coal-fired plants
b. Nuclear power plants
4. Gas turbine and steam power plants
5. Fuel cells
6. Cogeneration plants
7. The basics of renewable energies

[*updated 13.09.2018*]

Teaching methods/Media:
Printed lecture notes (regularly revised), blackboard with additional practical examples;
Exercises based on technical case studies and planning tasks.
[*updated 13.09.2018*]

Recommended or required reading:
_ Lindner, H./ Brauer, H./ Lehmann, C.: Taschenbuch der Elektrotechnik und Elektronik, 9. Auflage, Carl Hanser Verlag, 2008
_ Haubrich, H.-J.: Elektrische Energieversorgungssysteme, Verlag der Augustinus Bhg, 1997
_ Heuck, Dettmann _Energietechnik_, Vieweg-Teubner, 8.Auflage
_ Energie in Deutschland - BMWi

[*updated 13.09.2018*]

Introduction to Six Sigma

Module name (EN): Introduction to Six Sigma
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc-525-625-FÜ29
Hours per semester week / Teaching method: 1V+1U (2 hours per week)
ECTS credits: 3
Semester: 5
Mandatory course: no
Language of instruction: German
Assessment:
Curricular relevance: WIBASc-525-625-FÜ29 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 5, optional course, general subject
Workload: 30 class hours (= 22.5 clock hours) over a 15-week period. The total student study time is 90 hours (equivalent to 3 ECTS credits). There are therefore 67.5 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): WIBASc255 Statistics [*updated 11.02.2020*]
Recommended as prerequisite for:
Module coordinator: Prof. Dr.-Ing. Christian Köhler

Lecturer:
Prof. Dr.-Ing. Christian Köhler
[*updated 11.02.2020*]

Learning outcomes:
After successfully completing this module students will:
- be able to explain the different dimensions of Six Sigma
- know the practical effects of process variation
- be able to identify potential Six Sigma projects
- know how Six Sigma can be integrated into companies
- know the DMAIC phase model and can use selected tools from it
- can use the MINITAB software to support Six Sigma projects
- know further approaches, e.g. Lean Six Sigma or Design for Six Sigma
[*updated 13.09.2018*]

Module content:
Lecture:
- Introduction: The World of Six Sigma
- Integration of Six Sigma in companies
- DMAIC phase model with selected tools
- Lean Six Sigma
- Design for Six Sigma

Exercise:
- Introduction to Minitab
- Exercise sheets about the methods used (partly with Minitab)
[*updated 13.09.2018*]

Teaching methods/Media:
Lecture:
- Lecture at the blackboard, beamer
- Demonstrations with the Six Sigma software Minitab
- Demonstrators
- Presentation slides will be provided as lecture notes

Exercise:
- Exercises will be provided weekly, solved independently and the solutions discussed.
- Using the Minitab software in the computer room (A-K-01)
[*updated 13.09.2018*]

Recommended or required reading:
Melzer: Six Sigma - Kompakt und praxisnah, Springer Gabler
Töpfer (Hrsg.): Six Sigma, Springer
Lunau (Hrsg.): Six Sigma + Lean Toolset, Springer
Lunau (Hrsg.): Design for Six Sigma + Lean Toolset, Springer
Rath & Strong´s Six Sigma Pocket Guide, TÜV Media
Rath & Strong´s Six Sigma Lean Pocket Guide, TÜV Media
[*updated 13.09.2018*]

Introduction to the Energy Industry

Module name (EN): Introduction to the Energy Industry
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc-525-625-W1
Hours per semester week / Teaching method: 1V+1U (2 hours per week)
ECTS credits: 3
Semester: 5
Mandatory course: no
Language of instruction: German
Assessment: Written exam
Curricular relevance: WIBASc-525-625-W1 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 5, optional course
Workload: 30 class hours (= 22.5 clock hours) over a 15-week period. The total student study time is 90 hours (equivalent to 3 ECTS credits). There are therefore 67.5 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): None.
Recommended as prerequisite for: WIBASc-525-625-W3 Current Problems in Energy Supply (Seminar) [*updated 11.02.2020*]
Module coordinator: Prof. Dr. Uwe Leprich

Lecturer:
Prof. Dr. Uwe Leprich
[*updated 11.02.2020*]

Learning outcomes:
After successfully completing this module students will:
_ be familiar with the scope and characteristics of the energy industry.
_ be able to assess the economic and ecological significance of the energy industry within an economy.
_ be able to place key developments and problems in the energy industry in an overall context and critically analyze and evaluate them.
_ be able to independently analyze and deepen their knowledge about selected areas of the energy industry.
_ be able to independently develop solutions for selected problems in the energy industry
[*updated 13.09.2018*]

Module content:
1. Delimitations, basic terms and statistics
2. Reserves and resources / Energy scenarios
3. Energy and the environment
4. The petroleum industry
5. The coal industry (lignite and hard coal)
6. The electricity industry
7. Renewable energies in the power and heating sector
8. The efficient use of energy: techniques and realization

[*updated 13.09.2018*]

Teaching methods/Media:
A detailed outline with numerous references and a structured set of slides will be provided for this module.
[*updated 13.09.2018*]

Recommended or required reading:
_ Erdmann, Georg/Zweifel, Peter: Energieökonomik - Theorie und Anwendungen, 2. Auflage, Springer Berlin/Heidelberg; 2010
_ Schiffer, Hans-Wilhelm: Energiemarkt Deutschland, 11. Auflage, Tüv Media-Verlag, Köln, 2010
_ Winje, Dietmar/Witt, Dietmar: Energiewirtschaft, Band II der Handbuchreihe Energieberatung/Energie-management, 1. Auflage, Springer, Berlin u.a., 1991
[*updated 13.09.2018*]

Leadership and Team Management

Module name (EN): Leadership and Team Management
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc-525-625-FÜ38
Hours per semester week / Teaching method: 2V+2U (4 hours per week)
ECTS credits: 5
Semester: 5
Mandatory course: no
Language of instruction: English
Assessment: Written exam (90 min) (80%), assignments in class (20%)
Curricular relevance: WIBASc-525-625-FÜ38 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 5, optional course, general subject
Workload: 60 class hours (= 45 clock hours) over a 15-week period. The total student study time is 150 hours (equivalent to 5 ECTS credits). There are therefore 105 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): None.
Recommended as prerequisite for:
Module coordinator: Prof. Dr. Petra Garnjost

Lecturer:
Prof. Dr. Petra Garnjost
[*updated 06.01.2020*]

Learning outcomes:
At the successful conclusion of this course the students will:
articulate the variables in successful and effective teams,
be able to identify dysfunctions in teams and provide solutions,
have an understanding of their roles and behavior in teams,
have knowledge of the building theories of leadership,
understand the role of leadership in the management process,
have knowledge of the skills, knowledge and attributes of successful leaders, as well as an idea to improve and broaden their leadership skills.
[*updated 16.10.2018*]

Module content:
The course explores teamwork skills in work organizations and effective leadership behavior. Students will engage in the enhancement of their own skills in these areas combined with the study of empirical findings and classic and contemporary models of leadership and group dynamics.

Team Management
1. Team Analysis
2. Team Development
3. Decision Making in Teams
4. Negotiation and Conflict
5. Multicultural Teams

Leadership
1. Introduction to Leadership
2. History of Leadership
3. Emotional Intelligence
4. Transformational Leadership
5. Global Leadership

Individual leadership behavior
1. Self-Assessment
2. Personal Development Plan

[*updated 16.10.2018*]

Teaching methods/Media:
Material to prepare for class (videos, articles, presentations) will be available on Clix prior to each session.
Various interactive methods are used in class (team exercises, presentations, case studies, group discussions, self-assessments)
[*updated 16.10.2018*]

Recommended or required reading:

Brett, J., Behfar, K., & Kern, M. C. (2009). Managing multicultural teams. The Essential Guide to Leadership, 85.
Collins, J. (2007). Level 5 leadership. The Jossey-Bass reader on educational leadership, 2, 27-50.
DuBrin, AJ., Leadership: Research findings, practice and skills (8 ed.). Cengage Learning, Boston, MA 2016. ISBN 978-1-285-86636-9
Eisenhardt, K. M., Kahwajy, J. L., & Bourgeois III, L. J. (2009). How management teams can have a good fight. Harvard Business Review Press.
Frisch, B. (2008). When teams cant decide. What Makes a Decisive Leadership Team, 2.
Goleman, D., Boyatzis, R. E., & McKee, A. (2013). Primal leadership: Unleashing the power of emotional intelligence. Harvard Business Press.
Kotter, J. P. (2007). What leaders really do. Harvard Business Review, 68(3).
[*updated 16.10.2018*]

Machine tools

Module name (EN): Machine tools

Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013

Module code: WIBASc-525-625-Ing14

Hours per semester week / Teaching method: 1V+1U (2 hours per week)

ECTS credits: 3

Semester: 5

Mandatory course: no

Language of instruction:
German

Assessment:
Project, class presentation, written exam

Curricular relevance:
WIBAS-450/550-M2e Industrial Engineering, Bachelor, ASPO 01.10.2007, semester 5, optional course
WIBASc-525-625-Ing14 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 5, optional course

Workload:
30 class hours (= 22.5 clock hours) over a 15-week period.
The total student study time is 90 hours (equivalent to 3 ECTS credits).
There are therefore 67.5 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
WIBASc235 Engineering Mechanics I
WIBASc245 Manufacturing Engineering
WIBASc335 Engineering Mechanics II
WIBASc345 Design Technology / CAD
[*updated 11.02.2020*]

Recommended as prerequisite for:

Module coordinator:
Prof. Dr.-Ing. Christian Köhler

Lecturer:
Prof. Dr.-Ing. Christian Köhler
[*updated 11.02.2020*]

Learning outcomes:
After successfully completing this module, students will know the basic structure of machine tools for different manufacturing technologies.
Students will know the function of important elements of machine tools (e.g. frames, guides, drives, gears, controls).
They will be familiar with additional machine tool equipment required for operation.
In addition, students will be able to determine suitable machine tool concepts.
[*updated 02.07.2019*]

Module content:
1. Introduction
2. Design of selected types of machine tools
3. Function and design of important elements of machine tools
4. Additional equipment on machine tools
[*updated 02.07.2019*]

Teaching methods/Media:
Lecture with discussions, presentations and exercises
The following types of media will be used during the seminar: projector, laptop, sample components, blackboard, daylight recorder, etc.
[*updated 02.07.2019*]

Recommended or required reading:
Conrad, K.J.: Taschenbuch der Werkzeugmaschinen, Fachbuchverlag im Carl Hanser Verlag

Weck, M.; Brecher, C.: Werkzeugmaschinen (Band 1-5), VDI-Buch, Springer Verlag (schwerpunktmäßig Band 1 und 2)

Grote, K.H.; Feldhusen, J.: Dubbel _ Taschenbuch für den Maschinenbau, Springer Verlag

Europa Lehrmittel: Fachkunde Metall (für Übersicht und Einführung)
[*updated 02.07.2019*]

Maintenance Planning (Seminar)

Module name (EN): Maintenance Planning (Seminar)
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc-525-625-Ing3
Hours per semester week / Teaching method: 1SU+1S (2 hours per week)
ECTS credits: 3
Semester: 6
Mandatory course: no
Language of instruction: German
Assessment: Class presentation
Curricular relevance: WIBASc-525-625-Ing3 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 6, optional course
Workload: 30 class hours (= 22.5 clock hours) over a 15-week period. The total student study time is 90 hours (equivalent to 3 ECTS credits). There are therefore 67.5 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): WIBASc535 Introduction to Scientific Work (with seminar) [*updated 11.02.2020*]
Recommended as prerequisite for:
Module coordinator: Prof. Dr. Michael Krämer

Lecturer:
Prof. Dr. Michael Krämer
Torsten Schmidt
[*updated 11.02.2020*]

Learning outcomes:
After successfully completing this module students will:
_ know the essential terms and requirements for maintenance.
_ know which maintenance strategies exist and how they are implemented organizationally.
_ be able to identify weak points on the basis of key figures, take suitable countermeasures and estimate the costs incurred.
_ have the ability to apply this knowledge in a practical case with an industry partner.
[*updated 13.09.2018*]

Module content:
1. Basic maintenance terms
2. Tasks, maintenance requirements
3. Maintenance strategies
4. Vulnerability analysis
5. Budgeting for plant maintenance

[*updated 13.09.2018*]

Teaching methods/Media:
Regularly revised lecture notes will be passed out.
[*updated 13.09.2018*]

Recommended or required reading:
_ VDI-Richtlinien 3005
_ DIN 31051
_ Handbuch Instandhaltung, TÜV Rheinland
_ Eichler, C.: Instandhaltungstechnik, 5. Auflage, Verlag Technik / Huss Medi, 1998
[*updated 13.09.2018*]

Mathematics III

Module name (EN): Mathematics III
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc525-625-FÜ27
Hours per semester week / Teaching method: 2V+2U (4 hours per week)
ECTS credits: 5
Semester: 5
Mandatory course: no
Language of instruction: German
Assessment: Written exam
Curricular relevance: WIBASc525-625-FÜ27 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 5, optional course, technical
Workload: 60 class hours (= 45 clock hours) over a 15-week period. The total student study time is 150 hours (equivalent to 5 ECTS credits). There are therefore 105 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): WIBASc165 Mathematics I WIBASc265 Mathematics II [*updated 20.01.2020*]
Recommended as prerequisite for:
Module coordinator: Prof. Dr. Frank Kneip

Lecturer:
Michael Ohligschläger
[*updated 20.01.2020*]

Learning outcomes:
After successfully completing this module, students will have a basic understanding of the higher mathematical methods presented in the course. They will have the skills necessary to use these methods in real situations. Students will be able to analyze real problems with regard to the methods presented.
Number series, power series, function series (especially Fourier series) and Taylor series.
[*updated 13.09.2018*]

Module content:
Fourier and Laplace transform. Ordinary differential equations, mainly linear differential equations of the nth order and linear differential equation systems. Optional: higher-dimensional integration. Application of the above areas to technical and economic problems (based on examples).
[*updated 13.09.2018*]

Teaching methods/Media:
Lecture coupled with exercises. Media used: mainly blackboard and occasionally a projector (CAS calculations).
[*updated 13.09.2018*]

Recommended or required reading:
L. Papula: Mathematik für Ingenieure und Naturwissenschaftler Bände 1, 2 und 3
Fetzer/Fränkel: Mathematik Bände 2 und 3
H. Stöcker: Analysis für Ingenieurstudenten Band 2
[*updated 13.09.2018*]

Moderation and Leadership (Seminar)

Module name (EN): Moderation and Leadership (Seminar)
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc-525-625-FÜ7
Hours per semester week / Teaching method: 2S (2 hours per week)
ECTS credits: 3
Semester: 6
Mandatory course: no
Language of instruction: German
Assessment: Written composition with presentation
Curricular relevance: WIBASc-525-625-FÜ7 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 6, optional course
Workload: 30 class hours (= 22.5 clock hours) over a 15-week period. The total student study time is 90 hours (equivalent to 3 ECTS credits). There are therefore 67.5 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): WIBASc115 Principles of Business Administration I (BWL I) WIBASc215 WIBASc225 Procurement Logistics and Technical Sales and Distribution WIBASc535 Introduction to Scientific Work (with seminar) [*updated 11.02.2020*]
Recommended as prerequisite for:

Module coordinator:
Prof. Dr. Udo Venitz

Lecturer:
Lehrbeauftragte
[*updated 11.02.2020*]

Learning outcomes:
After successfully completing this module students will:
_ have - as preparation for their later function as managers - acquired knowledge and skills for moderating discussion and conflicts.
_ understand the interrelationships between communication and moderation.
_ be able to apply current moderation and mediation methods for decision-making processes within a company.
_ be aware of the particularities of moderation with regard to different cultural backgrounds.
[*updated 13.09.2018*]

Module content:
1. Moderator
2. Communication as the basis of moderation
3. The basics of mediation
4. A guide to moderation
5. Cultural aspects of moderation

[*updated 13.09.2018*]

Teaching methods/Media:
Interactive seminar. After an input phase by the lecturer - using various thematic examples - moderation and mediation processes are prepared and "played through" by the students. In "role-plays" the participants demonstrate that they can implement the content they have learned. Students will receive electronic lecture notes for the course.
[*updated 13.09.2018*]

Recommended or required reading:
_ Edfmüller, A./Wilhelm, T.: Moderation; Haufe Lexware; 5.Auflage; 2012
_ Funke, A./ Havenith, E.: Moderations-Tools; ManagerSeminare Verlag; 2. Auflage; 2011
_ Freund, U.: Moderationstraining; up next Verlag; _. A.; 2011
_ Hartmann, M./ Funke, R.: Gekonnt moderieren; Beltz Verlag; 4. Auflage; 2010
_ Hartmann, M./ Rieger, M.: Zielgerichtet moderieren; Beltz Verlag; 6. A.; 2012
_ Jiranek, H./Edmüller, A.: Konfliktmanagement, Haufe, 3. A., 2010
_ Tirok, M.: Moderieren; UVK; 2013
[*updated 13.09.2018*]

Network Model Renewable Energies

Module name (EN): Network Model Renewable Energies
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc-525-625-Ing17
Hours per semester week / Teaching method: 1V+1U+2PA (4 hours per week)
ECTS credits: 5
Semester: 5
Mandatory course: no
Language of instruction: German
Assessment: Project work
Curricular relevance: WIBASc-525-625-Ing17 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 5, optional course, general subject
Workload: 60 class hours (= 45 clock hours) over a 15-week period. The total student study time is 150 hours (equivalent to 5 ECTS credits). There are therefore 105 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): WIBASc-525-625-Ing10 Principles of Supply Networks and Systems WIBASc525-625-Ing11 Utility Network Calculation and Planning [*updated 20.01.2020*]
Recommended as prerequisite for:
Module coordinator: Prof. Dr. Rudolf Friedrich

Lecturer:
Prof. Dr. Rudolf Friedrich
[*updated 20.01.2020*]

Learning outcomes:
After successfully completing this module, students will have basic technical knowledge of electrical supply networks and systems.
- They will be familiar with the design, function and operating behavior of regenerative power plants
- They will be familiar with the technical problems involved in the energy transition
- They will understand the interaction between regenerative power plants and electrical supply networks
- Students will be able to simulate a real electrical supply network as an intelligent network (incl. network automation).

[*updated 02.07.2019*]

Module content:
1. Development of intelligent networks with renewable energies
2. Flexibility in intelligent networks
_ Regenerative power plants
_ Storage
_ Consumers
3. Low-voltage network automation
_ Switches
_ Measuring systems
_ Current, voltage and power measurement
4. Technical restrictions
_ Grid voltage stabilization
_ Resource capacity utilization
5 Network modeling
_ Scaling factors
_ Electrical components (relays, resistors, LEDs, etc.)
_ Circuitry

[*updated 02.07.2019*]

Teaching methods/Media:
Lab work
[*updated 02.07.2019*]

Recommended or required reading:
Lindner, H./ Brauer, H./ Lehmann, C.: Taschenbuch der Elektrotechnik und Elektronik, 9. Auflage, Carl Hanser Verlag, 2008
_ Haubrich, H.-J.: Elektrische Energieversorgungssysteme, Verlag der Augustinus Bhg, 1997
_ Heuck, Dettmann _Energietechnik_, Vieweg-Teubner, 8.Auflage
_ Energie in Deutschland _ BMWi
_ Wesselak, Schabbach, Regenerative Energietechnik, Springer-Verlag

[*updated 02.07.2019*]

Operations Research II

Module name (EN): Operations Research II
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc-525-625-FÜ14
Hours per semester week / Teaching method: 1V+1U (2 hours per week)
ECTS credits: 3
Semester: 5
Mandatory course: no
Language of instruction: German
Assessment: Will be announced at the beginning of the semester: oral examination resp. wriiten examination
Curricular relevance: WIBASc-525-625-FÜ14 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 5, optional course
Workload: 30 class hours (= 22.5 clock hours) over a 15-week period. The total student study time is 90 hours (equivalent to 3 ECTS credits). There are therefore 67.5 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): WIBASc455 Business Informatics / Operations Research [*updated 11.02.2020*]
Recommended as prerequisite for:
Module coordinator: Prof. Dr. Daniel F. Abawi

Lecturer:
Prof. Dr. Daniel F. Abawi
[*updated 11.02.2020*]

Learning outcomes:
After successfully completing this module, students will be able to:
_ identify and use different methodologies for solving LPs
_ implement mathematical models for different LPs using the Microsoft Excel Solver application
_ question the suitability of LP modeling with regard to its problems
_ identify the relationship between problems in business management practice and methods of operations research and, name possible solution methods
_ characterize the complexity of LPs or optimization problems
[*updated 13.09.2018*]

Module content:
Based on the obligatory course "Operations Research", students will become acquainted with other topics in Operations Research, as well as concepts for solving these problems.

1. Dynamic optimization (based on warehousing problems)
2. The duality of LPs
3. Decision tree procedure (especially branch-and-bound)
4. Use of IT applications to solve LPs or general operations research problems
5. Extended use of the Microsoft Solver optimization tool

[*updated 13.09.2018*]

Teaching methods/Media:
Sildes, projector, interactive exercises, blackboard, lecture notes
[*updated 13.09.2018*]

Recommended or required reading:
_ Domschke, W. / Drexl, A.: Introduction in Operations Research; 8. Auflage, Springer Verlag, 2011
_ Gohout, W.: Operations Research _ Einige ausgewählte Gebiete der linearen und nichtlinearen Optimierung; 4. Auflage, Oldenbourg Wissenschaftsverlag, 2009
_ Domschke, W. / Drexl, A. u.a.: Übungen und Fallbeispiele zum Operations Research; 7. Auflage, Springer Verlag, 2011
_ Zimmermann, W. / Stache, U.: Operations Research _ Quantitative Methoden zur Entscheidungsvorbereitung; 10. Auflage, Oldenbourg Wissenschaftsverlag, 2001
[*updated 13.09.2018*]

Planning a Production Plant

Module name (EN): Planning a Production Plant
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc-525-625-FÜ26
Hours per semester week / Teaching method: 2V+2PA (4 hours per week)
ECTS credits: 5
Semester: 5
Mandatory course: no
Language of instruction: German
Assessment: Written composition with presentation
Curricular relevance: WIBASc-525-625-FÜ26 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 5, optional course, engineering
Workload: 60 class hours (= 45 clock hours) over a 15-week period. The total student study time is 150 hours (equivalent to 5 ECTS credits). There are therefore 105 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): WIBASc115 Principles of Business Administration I (BWL I) WIBASc215 WIBASc245 Manufacturing Engineering WIBASc315 Cost Accounting WIBASc325 Investment/Financing [*updated 11.02.2020*]
Recommended as prerequisite for:

Module coordinator:
Prof. Dr. Michael Krämer

Lecturer:
Prof. Dr. Michael Krämer (lecture)
Torsten Schmidt (project)
[*updated 11.02.2020*]

Learning outcomes:
The course examines the students´ ability to reconcile economic and engineering issues and find solutions.
By working in groups the students will also train their social and communicative skills.
[*updated 13.09.2018*]

Module content:
Within the framework of a feasibility study, the students in the group must plan a production plant together. This includes, on the one hand, the description of the production process, the design of the machines and equipment required for production and the design of a layout for the entire plant. And on the other, students must determine the achievable prices for the purchase and sale of raw materials and products and make a prediction as to whether the planned company can be operated economically.
The project must be completed within a maximum of 15 weeks. The results will be presented in a PowerPoint presentation and written down in a joint paper.
[*updated 13.09.2018*]

Teaching methods/Media:
Projector presentation, written composition, project work
[*updated 13.09.2018*]

Recommended or required reading:
Depending on requirements and topics
[*updated 13.09.2018*]

Principles of Supply Networks and Systems

Module name (EN): Principles of Supply Networks and Systems

Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013

Module code: WIBASc-525-625-Ing10

Hours per semester week / Teaching method: 1V+1U (2 hours per week)

ECTS credits: 3

Semester: 5

Mandatory course: no

Language of instruction:
German

Assessment:
Written exam

Curricular relevance:
WIBASc-525-625-Ing10 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 5, optional course

Workload:
30 class hours (= 22.5 clock hours) over a 15-week period.
The total student study time is 90 hours (equivalent to 3 ECTS credits).
There are therefore 67.5 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
WIBASc435 Thermodynamics
WIBASc445 Electrical Engineering
[*updated 10.02.2020*]

Recommended as prerequisite for:
WIBASc-525-625-Ing17 Network Model Renewable Energies
WIBASc525-625-Ing11 Utility Network Calculation and Planning
[*updated 20.01.2020*]

Module coordinator:
Prof. Dr. Rudolf Friedrich

Lecturer:
Prof. Dr. Rudolf Friedrich
Lehrbeauftragte
[*updated 10.02.2020*]

Learning outcomes:
- After successfully completing this module, students will have basic technical knowledge about supply networks and _systems.
- They will be familiar with the structure, function and operating behavior of the equipment.
- They will be familiar with the internal structure of supply systems.
- They will be familiar with the interaction between the assets and the structure of the energy supply system.
- They will be able to technically evaluate network structures.
- They will have the theoretical basis for carrying out simple network planning.

[*updated 02.07.2019*]

Module content:
1. Gas, water, electricity supply
2. Electrical power supply
_ Electrical substations
_ Power stations
_ Power lines
_ Cables
3. Gas supply
_ Gas pressure regulating stations
_ Pipelines
_ Gas storage
4. Water supply
_ Water extraction
_ Water treatment and storage
_ Water distribution (pipe networks)
5. District heating supply

[*updated 02.07.2019*]

Teaching methods/Media:
Printed lecture notes (regularly revised), blackboard with additional practical examples; exercises based on technical case studies and planning tasks.
[*updated 02.07.2019*]

Recommended or required reading:

_ Homann, K./ Hüning, R.: Handbuch der Gas-Rohrleitungstechnik, 2. Auflage, Oldenbourg Verlag

_ Mutschmann, J./ Stimmelmayr F.: Taschenbuch der Wasserversorgung, 13. Auflage, Vieweg-Verlag

_ Cerbe G.: Grundlagen der Gastechnik, 7. Auflage, Hanser-Verlag

_ Lindner, H./ Brauer, H./ Lehmann, C.: Taschenbuch der Elektrotechnik und Elektronik, 9. Auflage, Carl Hanser Verlag, 2008

_ Haubrich, H.-J.: Elektrische Energieversorgungssysteme, Verlag der Augustinus Bhg, 1997

_ Heuck, Dettmann _Energietechnik_, Vieweg-Teubner, 8.Auflage

_ Energie in Deutschland - BMWi

[*updated 02.07.2019*]

Process Management

Module name (EN): Process Management
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc-525-625-FÜ1
Hours per semester week / Teaching method: 1V+1U (2 hours per week)
ECTS credits: 3
Semester: 5
Mandatory course: no
Language of instruction: German
Assessment: Paper with presentation or written exam
Curricular relevance: WIBASc-525-625-FÜ1 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 5, optional course
Workload: 30 class hours (= 22.5 clock hours) over a 15-week period. The total student study time is 90 hours (equivalent to 3 ECTS credits). There are therefore 67.5 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): None.
Recommended as prerequisite for:
Module coordinator: Prof. Dr. Michael Krämer

Lecturer:
Lehrbeauftragte
[*updated 06.01.2020*]

Learning outcomes:
After successfully completing this module students will:
_ know the different processes and how to categorize them.
_ know the methods for process description and the different methods for process improvement.
_ have learned the basics of statistical process control
_ and will be able to apply these to examples in a model factory.
[*updated 13.09.2018*]

Module content:
1. Structuring processes
2. Technical processes
3. Production planning and production control process
4. Statistical process control
5. FMEA
6. Process introduction and optimization

[*updated 13.09.2018*]

Teaching methods/Media:
Regularly revised lecture notes will be passed out.
[*updated 13.09.2018*]

Recommended or required reading:
_ Füermann, T./Dammasch, C.: Prozessmanagement, 3. Auflage, Carl Hanser Verlag, 2008
_ Franz, S./Scholz, R.: Prozessmanagement leicht gemacht, Hanser Fachbuch, 1996
_ Helfrich, C.: Praktisches Prozessmanagement, 2. Auflage, Hanser Fachbuch, 2002
_ Becker, J./Kugler, M./Rosemann, M: Prozessmanagement, 6. Auflage, Springer, 2008
[*updated 13.09.2018*]

Production Planning (Seminar)

Module name (EN): Production Planning (Seminar)
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc-525-625-Ing1
Hours per semester week / Teaching method: 1U+1P (2 hours per week)
ECTS credits: 3
Semester: 6
Mandatory course: no
Language of instruction: German
Assessment: Project work
Curricular relevance: WIBASc-525-625-Ing1 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 6, optional course
Workload: 30 class hours (= 22.5 clock hours) over a 15-week period. The total student study time is 90 hours (equivalent to 3 ECTS credits). There are therefore 67.5 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): WIBASc245 Manufacturing Engineering WIBASc535 Introduction to Scientific Work (with seminar) [*updated 11.02.2020*]
Recommended as prerequisite for:
Module coordinator: Prof. Dr.-Ing. Dieter Arendes

Lecturer:
Prof. Dr.-Ing. Dieter Arendes
[*updated 11.02.2020*]

Learning outcomes:
After successfully completing this module students will:
_ be able to systematically and comprehensibly plan production for (new) products, including the essential technical (machines, tools, production processes, time schedules and number of employees) and economic aspects (investments, production costs), i.e. students will
_ be able to create a production parts list and a process graph from a product.
_ be able to develop a production concept with estimates of employee requirements and investments.
_ be able to create a layout for a one-piece-flow assembly line and build it as a 1:1 model, as well as to transfer this into a concept for total production.
_ be able to estimate the necessary investments and staff capacities.
[*updated 02.07.2019*]

Module content:
Based on a specific product, e.g. drilling machine, jigsaw, orbital sander, a production plan will be created:
_ Component analysis with parts list and decision regarding in-house/external production
_ Creation of a process graph, production concept with time specifications and individual investments
_ Creation of a layout for a chaku-chaku line with a high manual part
_ Planning the production for a multi-year quantity scenario
_ Calculation of production costs

If industrial partners are available, their existing production lines will be analyzed and replanned.
[*updated 02.07.2019*]

Teaching methods/Media:
The following types of media will be used during the seminar: Projector, slides, laptop, sample components, blackboard, daylight recorder, etc.
Planning will take place 1 to 1 in the model factory with mobile assembly tables, including assembly tools and devices. Results will be presented and discussed in several groups.
[*updated 02.07.2019*]

Recommended or required reading:

_ Meran, R., John, A., Staudter, C., Roenpage, O., Lunau, S.: Six Sigma+Lean Toolset, Mindset zur erfolgreichen Umsetzung von Verbesserungsprojekten, Springer-Verlag Berlin Heidelberg, 2012

_ Erlach, K., Wertstromdesign: Der Weg zur schlanken Fabrik, Springer-Verlag Berlin Heidelberg, 2010

_ Brunner, F.J., Japanische Erfolgskonzepte, Hanser- Verlag, 2011

_ Rother, M., Die Kata des Weltmarktführers, Campus Verlag, 2009

_ May, C.; Schumek, P., TPM _ Total Productive Management, CETPM Publishing, 2009

_ Dickmann, P., Schlanker Materialfluss, Springer-Verlag, 2007

_ Takeda, H., Das synchrone Produktionssystem, Verlag Moderne Industrie, 1995

_ Westkämper, E., Null-Fehler-Produktion in Prozessketten, Springer-Verlag, 1997

_ Shingo, S., Poka-Yoke, gfmt-Gesellschaft für Management und Technologie, 1991

_ Shingo, S., Das Erfolgsgeheimnis der Toyota Produktion, Verlag Moderne Industrie, 1993

_ Womack, J. P., Jones, D. T., Auf dem Weg zum perfekten Unternehmen, Heyne-Verlag, 1998

_ Eversheim, W., Gestaltung von Produktionssystemen, Springer-Verlag, 1999

[*updated 02.07.2019*]

Production Project

Module name (EN): Production Project
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc-525-625-FÜ30
Hours per semester week / Teaching method: 2PA (2 hours per week)
ECTS credits: 3
Semester: 6
Mandatory course: no
Language of instruction: German
Assessment: Project work
Curricular relevance: WIBASc-525-625-FÜ30 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 6, optional course, general subject
Workload: 30 class hours (= 22.5 clock hours) over a 15-week period. The total student study time is 90 hours (equivalent to 3 ECTS credits). There are therefore 67.5 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): WIBASc-525-625-Ing2 Integrated Production Systems WIBASc245 Manufacturing Engineering [*updated 11.02.2020*]
Recommended as prerequisite for:
Module coordinator: Prof. Dr.-Ing. Dieter Arendes

Lecturer:
Prof. Dr.-Ing. Dieter Arendes
[*updated 11.02.2020*]

Learning outcomes:
Learning outcomes:
After successfully completing this module students will:
_ have experienced teamwork with its group dynamics and have developed and strengthened their self-organization and project management skills
_ be able to present and discuss their work results
_ have deepened their knowledge in a selected and current thematic area from the field of production.
[*updated 13.09.2018*]

Module content:
Student teams will independently work on a technical or interdisciplinary task from the field of production and summarize their results in a project report (and present them in a presentation). The teams themselves are responsible for delegating tasks and organizing. The project teams will be accompanied and coached by professors and lecturers from the HTW.
[*updated 13.09.2018*]

Teaching methods/Media:
Regular support and coaching. Presentation and moderation media such as meta-plan boards, flip charts, a PC with beamer
[*updated 13.09.2018*]

Recommended or required reading:
The lecturer will recommend literature at the beginning of the course depending on the project task.
[*updated 13.09.2018*]

Quality Techniques (Seminar, English)

Module name (EN): Quality Techniques (Seminar, English)

Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013

Module code: WIBASc-525-625-Ing4

Hours per semester week / Teaching method: 2SU (2 hours per week)

ECTS credits: 3

Semester: 6

Mandatory course: no

Language of instruction:
English

Assessment:
Written composition with presentation

Curricular relevance:
WIBASc-525-625-Ing4 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 6, optional course

Workload:
30 class hours (= 22.5 clock hours) over a 15-week period.
The total student study time is 90 hours (equivalent to 3 ECTS credits).
There are therefore 67.5 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
WIBASc125 Industrial Management
WIBASc245 Manufacturing Engineering
WIBASc365 English I
WIBASc465 English II
WIBASc535 Introduction to Scientific Work (with seminar)
[*updated 11.02.2020*]

Recommended as prerequisite for:

Module coordinator:
Prof. Dr. Udo Venitz

Lecturer:
Prof. Dr. Udo Venitz
[*updated 11.02.2020*]

Learning outcomes:
After successfully completing this module students will be able to:
_ independently research a technical subject using different quality techniques.
_ create an English-language documentation and presentation (assistance will be available at the beginning of the course) by themselves on a subject assigned to them.
_ demonstrate their communicative skills by presenting and discussing their subject in English in front of their fellow students and the lecturer.
_ follow and understand specialized lectures in English and solve problems by asking questions in English. In addition, they will have acquired a good overview of the various quality techniques.
[*updated 13.09.2018*]

Module content:
1. Basic tools
2. Preventative methods
3. Capability analyses incl. statistical principles
4. Inspection methods
5. Additional techniques
[*updated 13.09.2018*]

Teaching methods/Media:
Participants will receive a summary of each topic from their fellow classmates.
Presentations will be carried out using a laptop and projector.
[*updated 14.03.2018*]

Recommended or required reading:
_ Brunner, F.J./Wagner, K.W.: Taschenbuch Qualitätsmanagement, 4. Auflage, Carl Hanser Verlag, 2010
_ Kamiske: Qualitätstechniken für Ingenieure; Symposion Publishing; 2009
_ Linß: Qualitätsmanagement für Ingenieure; C. Hanser Verlag; 2011
_ Schmitt, R./Pfeifer, T.: Qualitätsmanagement, 4. Auflage, Carl Hanser Verlag, 2010
_ Theden, P./Colsman, H.: Qualitätstechniken, 4. Auflage, Carl Hanser Verlag, 2005
_ Zollondz, H.-D.: Grundlagen Qualitätsmanagement, 3. Auflage, Oldenbourg Wissenschaftsverlag, 2011
[*updated 14.03.2018*]

Research Seminar

Module name (EN): Research Seminar
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc-525-625-FÜ33
Hours per semester week / Teaching method: 2SU+2S (4 hours per week)
ECTS credits: 5
Semester: 5
Mandatory course: no
Language of instruction: English
Assessment: Written composition with presentation
Curricular relevance: WIBASc-525-625-FÜ33 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 5, optional course, general subject
Workload: 60 class hours (= 45 clock hours) over a 15-week period. The total student study time is 150 hours (equivalent to 5 ECTS credits). There are therefore 105 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): WIBASc365 English I WIBASc465 English II [*updated 11.02.2020*]
Recommended as prerequisite for:
Module coordinator: Prof. Dr.-Ing. Christian Köhler

Lecturer:
Prof. Dr.-Ing. Christian Köhler
[*updated 11.02.2020*]

Learning outcomes:
[*still undocumented*]

Module content:
[*still undocumented*]

Recommended or required reading:
[*still undocumented*]

Simulation

Module name (EN): Simulation
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc-525-625-FÜ23
Hours per semester week / Teaching method: 1V+1U (2 hours per week)
ECTS credits: 3
Semester: 4
Mandatory course: no
Language of instruction: German
Assessment: Written exam, presentation
Curricular relevance: WIBAS-450/550-M5g Industrial Engineering, Bachelor, ASPO 01.10.2007, semester 4, optional course WIBASc-525-625-FÜ23 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 4, optional course
Workload: 30 class hours (= 22.5 clock hours) over a 15-week period. The total student study time is 90 hours (equivalent to 3 ECTS credits). There are therefore 67.5 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): WIBASc145 Physics WIBASc165 Mathematics I WIBASc255 Statistics WIBASc265 Mathematics II WIBASc355 Computer Science / Programming [*updated 06.01.2020*]

Recommended as prerequisite for:
Module coordinator: Prof. Dr. Frank Kneip
Lecturer: Prof. Dr. Frank Kneip [*updated 16.08.2011*]
Learning outcomes: [*still undocumented*]
Module content: [*still undocumented*]
Recommended or required reading: [*still undocumented*]

Simulation II

Module name (EN): Simulation II

Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013

Module code: WIBASc-525-625-FÜ19

Hours per semester week / Teaching method: 1V+1U (2 hours per week)

ECTS credits: 3

Semester: 5

Mandatory course: no

Language of instruction:
German

Assessment:
Written exam

Curricular relevance:
WIBASc-525-625-FÜ19 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 5, optional course

Workload:
30 class hours (= 22.5 clock hours) over a 15-week period.
The total student study time is 90 hours (equivalent to 3 ECTS credits).
There are therefore 67.5 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
WIBASc145 Physics
WIBASc165 Mathematics I
WIBASc255 Statistics
WIBASc265 Mathematics II
WIBASc355 Computer Science / Programming
[*updated 06.01.2020*]

Recommended as prerequisite for:

Module coordinator:
Prof. Dr. Frank Kneip

Lecturer:
Prof. Dr. Frank Kneip
[*updated 06.01.2020*]

Learning outcomes:
After successfully completing this module students will:
_ have received insight into integration methods for solving common differential equations.
_ know options regarding the solution methods in Simulink.
_ have the ability to implement time-discrete systems in Simulink taking sampling times into account.
_ be able to model and implement suitable systems using non-linear, discontinuous and/or user-defined sub-elements.
_ have the ability to interpret simulation results.
[*updated 13.09.2018*]

Module content:
1. Integration methods in Simulink
2. Importance of selected options from the solution methods
3. Sampling times and time-discrete systems
4. Non-linear and discontinuous elements
5. User-defined functions in Simulink
6. Implementation and simulation of example models

[*updated 13.09.2018*]

Teaching methods/Media:
Lecture with integrated exercises,
presentation with projector, lecture notes, blackboard, PC, Matlab/Simulink
[*updated 13.09.2018*]

Recommended or required reading:
_ Pietruszka, W. D.: Matlab und Simulink in der Ingenieurpraxis _ Modellbildung, Berechnung und Simulation; 3. Auflage, Vieweg+Teubner Verlag, 2012
_ RRZN Handbuch: Matlab/Simulink; 4. Auflage, 2012
_ Nollau, R.: Modellierung und Simulation technischer Systeme; Springer Verlag, 2009
_ Haußer, F., Luchko, Y.: Mathematische Modellierung mit Matlab; Spektrum Akademischer Verlag, 2011
_ Scherf, H.: Modellbildung und Simulation dynamischer Systeme - Eine Sammlung von Simulink-Beispielen;
_ 4. Auflage, Oldenbourg Verlag, 2010
[*updated 13.09.2018*]

Starting a Business - "5 Euro-Business"

Module name (EN): Starting a Business - "5 Euro-Business"
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc-525-625-FÜ21
Hours per semester week / Teaching method: 2SU+2F (4 hours per week)
ECTS credits: 5
Semester: 5
Mandatory course: no
Language of instruction: German
Assessment: Written composition with presentation
Curricular relevance: WIBASc-525-625-FÜ21 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 5, optional course, corporate governance
Workload: 60 class hours (= 45 clock hours) over a 15-week period. The total student study time is 150 hours (equivalent to 5 ECTS credits). There are therefore 105 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): WIBASc115 Principles of Business Administration I (BWL I) [*updated 11.02.2020*]
Recommended as prerequisite for:
Module coordinator: Prof. Dr. Stefan Georg

Lecturer: Prof. Dr. Stefan Georg
[*updated 02.07.2014*]

Learning outcomes:
[*still undocumented*]

Module content:
[*still undocumented*]

Recommended or required reading:
[*still undocumented*]

Technical Sales and Distribution (Seminar)

Module name (EN): Technical Sales and Distribution (Seminar)

Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013

Module code: WIBASc525-625-W11

Hours per semester week / Teaching method: 1SU+1S (2 hours per week)

ECTS credits: 3

Semester: 6

Mandatory course: no

Language of instruction:
English

Assessment:
Term paper, presentation

Curricular relevance:
WIBASc525-625-W11 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 6, optional course, general subject

Workload:
30 class hours (= 22.5 clock hours) over a 15-week period.
The total student study time is 90 hours (equivalent to 3 ECTS credits).
There are therefore 67.5 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
WIBASc-525-625-FÜ39
WIBASc225 Procurement Logistics and Technical Sales and Distribution
WIBASc365 English I
WIBASc465 English II
WIBASc535 Introduction to Scientific Work (with seminar)
[*updated 11.02.2020*]

Recommended as prerequisite for:

Module coordinator:
Prof. Dr.-Ing. Christian Köhler

Lecturer:
Prof. Dr.-Ing. Christian Köhler
[*updated 11.02.2020*]

Learning outcomes:
After successfully completing this module, students will have gained in-depth insight and practical experience in selected areas of technical sales and distribution, e.g. international & cross-cultural aspects of technical sales and distribution, impacts of digitalization, negotiation skills.

They will be familiar with effective meeting strategies and have improved their communication skills in sales situations.

Students will understand and be able to explain complex business contexts.
[*updated 13.09.2018*]

Module content:
Basics of technical sales and distribution (repetition)
Internationalization strategies and cultural differences
Personal appearance and skills in sales situations (meetings, product presentations, argumentation, negotiations etc.)
Impacts of digitalization (e.g. aspects of social media in B2B-markets)
Product management
Case studies
Project work
[*updated 13.09.2018*]

Teaching methods/Media:
Lectures, discussions, debates, group work, case studies
[*updated 14.03.2018*]

Recommended or required reading:
Care & Bohlig (2014): Mastering Technical Sales: The Sales Engineer´s Handbook, Artech House Publishing
Hollensen: Global Marketing, Pearson Education Limited
Brennan, Canning & McDowell: Business-to-Business Marketing, Sage Publishing
[*updated 13.09.2018*]

Technology and Innovation Management (English)

Module name (EN): Technology and Innovation Management (English)

Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013

Module code: WIBASc-525-625-FÜ36

Hours per semester week / Teaching method: 4PA (4 hours per week)

ECTS credits: 5

Semester: according to optional course list

Mandatory course: no

Language of instruction:
English

Assessment:
Project work

Curricular relevance:
IBB-650 International Business Administration, Bachelor, ASPO 01.10.2020, semester 6, optional course, general subject
WIBASc-525-625-FÜ36 Industrial Engineering, Bachelor, ASPO 01.10.2013, optional course, general subject

Workload:
60 class hours (= 45 clock hours) over a 15-week period.
The total student study time is 150 hours (equivalent to 5 ECTS credits).
There are therefore 105 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
WIBASc225 Procurement Logistics and Technical Sales and Distribution
WIBASc315 Cost Accounting
WIBASc345 Design Technology / CAD
WIBASc365 English I
WIBASc465 English II
WIBASc545 Project Management and Communication
[*updated 11.02.2020*]

Recommended as prerequisite for:

Module coordinator:
Prof. Dr.-Ing. Christian Köhler

Lecturer:
Prof. Dr.-Ing. Christian Köhler
[*updated 11.02.2020*]

Learning outcomes:
Students who have successfully completed this module, ...
... are familiar with the theoretical basics of technology and innovation management
... can name the tasks of technology and innovation management in companies
... know phase models (Design Thinking, Cross-Industry Innovation) for the successful generation of innovations
... can apply selected systematic methods of technology and innovation management in practice
... can create an innovation-friendly atmosphere in teams
... have gathered a mindset that promotes innovation
... can translate an innovation into a business model and market it
... have experienced the ups and downs of an innovation project with Design Thinking themselves
[*updated 04.02.2020*]

Module content:
1. Introduction to innvoation management
2. Introduction to Design Thinking
3. Disruption, structural and organizational aspects of innovation management
4. Design Thinking Phase 1: Inspiration
5. Deisgn Thinking Phase 2: Ideation
6. Deisgn Thinking Phase 3: Implementation
7. Basics of technology management

The course is supported by innovation labs and self-study phases in which students work on a design thinking project.
[*updated 12.06.2019*]

Teaching methods/Media:
Lectures with excercises
Innovation labs
Project work
Project reporting
Self-reflection
[*updated 04.02.2020*]

Additional information:
Disruption was voted "Economic Word of the Year" by the FAZ in 2015 and is associated with the fact that companies and business models that have been successful for decades suddenly have no more future. In the meantime, companies have realised that good ideas alone are not enough to be innovative and thus, successful in the long term. Ideas only become innovations when they turn into products or services that are successful on the market. This elective teaches how this works, which obstacles must be overcome and how innovations are created systematically.

Please register via the Moodle Learning Management System.
[*updated 04.02.2020*]

Recommended or required reading:
Vullings/Heleven: Not invented here - Cross-Industry-Innovation, BIS Publishers, 2015
Brown: Change by Design, HarperCollins
Bower/Christensen: Disruptive technologies - Catching the wave. in: Harvard Business Review, Jan/Feb 1995
Christensen: The Innovator´s Dilemma: When New Technologies Cause Great Firms to Fail (Management of Innovation and Change), Harvard Business Review Press, 2013
Ries: The Lean Startup: How Today´s Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses, Currency, 2011
Dark Horse Innovation: Digital Innovation Playbook, Murmann Publishers, 2017
Lewrick/Link/Leifer: The Design Thinking Playbook, Wiley, 2018

and additional reading material distributed during the course
[*updated 27.01.2020*]

Using Mathematical Software

Module name (EN): Using Mathematical Software
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc-525-625-FÜ12
Hours per semester week / Teaching method: 1V+1U (2 hours per week)
ECTS credits: 3
Semester: 5
Mandatory course: no
Language of instruction: German
Assessment: Written exam
Curricular relevance: WIBASc-525-625-FÜ12 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 5, optional course
Workload: 30 class hours (= 22.5 clock hours) over a 15-week period. The total student study time is 90 hours (equivalent to 3 ECTS credits). There are therefore 67.5 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): WIBASc165 Mathematics I WIBASc255 Statistics WIBASc265 Mathematics II WIBASc455 Business Informatics / Operations Research [*updated 20.01.2020*]
Recommended as prerequisite for:

Module coordinator:
Prof. Dr. Frank Kneip

Lecturer:
Michael Ohligschläger
[*updated 20.01.2020*]

Learning outcomes:
After successfully completing this module students will:
_ be able to model basic mathematical/technical problems and solve them with the help of a CAS (Computer Algebra System).
_ have a basic understanding of the general structure of common CAS such as Maple, Mathematica, etc.
_ have basic knowledge of how CAS libraries can be successfully used as tools.
_ have basic skills that can be used to present their results in an appealing and adequate form.
_ be capable of independently solving technical program problems using the program´s internal help systems.
[*updated 13.09.2018*]

Module content:
1. Introduction to principles and operation of computer algebra systems (CAS) (e.g. Mathematica, Mupad, Maple, Derive)
2. Realization of small projects in the fields of graphics, numerics, differential and integral calculus, linear algebra and stochastics
3. Principles of mathematical modelling
4. Case studies on mathematical modelling and its implementation with a CAS (e.g. Mathematica), e.g. on cryptography, curves and surfaces, differential equations, Monte Carlo methods
[*updated 13.09.2018*]

Teaching methods/Media:
The program packages Maple, Matlab will be used.
[*updated 13.09.2018*]

Recommended or required reading:

_ Barnes, G./ Fulford, G. R.: Mathematical Modelling with Case Studies; Crc Pr Inc, 2008
_ Basmadjian, D.: Mathematical Modeling of Physical Systems; Oxford University Press, 2003
_ Davis W. / Porta, H. / Uhl, J. J.: Calculus & Mathematica; Addison Wesley, 1994
_ Edwards, D. / Hamson, M.: Guide to Mathematical Modelling; Industrial Pr Inc, 2006
_ Hearn, D. D. / Baker, M. P. / Carithers, W.: Computer Graphics; Prentice Hall, 2010
_ Walz: Maple 7, Rechnen und Programmieren; Oldenbourg Wissenschaftsverlag, 2002
_ Kofler, M. / Bitsch, G. / Komma, M.: Maple: Einführung, Anwendung, Referenz; 5. Auflage, Addison-Wesley, 2002
_ Werner, W.: Mathematik lernen mit Maple 1; 2. Auflage, Dpunkt Verlag, 2001
_ Werner, W.: Mathematik lernen mit Maple 2, dpunkt Verlag, 1998
_ Fiume, E.: Scientific Computing; dpunkt Verlag, 1998

[*updated 13.09.2018*]

Utility Network Calculation and Planning

Module name (EN): Utility Network Calculation and Planning
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc525-625-Ing11
Hours per semester week / Teaching method: 1V+1U (2 hours per week)
ECTS credits: 3
Semester: 5
Mandatory course: no
Language of instruction: German
Assessment: Students will work on a planning task with the aid of computers
Curricular relevance: WIBASc525-625-Ing11 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 5, optional course
Workload: 30 class hours (= 22.5 clock hours) over a 15-week period. The total student study time is 90 hours (equivalent to 3 ECTS credits). There are therefore 67.5 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): WIBASc-525-625-Ing10 Principles of Supply Networks and Systems [*updated 06.01.2020*]
Recommended as prerequisite for: WIBASc-525-625-Ing17 Network Model Renewable Energies [*updated 20.01.2020*]

Module coordinator:
Prof. Dr. Rudolf Friedrich

Lecturer:
Prof. Dr. Rudolf Friedrich
Lehrbeauftragte
[*updated 06.01.2020*]

Learning outcomes:
- After successfully completing this module, students will be able to use computer-aided utility network calculation and planning tools.
- They will be able to monitor electricity networks and represent them graphically.
- They will be able to monitor gas networks and represent them graphically.
- Students will be able to perform calculations and plan independently.
- They will be able to evaluate their calculation results.

[*updated 02.07.2019*]

Module content:
1. Principles and the operation of the Stanet pipe network calculation program
2. Principles and the operation of the Neplan network analysis tool
3. Electrical network calculation (short circuit current calculation, power-flow study)
4. Pipe network calculation

[*updated 13.09.2018*]

Teaching methods/Media:
Program training in the PC laboratory.
Exercises based on technical case studies, as well as calculation and planning tasks.
[*updated 02.07.2019*]

Recommended or required reading:
_ Homann, K./ Hüning, R.: Handbuch der Gas-Rohrleitungstechnik, 2. Auflage, Oldenbourg Verlag
_ Cerbe G.: Grundlagen der Gastechnik, 7. Auflage, Hanser-Verlag
_ Lindner, H./ Brauer, H./ Lehmann, C.: Taschenbuch der Elektrotechnik und Elektronik, 9. Auflage, Carl Hanser Verlag, 2008
_ Haubrich, H.-J.: Elektrische Energieversorgungssysteme, Verlag der Augustinus Bhg, 1997
_ Heuck, Dettmann _Energietechnik_, Vieweg-Teubner, 8.Auflage

[*updated 13.09.2018*]

Valuation (English)

Module name (EN): Valuation (English)
Degree programme: Industrial Engineering, Bachelor, ASPO 01.10.2013
Module code: WIBASc-525-625-W7
Hours per semester week / Teaching method: 1V+1U (2 hours per week)
ECTS credits: 3
Semester: 5
Mandatory course: no
Language of instruction: English
Assessment: Written exam
Curricular relevance: WIBASc-525-625-W7 Industrial Engineering, Bachelor, ASPO 01.10.2013, semester 5, optional course
Workload: 30 class hours (= 22.5 clock hours) over a 15-week period. The total student study time is 90 hours (equivalent to 3 ECTS credits). There are therefore 67.5 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): None.
Recommended as prerequisite for:
Module coordinator: Prof. Dr. Andy Junker

Lecturer:
Prof. Dr. Andy Junker
[*updated 31.01.2020*]

Learning outcomes:
After successfully completing this module, students will have learned about and understand the different reasons for a business valuation. They will be familiar with the relevant valuation methods and the derivation of a risk-adjusted discount rate (portfolio selection, CAPM, debt policy, Modigliani-Miller)
They will understand the importance of an integrated corporate planning (P&L, cash flow and balance sheet) as a prerequisite for business valuation.
Students will be able to analyze, estimate and apply the typical paramaters of a valuation (Beta, risk premium, cash flow).
Students will be familiar with the highlights of German valuation standards (IDW S1, RS 10).
[*updated 13.09.2018*]

Module content:
A. Valuation as special case of capital budgeting
B. Reasons for valuation
C. Valuation methods
1. Asset value
2. Multiples
3. Net present value
4. DCF (Discounted Cashflow)
D. Procedure
1. Planning
i. Analysis of the past
ii. Validation of planning
2. Non-operation assets
3. Discount rate
iii. Portfolio Selection / CAPM
iv. Beta / Modigliani-Miller / Inflation
4. Taxes
5. Distinctions
E. Impairment test (IFRS)
F. Summary
[*updated 13.09.2018*]

Teaching methods/Media:
PowerPoint handout, case studies, Excel model
[*updated 14.03.2018*]

Recommended or required reading:

_ Brealey, R. / Myers, S. / Allen, F.: Principles of Corporate Finance, 10th edition, 2010

_ Copeland, Tom u.a.: Unternehmenswert; 3. Auflage, Campus Verlag, Frankfurt 2002

_ Damodaran, Aswath: Damodaran on Valuation; 2nd edition, John Wiley and Sons, New Jersey 2006

_ Drukarczyk, Jochen/Schüler, Andreas: Unternehmensbewertung; 6. Aufl., Vahlen, München 2009

_ Institut der Wirtschaftsprüfer: Grundsätze zur Durchführung von Unternehmensbewertungen (IDW Standard S1) i.d.F. vom 2.4.08.

[*updated 14.03.2018*]