Course catalogue

Department Wirtschaft

Study Programme Business Engineering Logistics

Degree awarded Bachelor of Engineering (B.Eng.)

Effective as of:	**Fall Semester 2021/22**
Course leader:	**Prof. Dr.-Ing. Susanne Hetterich**
Issued in printed form:	**10.11.2023**
Workload:	**210 ECTS**
Academic regulations:	**1**

Modules and course units

Module	Module coordinator
G1 Logistics systems	Prof. Dr.-Ing. Markus Fittinghoff
G2 Practical Computer Science I	Prof. Dr. Stefan Kuhlins
G3 Applied Mathematics I	Prof. Dr. Bernd-Ole Wartlick
G4 Business Administration I	Prof. Dr. Susanne Hetterich
G5 Engineering I	Prof. Dr.-Ing. Michael Dietzel
G6 General Skills	Prof. Dr.-Ing. Annett Großmann Julia Aldinger
G7 Practical Computer Science II	Prof. Dr. Stefan Kuhlins
G8 Applied Mathematics II	Prof. Dr. Bernd-Ole Wartlick
G9 Physics	Prof. Dr. Bernd-Ole Wartlick
G10 Business Administration II	Prof. Dr. Susanne Hetterich
G11 Engineering II	Prof. Dr.-Ing. Michael Dietzel Dr.-Ing. Thomas Kriehn
H1 Methods & Processes	Prof. Dr. Susanne Hetterich Prof. Dr. Bernd-Ole Wartlick
H2 Material Flow Engineering	Prof. Dr.-Ing. Michael Dietzel
H3 Company Organization	Prof. Dr.-Ing. Annett Großmann
H4 Databases	Prof. Dr. Stefan Kuhlins
H5 Statistics	Prof. Dr. Bernd-Ole Wartlick
VA Concentration Field Technic and AI Lab	Dr.-Ing. Thomas Kriehn
VA Concentration Field Business	Prof. Dr. Susanne Hetterich
H6 Data Analytics	Prof. Dr. Susanne Hetterich
H7 Planning of Logistics Systems	Prof. Dr.-Ing. Markus Fittinghoff
H8 Production Systems and Occupational Science & Work Safety	Prof. Dr.-Ing. Markus Fittinghoff Prof. Dr.-Ing. Annett Großmann
H9 Quality, Environmental and Energy Management, Sustainability	Prof. Dr.-Ing. Annett Großmann
H10 Business Law and Ethics	Prof. Dr. Sabine Boos
P Practical semester and colloquium for the practical semester	Prof. Dr. Stefan Kuhlins
H11 Applied Computer Science in Logistics	Prof. Dr. Stefan Kuhlins
H12 Warehouse Management Systems & Simulation	Prof. Dr.-Ing. Markus Fittinghoff
H13 Human Resources Management & Leadership	Prof. Dr.-Ing. Annett Großmann
WL	Dr.-Ing. Thomas Kriehn Prof. Dr.-Ing. Annett Großmann
H14 Transfer Competence	Prof. Dr. Susanne Hetterich
B Thesis	Prof. Dr. Susanne Hetterich

General learning outcomes Business Engineering Logistics

On the one hand, graduates can take on management tasks as executives and on the other hand, they can be deployed as highly qualified specialists.
They are enabled to take on typical management tasks such as the organization and personnel, capacity and deployment planning of logistics departments such as incoming and outgoing goods, warehousing and production areas. You will have a high level of abstraction, analytical thinking and detailed process knowledge in intralogistics in order to be able to design cross-functional, cross-divisional and cross-company processes in a cost-effective, efficient and robust manner. They have basic legal knowledge for contract negotiations. Graduates are able to prepare economic decisions on investments in material flow technologies and the flow of information in logistics systems. They have the competence to be able to lay out and design both the material flow and the accompanying information flow. They thus help to ensure the operation and maintenance of logistics systems and also to bring about improvements. They achieve the latter by taking a holistic view of equipment and its networked control using modern IT systems. The unique selling points of this degree program in education are

- the integration of the three pillars of technology, processes and people within the focus on logistics,
- the choice in the specializations Innovation Projects and Technology + AI Lab as well as
- the high degree of networking within the framework of practical projects.

First-year programme

Module G1 382000 Logistics systems

Duration	1 Semester
Contact hours per week (45 mins each)	4
Type of assessment	Module without assessment: Grade includes individual student performances
Number of ECTS credits awarded	5.0
Preconditions for obtaining ECTS credits	Successful participation in the laboratory experiments
Module coordinator	Prof. Dr.-Ing. Markus Fittinghoff
Professional competence: In-depth knowledge and comprehension	The students can describe the various tasks and functions of packaging and derive the effects of packaging design on the entire logistics system. They are able to determine the strength of packaging materials using a stacking press in laboratory tests. The students can explain the different techniques for forming loading units and assess their achievable qualities and performance. The students can name and differentiate the conveying and storage techniques required for the design of intralogistic material flows and evaluate their use according to various criteria and requirements. The students can classify the variants of different picking principles and techniques.
Professional competence: conative skills, analysis and synthesis of knowledge	Packaging and cushioning materials can be dimensioned and optimised using examples. Suitable variants can be proposed, selected and planned into simple systems from the multitude of available conveying and storage equipment. With the help of cycle time calculations, conveyors can be dimensioned in terms of throughput and required number. Picking systems can be designed and laid out according to requirements.
Personal competence: Social abilities and skills	The students are able to explain the necessary, careful handling of raw materials and energy in terms of the circular economy and the packaging law. The students are aware of the effects of a logistically appropriate design of packaging and loading units in the context of modularisation.
Personal competence: Independence / autonomy)	Students can measure and record the behaviour of transceivers and transponders at different frequencies and shielding in laboratory tests. The performance of simple systems of continuous and discontinuous conveyors can be calculated analytically.
Competence levels according to GQF	6
Prerequisites (see below)	
Module specifics	
Scheduled	regular plus one appointment per student* for the laboratory experiments in small groups
Combined assessments	Will be published in the first three weeks of lectures

Course unit title G1.1 382001 Logistics systems

This course unit forms part of module G1, it is mandatory.

Name of lecturer(s)	Prof. Dr.-Ing. Markus Fittinghoff
Semester	1
Available in	Winter and summer semester
Mode of delivery	Lecture, Seminar including exercises
Language of instruction	German and English
Course unit title (German)	Logistiksysteme
Number of ECTS credits awarded	5.0, this corresponds to a workload of 125 hours
Contact hours per week (45 mins each)	4.0
Workload: Contact hours	60
Workload: Independent studies	63,5
Workload details	
Type of assessment	Course-specific time-constraint assignment
Duration of assessment	90 Minutes
Type of course unit	Mandatory
Prerequisites (see below)	
Planned learning activities and teaching methods	Lecture, lecture with integrated exercises and case studies, laboratory experiments and protocol
Professional competence: In-depth knowledge and comprehension (Bloom)	The students are able to describe the various tasks and functions of packaging and derive the effects of packaging design on the entire logistics system. They are able to determine the strength of packaging materials using a stacking press in laboratory tests. The students can explain the different techniques for forming loading units and assess their achievable qualities and performance. The students can name and differentiate the conveying and storage techniques required for the design of intralogistic material flows and evaluate their use according to various criteria and requirements. The students are able to classify the variants of different picking principles and techniques.
Professional competence : conative skills, analysis and synthesis of knowledge	Packaging and cushioning materials can be dimensioned and optimised using examples. From the multitude of available conveying and storage equipment, suitable variants can be proposed, selected and planned into simple systems according to requirements. With the help of cycle time calculations, conveyors can be dimensioned in terms of throughput and required number. Picking systems can be designed and laid out according to requirements.

Personal competence: Social abilities and skills	The students are able to explain the sustainable use of raw materials and energy in terms of the circular economy and the packaging law. The students are aware of the effects of a logistically appropriate design of packaging and loading units in the context of modularisation.
Personal competence: Independence / autonomy	Students can measure and record the behaviour of transceivers and transponders at different frequencies and shielding in laboratory tests. The performance of simple systems of continuous and discontinuous conveyors can be calculated analytically.
Competence levels according to GQF	6
Course unit contents	Packaging, packaging materials, packaging materials and packaging aids Loading aids, load unit formation, load securing Identification technology Storage and retrieval systems Conveyor systems, sorting and distribution systems Automated guided vehicles Order picking systems (manual, semi-automated, automated)
Recommended optional programme components	
Additional specifics	
Recommended or required reading	Kaßmann, M.: Grundlagen der Verpackung, Beuth, Berlin, Wien,Zürich, 2014 ten Hompel, Schmidt, Dregger: Materialflusssysteme:Förder- und Lagertechnik, Springer Berlin Heidelberg, 4. Auflage, 2018 ten Hompel, Sadowsky, Beck: Kommissionierung: Materialflusssysteme 2 - Planung und Berechnung der Kommissionierung in der Logistik, Springer, 1. Auflage, 2011 Martin: Transport- und Lagerlogistik: Planung, Struktur, Steuerungund Kosten von Systemen der Intralogistik, Vieweg TeubnerWiesbaden, 9. Auflage, 2014 Wehking, K.-H.: Technisches Handbuch Logistik 1 und 2: Fördertechnik, Materialfluss, Intralogistik. Springer Berlin Heidelberg, 1. Auflage, 2020
Scheduled	regular plus one appointment per student* for the laboratory experiments in small groups
Combined assessments	Will be published in the first three weeks of lectures

Module G2 382010 Practical Computer Science I

Duration	Semester
Contact hours per week (45 mins each)	4
Type of assessment	Module without assessment: Grade includes individual student performances
Number of ECTS credits awarded	5.0
Preconditions for obtaining ECTS credits	
Module coordinator	Prof. Dr. Stefan Kuhlins
Professional competence: In-depth knowledge and comprehension	Students are able to explain simple computer programmes.
Professional competence: conative skills, analysis and synthesis of knowledge	Students are able to develop computer programs to solve simple tasks.
Personal competence: Social abilities and skills	Students are able to develop computer programmes in teams to solve simple tasks.
Personal competence: Independence / autonomy)	Students are able to independently develop computer programmes to solve simple tasks.
Competence levels according to GQF	6
Prerequisites (see below)	
Module specifics	
Scheduled	Timetable StarPlan
Combined assessments	Will be published in the first three weeks of lectures

Course unit title G2.1 382011 Practical Computer Science I

This course unit forms part of module G2, it is mandatory.

Name of lecturer(s)	Prof. Dr. Stefan Kuhlins
Semester	1
Available in	Winter and summer semester
Mode of delivery	Lecture including integrated exercises
Language of instruction	German
Course unit title (German)	Praktische Informatik I
Number of ECTS credits awarded	5.0, this corresponds to a workload of 125 hours
Contact hours per week (45 mins each)	4.0
Workload: Contact hours	60
Workload: Independent studies	63,5
Workload details	
Type of assessment	Preliminary examination based on a combination of assessments; concluded by a time-constraint written assignment
Duration of assessment	90 Minutes
Type of course unit	Mandatory
Prerequisites (see below)	
Planned learning activities and teaching methods	Lecture with integrated exercises, regular homework assignments
Professional competence: In-depth knowledge and comprehension (Bloom)	Students are able to explain simple computer programmes.
Professional competence : conative skills, analysis and synthesis of knowledge	Students are able to develop computer programs to solve simple tasks.
Personal competence: Social abilities and skills	Students are able to develop computer programmes in teams to solve simple tasks.
Personal competence: Independence / autonomy	The students are able to independently develop computer programmes to solve simple tasks.
Competence levels according to GQF	6
Course unit contents	• Basics of computer science • Basics of programming • Data types • Variables • Expressions • Instructions • Control structures • Procedures • Functions • Algorithms

Recommended optional programme components	
Additional specifics	
Recommended or required reading	• Balzert, H.: Grundlagen der Informatik, Spektrum Akademischer Verlag • Boles, D.: Programmieren spielend gelernt mit dem Java-Hamster-Modell, Teubner Verlag • Saake, G. und Sattler, K.: Algorithmen und Datenstrukturen, dpunkt.verlag • Schader, M. und Kuhlins, S.: Programmieren in C++: Einführung in den Sprachstandard, Springer-Verlag • Schneider, U. und Werner, D.: Taschenbuch der Informatik, Fachbuchverlag Leipzig
Scheduled	Timetable StarPlan
Combined assessments	Will be published in the first three weeks of lectures

Module G3 382020 Applied Mathematics I

Duration	Semester
Contact hours per week (45 mins each)	4
Type of assessment	Module without assessment: Grade includes individual student performances
Number of ECTS credits awarded	5.0
Preconditions for obtaining ECTS credits	
Module coordinator	Prof. Dr. Bernd-Ole Wartlick
Professional competence: In-depth knowledge and comprehension	Students will be able to, -represent logical statements mathematically, -apply the basic computational methods of calculus, -recognize problems of linear algebra and apply them to applications, -characterize computational models in economics.
Professional competence: conative skills, analysis and synthesis of knowledge	
Personal competence: Social abilities and skills	
Personal competence: Independence / autonomy)	The students can show in which cases problem solutions by mathematical models are useful.
Competence levels according to GQF	5
Prerequisites (see below)	
Module specifics	
Scheduled	regular
Combined assessments	Will be published in the first three weeks of lectures.

Course unit title G3.1 382021 Applied Business Mathematics

This course unit forms part of module G3, it is mandatory.

Name of lecturer(s)	Prof. Dr. Bernd-Ole Wartlick
Semester	1
Available in	Winter and summer semester
Mode of delivery	Lecture including integrated exercises
Language of instruction	German
Course unit title (German)	Wirtschaftsmathematik
Number of ECTS credits awarded	5.0, this corresponds to a workload of 125 hours
Contact hours per week (45 mins each)	4.0
Workload: Contact hours	60
Workload: Independent studies	63,5
Workload details	
Type of assessment	Course-specific time-constraint assignment
Duration of assessment	90 Minutes
Type of course unit	Mandatory
Prerequisites (see below)	
Planned learning activities and teaching methods	Lecture, exercises, exam preparation
Professional competence: In-depth knowledge and comprehension (Bloom)	Students are able to, -represent logical statements mathematically, -apply the basic calculation methods of calculus, -recognise problems of linear algebra and transfer them to applications, -characterise economic calculation models.
Professional competence : conative skills, analysis and synthesis of knowledge	Students are able to, -calculate with truth tables, -perform the calculation methods of differential and integral calculus and uncover relationships, -calculate systems of linear equations and interpret the result, -create and evaluate simple models in the field of economic mathematics.
Personal competence: Social abilities and skills	
Personal competence: Independence / autonomy	The students can show in which cases problem solutions by mathematical models are useful.

Competence levels according to GQF	5
Course unit contents	-Fundamental concepts: Numbers, sets and propositional logic -Series and series -Linear problems: Applications -Functions and economic applications -Differential calculus -Integral calculus -Vector calculus
Recommended optional programme components	
Additional specifics	
Recommended or required reading	• Papula, L.: Mathematik für Ingenieure und Naturwissenschaftler, Band 1+2, Springer Vieweg Verlag • Papula, L.: Mathematische Formelsammlung für Ingenieure und Naturwissenschaftler, Springer Vieweg Verlag • Bigalke/Köhler: Mathematik Analysis Band 1, Cornelsen Verlag • Mathe macchiato Analysis: Cartoonkurs für Schüler und Studenten, Pearson Verlag
Scheduled	regular
Combined assessments	Will be published in the first three weeks of lectures.

Module G4 382030 Business Administration I

Duration	Semester
Contact hours per week (45 mins each)	4
Type of assessment	Module without assessment: Grade includes individual student performances
Number of ECTS credits awarded	5.0
Preconditions for obtaining ECTS credits	active and complete fulfilment of the respective compulsory components successful passing of the respective final examinations will be announced in the first 3 weeks of lectures.
Module coordinator	Prof. Dr. Susanne Hetterich
Professional competence: In-depth knowledge and comprehension	The students know and understand the basics and terms in logistics and corresponding business management areas. They understand the requirements of different application areas for logistical and business management techniques and methods and can roughly assess logistical concepts.
Professional competence: conative skills, analysis and synthesis of knowledge	Students can develop, evaluate and justify rough logistical processes and concepts for different framework conditions and business models, also in alternatives. They can evaluate the business consequences of logistical solutions on a rough basis.
Personal competence: Social abilities and skills	Students can take on roles in teams and organise themselves in groups and their roles and possibly resolve conflicts. They learn to give and accept feedback.
Personal competence: Independence / autonomy)	Students can coordinate and organise themselves independently in a team, and at the same time work and learn in a self-organised manner. They can develop a rough methodical approach and prepare and communicate work results in a structured way.
Competence levels according to GQF	5
Prerequisites (see below)	
Module specifics	
Scheduled	https://splan.hs-heilbronn.de/ 2 SWS each as a regular weekly lecture
Combined assessments	Will be published in the first three weeks of lectures

Course unit title G4.1 382031 Business Administration and Logistics Processes

This course unit forms part of module G4, it is mandatory.

Name of lecturer(s)	Prof. Dr. Susanne Hetterich
Semester	1
Available in	Winter and summer semester
Mode of delivery	Lecture
Language of instruction	German
Course unit title (German)	Betriebswirtschaftliche und logistische Prozesse
Number of ECTS credits awarded	5.0, this corresponds to a workload of 123,5 hours
Contact hours per week (45 mins each)	4.0
Workload: Contact hours	60
Workload: Independent studies	63,5
Workload details	• Lectures • Technical lectures by practical speakers • Exercises within and complementary to the lectures • Logistics case studies in small groups • Written exam with preparation
Type of assessment	Course-specific combination of assessments; concluded by a written examination
Duration of assessment	90 Minutes
Type of course unit	Mandatory
Prerequisites (see below)	none
Planned learning activities and teaching methods	• Lectures (basics) • Exercises, case studies in group work (of which 15-20 h outside the lecture) • Presentations of case studies with discussion and active feedback in the plenum

Professional competence: In-depth knowledge and comprehension (Bloom)	• Students have a basic understanding of the tasks, objectives, terms and processes of (intra-)logistics and the associated business management background and methods. • Students can and do understand the logistical and business management processes of different industries. • Students have an understanding of the general dependencies and configuration of logistical processes. • Students have the basic ability to understand, analyse and evaluate considered processes and methods in the application context. • Students know the administrative and controlling tasks and processes in logistics. • Students know and understand the basics and design options in resource management. • Students can apply logistics-relevant basics of accounting. • Students know the basics of inventory procedures and can implement them according to the framework conditions. • Students know the logistical processes of commerce and the essential logistical requirements of special sectors. • Students understand the design of more complex business models (VMI, distribution networks, supply chain, etc.) and can develop rough concepts in line with requirements.
Professional competence : conative skills, analysis and synthesis of knowledge	• Students have the basic ability to understand logistical processes and methods in the context of application, to define suitable requirements and target criteria and to analyse or evaluate them in general terms. • Students can develop initial logistical solutions in given framework conditions (with student coaching). • Students can present, communicate and argue the developed logistical strategies and systems. • Students can apply simple logistical accounting • Students understand essential key figures, can determine and interpret them. • Students can apply more complex methods for the design of logistical systems such as distribution structures.
Personal competence: Social abilities and skills	• Students can organise themselves in teams, develop roles and develop and present joint work results, present and argue together (students also get to know each other and develop a semester community). • Students can participate in discussions, give and accept constructive feedback in plenary. • Students can develop logical strategies in groups and work together in different roles to solve more complex tasks.
Personal competence: Independence / autonomy	The students can work out a joint result in a team-oriented manner. They can distribute tasks independently and take on roles in the case studies in terms of their own areas of responsibility. For these, they can independently develop and represent arguments for the chosen solutions.
Competence levels according to GQF	5

Course unit contents	• Logistical and business management basics and methods • Logistical processes, objectives and structures with internal and external interfaces • functional order processing purchasing/procurement logistics - materials management and production logistics - sales/ distribution logistics + information logistics • Case study work: logistical concept for specific logistical business model • Administrative processes: • Basics Coordination of logistical sub-processes internally and externally • Internal and external accounting, planning & budgeting (purpose and addressees, basic structure of reporting, control cycle) • Inventory • Process variants according to sector, market, business model, incl. eBusiness models • Process management and coordination within and across companies
Recommended optional programme components	Working basics
Additional specifics	Independent group project work on logistical case studies with a high degree of creative freedom Guest speakers
Recommended or required reading	• Koether, R.: Taschenbuch der Logistik, Carl Hanser Verlag München Wien • Gleißner, H.; Femerling, J.C.: Logistik, Gabler Verlag Wiesbaden • Gleißner, H.; Möller, K.: Fallstudien Logistik, Gabler Verlag Wiesbaden • Günthner, W.A.; Heptner, K.: Technische Innovationen für die Logistik • Thommen, J.-P.; Achleitner, A.-K.: Allg. Betriebswirtschaftslehre, Gabler Verlag, Wiesbaden • Hutschenreuter, T.: Allgemeine Betriebswirtschaftslehre, Gabler Verlag, Wiesbaden • Weber, W.; Kabst, R.: Einführung in die Betriebswirtschaftslehre, Gabler Verlag, Wiesbaden • Vahs, D.: Organisation, Schaeffer Poeschl, Stuttgart • Wöhe, G.; Döring, U.: Einführung in die Betriebswirtschaftslehre, Vahlen, München • Budde, R.; Engelhardt, P.(Hrg.): Industrielle Geschäftsprozesse, Cornelsen, Berlin • Olfert, K.; Rahn, H.-J.; Einführung in die Betriebswirtschaftslehre, Kiehl Friedrich Verlag, Herne • Scholl, A.; Domschke, W.: Grundlagen der Betriebswirtschaftslehre, Springer, Berlin

Scheduled	https://splan.hs-heilbronn.de/ regular lectures/exercises compulsory participation with guest lecturers + consultation dates for case studies + 2-4 half-day appointments for the presentation of the case studies (in 2 partial presentations)
Combined assessments	Will be published in the first three weeks of lectures

Module G5 382040 Engineering I

Duration	1 Semester
Contact hours per week (45 mins each)	4
Type of assessment	Module without assessment: Grade includes individual student performances
Number of ECTS credits awarded	5.0
Preconditions for obtaining ECTS credits	Passing the examination performance
Module coordinator	Prof. Dr.-Ing. Michael Dietzel
Professional competence: In-depth knowledge and comprehension	The module "Engineering I" enables students to describe important fundamentals of the engineering subject area of technical mechanics.
Professional competence: conative skills, analysis and synthesis of knowledge	The module "Technology 1" enables students to analyse tasks in technical mechanics and apply methods to solve technical problems.
Personal competence: Social abilities and skills	
Personal competence: Independence / autonomy)	
Competence levels according to GQF	6
Prerequisites (see below)	
Module specifics	
Scheduled	https://splan.hs-heilbronn.de/
Combined assessments	Will be published in the first three weeks of lectures

Course unit title G5.1 382041 Engineering Mechanics

This course unit forms part of module G5, it is mandatory.

Name of lecturer(s)	Prof. Dr.-Ing. Michael Dietzel
Semester	1
Available in	Winter and summer semester
Mode of delivery	Lecture including integrated exercises
Language of instruction	German
Course unit title (German)	Technische Mechanik
Number of ECTS credits awarded	5.0, this corresponds to a workload of 125 hours
Contact hours per week (45 mins each)	4.0
Workload: Contact hours	60
Workload: Independent studies	63,5
Workload details	• Lecture • Exercise • Self-study • Written exam
Type of assessment	Course-specific time-constraint assignment
Duration of assessment	90 Minutes
Type of course unit	Mandatory
Prerequisites (see below)	Mathematics school knowledge
Planned learning activities and teaching methods	Teaching methods: Lecture with exercises, practical examples Learning methods: Lecture wrap-up, independent work on exercises
Professional competence: In-depth knowledge and comprehension (Bloom)	Students will be able to, - explain the basics of statics, - explain the procedure of an engineer to solve technical tasks of statics, - explain the basic terms of strength theory and explain calculated results, - to recognise the relationship between load and the resulting stresses and changes in the shape of structural components, - describe the calculation methods for dimensioning simple components.
Professional competence : conative skills, analysis and synthesis of knowledge	Students will be able to, - analyse different mechanical equilibrium systems, including plane and spatial groups of forces on rigid bodies, - calculate internal forces on plane structures, - analyse and evaluate the stresses of simple components under static mechanical loads and dimension these components depending on the permissible stress, - calculate deformations of simple components.

Personal competence: Social abilities and skills	
Personal competence: Independence / autonomy	
Competence levels according to GQF	6
Course unit contents	Statics Basic concepts (force, moment, axioms of statics) Force systems (equivalence, equilibrium) Body systems, load-bearing structures, sectional principle, support reactions, internal forces, trusses Centre of gravity Friction (static friction, sliding friction, rolling friction, cable friction) Beams and frames (internal forces) Strength of materials Deformation Tension and compression Bending Shear force, shear Compression Torsion Composite stress
Recommended optional programme components	
Additional specifics	
Recommended or required reading	• Hagedorn, P. (2006): Technische Mechanik: Festigkeitslehre. 4. Aufl., Frankfurt am Main: Harri Deutsch • Dankert, J.; Dankert, H. (2013): Technische Mechanik: Statik, Festigkeitslehre, Kinematik/Kinetik. 7. Aufl., Wiesbaden: Springer
Scheduled	https://splan.hs-heilbronn.de/
Combined assessments	Will be published in the first three weeks of lectures

Module G6 382050 General Skills

Duration	1 Semester
Contact hours per week (45 mins each)	4
Type of assessment	Module without assessment: Grade includes individual student performances
Number of ECTS credits awarded	5.0
Preconditions for obtaining ECTS credits	Regular participation (in the English language laboratory), a presentation and passing the essays as well as the written paper.
Module coordinator	Prof. Dr.-Ing. Annett Großmann Julia Aldinger
Professional competence: In-depth knowledge and comprehension	Students are able to write scientific papers. An independent term paper is written outside of lecture time. In the subject English, a lecture, an essays and a presentation are conducted in order to be able to speak English better.
Professional competence: conative skills, analysis and synthesis of knowledge	Students are able to create and give presentations also in English. They know basic techniques of scientific work and principles of time and self-management.
Personal competence: Social abilities and skills	During group work and activating teaching, students acquire social competence skills.
Personal competence: Independence / autonomy)	In the preparation and timely submission of presentations, essays and papers, students acquire skills of independence.
Competence levels according to GQF	6
Prerequisites (see below)	
Module specifics	
Scheduled	acc to starplan
Combined assessments	Will be published in the first three weeks of lectures

Course unit title G6.1 382051 Scientific Work

This course unit forms part of module G6, it is mandatory.

Name of lecturer(s)	Prof. Dr.-Ing. Annett Großmann Julia Aldinger
Semester	1
Available in	Winter and summer semester
Mode of delivery	Lecture
Language of instruction	German and English
Course unit title (German)	Wissenschaftliches Arbeiten
Number of ECTS credits awarded	2.5, this corresponds to a workload of 62,50 hours
Contact hours per week (45 mins each)	2.0
Workload: Contact hours	30
Workload: Independent studies	32,50
Workload details	
Type of assessment	Preliminary examination based on a practice-related assignment
Duration of assessment	0 Minutes
Type of course unit	Mandatory
Prerequisites (see below)	
Planned learning activities and teaching methods	• Lecture with exercises on the contents • Learning circles, group work based on division of labour, partner work, individual work, lectures • Assignment of paper topics, which are presented in the course • Independent preparation of a term paper outside the lecture period
Professional competence: In-depth knowledge and comprehension (Bloom)	• The students can produce a scientific paper • They know basic techniques of scientific work • They know basic principles of time and self-management
Professional competence : conative skills, analysis and synthesis of knowledge	• Students are able to create and deliver presentations. • They know which factors influence learning and how to adapt their own learning accordingly
Personal competence: Social abilities and skills	Learning circles, group work based on division of labour, partner work, individual work, lectures
Personal competence: Independence / autonomy	
Competence levels according to GQF	5

Course unit contents	Teaching the basics of - Presentation structure and techniques - Scientific work, scientific standards, in particular research, citing sources/citations - Time and self-management - Learning strategies Practical exercises - Developing and giving a presentation - Scientific work
Recommended optional programme components	
Additional specifics	Type of examination: SA Preliminary examination in module G6 General Competences together with G6.2 Logistics & Business English
Recommended or required reading	Rost, Friedrich (2010): Lern- und Arbeitstechniken für das Studium. 6. Auflage, Wiesbaden: VS Verlag für Sozialwissenschaften. Metzig & Schuster (2003): Lernen zu Lernen. 6. Auflage, Berlin/ Heidelberg: Springer Verlag.
Scheduled	https://splan.hs-heilbronn.de/
Combined assessments	Will be published in the first three weeks of lectures

Course unit title G6.2 382052 Logistics & Business English

This course unit forms part of module G6, it is mandatory.

Name of lecturer(s)	Prof. Dr.-Ing. Annett Großmann
Semester	1
Available in	Winter and summer semester
Mode of delivery	Seminar, labororatory, exercise
Language of instruction	English
Course unit title (German)	Logistics & Business English
Number of ECTS credits awarded	2.5, this corresponds to a workload of 62,50 hours
Contact hours per week (45 mins each)	2.0
Workload: Contact hours	30
Workload: Independent studies	31,50
Workload details	The course is taught entirely in English
Type of assessment	Course-specific combination of assessments; concluded by a written examination
Duration of assessment	60 Minutes
Type of course unit	Mandatory
Prerequisites (see below)	Good English skills comparable to B1 level (written/oral)
Planned learning activities and teaching methods	Teaching methods: Lecture and tutorial, practice-oriented learning and presentation.
Professional competence: In-depth knowledge and comprehension (Bloom)	Students are able to grasp, process and reproduce job-related information in English confidently in written and oral form.
Professional competence : conative skills, analysis and synthesis of knowledge	Students are able to use the English language for subject-related content. In doing so, the exclusive use of the English language in lessons facilitates the transition to professional practice. Outcome: Good English language skills comparable to B2 level (written/oral).
Personal competence: Social abilities and skills	The students are able to develop the contents responsibly during the course or in the preparation of the presentations, also through group work in expert teams. They can guide the professional development of others and deal with problems in teams with foresight. Represent complex subject-related problems and solutions argumentatively to experts in English and develop them further with them.
Personal competence: Independence / autonomy	The students have the competence to work out the contents of lectures in English in self-study, to reflect on their own and others' learning and work objectives, to evaluate them, to pursue them in a self-directed manner and to take responsibility for them, as well as to draw consequences for the work processes in the team.

Competence levels according to GQF	6
Course unit contents	Students will be able to handle the following content in English: Communication skills Negotiation skills Small talk Telephone conversations Writing business letters and emails Thematically it is about "Logistics and Disptibution Management".
Recommended optional programme components	
Additional specifics	Teaching language English
Recommended or required reading	Spedition und Logistik: Fachwörter von A - Z Deutsch und Englisch Taschenbuch – 31. März 2009, Verlag: Bildungsverlag Eins; Auflage: 4. Auflage (31. März 2009) Handbook of Logistics and Distribution Management, Understanding the Supply Chain, 5th Edition, Rushton, A.; Croucher, P.; Baker, P.: 2010 Englisch im Job, Gertrud Goudswaard, Sander M. Schroevers, Haufe-Lexware GmbH & Co. KG, 2012 Taschenguide Business English von Goudswaard, Gertrud; Henderson, Derek; Streitwieser, Veronika, Freiburg: Haufe-Lexware GmbH & Co. KG, 2012.
Scheduled	see timetable StarPlan: https://splan.hs-heilbronn.de/
Combined assessments	Will be published in the first three weeks of lectures Examination by combined exam with presentation. Attendance is compulsory, as only through regular participation in the course and completion of the homework can the language English be learned.

Module G7 382060 Practical Computer Science II

Duration	1 Semester
Contact hours per week (45 mins each)	4
Type of assessment	Module without assessment: Grade includes individual student performances
Number of ECTS credits awarded	5.0
Preconditions for obtaining ECTS credits	
Module coordinator	Prof. Dr. Stefan Kuhlins
Professional competence: In-depth knowledge and comprehension	Students are able to explain complex computer programmes.
Professional competence: conative skills, analysis and synthesis of knowledge	Students are able to develop computer programs to solve complex tasks.
Personal competence: Social abilities and skills	Students are able to develop computer programmes in teams to solve complex tasks.
Personal competence: Independence / autonomy)	Students are able to independently develop computer programmes to solve complex tasks.
Competence levels according to GQF	6
Prerequisites (see below)	
Module specifics	
Scheduled	Timetable StarPlan
Combined assessments	Will be published in the first three weeks of lectures

Course unit title G7.1 382061 Practical Computer Science II

This course unit forms part of module G7, it is mandatory.

Name of lecturer(s)	Prof. Dr. Stefan Kuhlins
Semester	2
Available in	Winter and summer semester
Mode of delivery	Lecture including integrated exercises
Language of instruction	German
Course unit title (German)	Praktische Informatik II
Number of ECTS credits awarded	5.0, this corresponds to a workload of 125 hours
Contact hours per week (45 mins each)	4.0
Workload: Contact hours	60
Workload: Independent studies	63,5
Workload details	
Type of assessment	Course-specific combination of assessments; concluded by a written examination
Duration of assessment	90 Minutes
Type of course unit	Mandatory
Prerequisites (see below)	
Planned learning activities and teaching methods	Lecture with integrated exercises, regular homework assignments
Professional competence: In-depth knowledge and comprehension (Bloom)	Students are able to explain complex computer programmes.
Professional competence : conative skills, analysis and synthesis of knowledge	Students are able to develop computer programs to solve complex tasks.
Personal competence: Social abilities and skills	Students are able to develop computer programmes in teams to solve complex tasks.
Personal competence: Independence / autonomy	Students are able to independently develop computer programmes to solve complex tasks.
Competence levels according to GQF	6
Course unit contents	• Basics of computer science • Basics of Programming • Algorithms and Data Structures • Computer networks • Web-based applications • Data security and data protection
Recommended optional programme components	
Additional specifics	

Recommended or required reading	• Balzert, H.: Grundlagen der Informatik, SpektrumAkademischer Verlag • Gumm, H.P. und Sommer, M.: Einführung in die Informatik, Oldenbourg Wissenschaftsverlag • Herold, H.; Lurz, B. und Wohlrab, J.: Grundlagen der Informatik, Pearson Studium • Saake, G. und Sattler, K.: Algorithmen und Datenstrukturen, dpunkt.verlag • Schneider, U. und Werner, D.: Taschenbuch der Informatik, Fachbuchverlag Leipzig
Scheduled	Timetable StarPlan
Combined assessments	Will be published in the first three weeks of lectures

Module G8 382070 Applied Mathematics II

Duration	Semester
Contact hours per week (45 mins each)	4
Type of assessment	Module without assessment: Grade includes individual student performances
Number of ECTS credits awarded	5.0
Preconditions for obtaining ECTS credits	
Module coordinator	Prof. Dr. Bernd-Ole Wartlick
Professional competence: In-depth knowledge and comprehension	The students know advanced calculation methods from the field of engineering mathematics.
Professional competence: conative skills, analysis and synthesis of knowledge	Students will be able to, -calculate with complex numbers, -calculate and classify technical systems with the help of differential equations, -transform logistic processes into mathematical models, -carry out mathematical transformations.
Personal competence: Social abilities and skills	
Personal competence: Independence / autonomy)	
Competence levels according to GQF	6
Prerequisites (see below)	
Module specifics	
Scheduled	regular
Combined assessments	Will be published in the first three weeks of lectures

Course unit title G8.1 382071 Applied Mathematics for Engineering

This course unit forms part of module G8, it is mandatory.

Name of lecturer(s)	Prof. Dr. Bernd-Ole Wartlick
Semester	2
Available in	Winter and summer semester
Mode of delivery	Lecture including integrated exercises
Language of instruction	German
Course unit title (German)	Ingenieurmathematik
Number of ECTS credits awarded	5.0, this corresponds to a workload of 125 hours
Contact hours per week (45 mins each)	4.0
Workload: Contact hours	60
Workload: Independent studies	63,5
Workload details	
Type of assessment	Course-specific time-constraint assignment
Duration of assessment	90 Minutes
Type of course unit	Mandatory
Prerequisites (see below)	
Planned learning activities and teaching methods	Lecture and exercises
Professional competence: In-depth knowledge and comprehension (Bloom)	The students know advanced calculation methods from the field of engineering mathematics.
Professional competence : conative skills, analysis and synthesis of knowledge	Students will be able to, -calculate with complex numbers, -calculate and classify technical systems with the help of differential equations, -transform logistic processes into mathematical models, -carry out mathematical transformations.
Personal competence: Social abilities and skills	
Personal competence: Independence / autonomy	
Competence levels according to GQF	6

Course unit contents	-Complex numbers -Calculus of matrices -Differential equations -Functions of several independent variables -Laplace transformation
Recommended optional programme components	
Additional specifics	
Recommended or required reading	• Papula, L.: Mathematik für Ingenieure und Naturwissenschaftler Band 1+2, Springer Vieweg Verlag • Papula, L.: Mathematische Formelsammlung für Ingenieure und Naturwissenschaftler, Springer Vieweg Verlag • Bigalke/Köhler: Mathematik Band 2, Cornelsen Verlag
Scheduled	regular
Combined assessments	Will be published in the first three weeks of lectures.

Module G9 382080 Physics

Duration	Semester
Contact hours per week (45 mins each)	4
Type of assessment	Module without assessment: Grade includes individual student performances
Number of ECTS credits awarded	5.0
Preconditions for obtaining ECTS credits	
Module coordinator	Prof. Dr. Bernd-Ole Wartlick
Professional competence: In-depth knowledge and comprehension	The students have knowledge of elementary physical models. They understand the basic phenomena of physics.
Professional competence: conative skills, analysis and synthesis of knowledge	The students can apply the methods of physics. They solve technical problems from the field of intralogistics using these methods.
Personal competence: Social abilities and skills	
Personal competence: Independence / autonomy)	The students also assess issues from the field of energy management from the perspective of sustainability.
Competence levels according to GQF	5
Prerequisites (see below)	
Module specifics	
Scheduled	regular
Combined assessments	Will be published in the first three weeks of lectures

Course unit title G9.1 382081 Physics for Logistics Processes

This course unit forms part of module G9, it is mandatory.

Name of lecturer(s)	Prof. Dr. Bernd-Ole Wartlick
Semester	2
Available in	Winter and summer semester
Mode of delivery	Lecture including integrated exercises
Language of instruction	German
Course unit title (German)	Physik für logistische Prozesse
Number of ECTS credits awarded	5.0, this corresponds to a workload of 125 hours
Contact hours per week (45 mins each)	4.0
Workload: Contact hours	60
Workload: Independent studies	63,5
Workload details	
Type of assessment	Course-specific time-constraint assignment
Duration of assessment	90 Minutes
Type of course unit	Mandatory
Prerequisites (see below)	
Planned learning activities and teaching methods	Lecture and exercises
Professional competence: In-depth knowledge and comprehension (Bloom)	The students have knowledge of elementary physical models. They understand the basic phenomena of physics.
Professional competence : conative skills, analysis and synthesis of knowledge	The students can apply the methods of physics. They solve technical problems from the field of intralogistics using these methods.
Personal competence: Social abilities and skills	
Personal competence: Independence / autonomy	The students also assess issues from the field of energy management from the perspective of sustainability.
Competence levels according to GQF	5
Course unit contents	-Mechanics: Kinematics, forces, vibrations, energy -Electricity -Optics -Thermodynamics
Recommended optional programme components	
Additional specifics	

Recommended or required reading	• Physik Oberstufe: Gesamtband, Cornelsen Verlag • Harten, U.: Physik-Einführung für Ingenieure und Naturwissenschaftler, Springer Verlag • Herber, K. und Müller, T.: Physik macchiato - Cartoonkurs für Schüler und Studenten, Pearson Verlag
Scheduled	regular
Combined assessments	Will be published in the first three weeks of lectures

Module G10 382090 Business Administration II

Duration	1 Semester
Contact hours per week (45 mins each)	4
Type of assessment	Module without assessment: Grade includes individual student performances
Number of ECTS credits awarded	5.0
Preconditions for obtaining ECTS credits	
Module coordinator	Prof. Dr. Susanne Hetterich
Professional competence: In-depth knowledge and comprehension	The students are familiar with essential methods for operational control from a profitability point of view, understand their modes of action as well as advantages and disadvantages and can apply them in a target- and case-oriented manner.
Professional competence: conative skills, analysis and synthesis of knowledge	The students get to know logistical control methods. They know the various cost and performance-relevant questions of business administration and their calculative evaluation methods with their applicability and limits. The students can select specific methods for the analysis and control of companies and especially of logistics areas and develop them context-specifically, especially from a business administration cost and performance view on a strategic, tactical and operational level, taking into account the company environment.
Personal competence: Social abilities and skills	
Personal competence: Independence / autonomy)	Students can independently analyse, evaluate and design logistics control systems.
Competence levels according to GQF	6
Prerequisites (see below)	builds on the Business Administration I module
Module specifics	
Scheduled	https://splan.hs-heilbronn.de/ regular weekly lecture
Combined assessments	Will be published in the first three weeks of lectures

Course unit title G10.1 382091 Cost & Activity Accounting

This course unit forms part of module G10, it is mandatory.

Name of lecturer(s)	Prof. Dr. Susanne Hetterich
Semester	2
Available in	Winter and summer semester
Mode of delivery	Lecture
Language of instruction	German
Course unit title (German)	Kosten- und Leistungsrechnung
Number of ECTS credits awarded	2.5, this corresponds to a workload of 61,5 hours
Contact hours per week (45 mins each)	2.0
Workload: Contact hours	30
Workload: Independent studies	31,5
Workload details	• Lecture • Case studies and exercises • Self-study • Written exam (as interdisciplinary exam with IuF)
Type of assessment	Course-specific combination of assessments; concluded by a written examination
Duration of assessment	60 Minutes
Type of course unit	Mandatory
Prerequisites (see below)	builds on Business Administration I
Planned learning activities and teaching methods	• Lecture • Case studies (within the framework of the lecture) • Self-study: Exercises, preparation and follow-up, exam preparation
Professional competence: In-depth knowledge and comprehension (Bloom)	• The students know the basic terms and methods of cost and activity accounting. • The students know business management decision-making and evaluation questions on methods and can correctly assign them. • The students understand the methods and their application possibilities and limits. • The students can correctly interpret the results in context and select further methods.
Professional competence : conative skills, analysis and synthesis of knowledge	Students can identify and apply the appropriate methods for business evaluation and decision-making issues. Methods can be appropriately adapted and transferred.
Personal competence: Social abilities and skills	

Personal competence: Independence / autonomy	Students can independently carry out commercial valuations for a wide range of issues.
Competence levels according to GQF	6
Course unit contents	• Cost types, cost centre and cost unit accounting • Product costing, costing methods and variants • Standard costing, cost variances and their analysis • Single and multi-level contribution margin accounting
Recommended optional programme components	parallel to investment and financing
Additional specifics	
Recommended or required reading	• Coenenberg, A./Fischer, Th./Günther, Th.: Kostenrechnungs und Kostenanalyse, Schäffer Poeschl, Stuttgart • Jórasz, W.: Kosten- und Leistungsrechnung, Schäffer-Poeschl, Stuttgart • Olfert, K. (Hrsg.): Kostenrechnung, Kiehl Friedrich Verlag, Herne
Scheduled	https://splan.hs-heilbronn.de/ regular lecture with exercises
Combined assessments	Will be published in the first three weeks of lectures

Course unit title G10.2 382092 Investment & Financing

This course unit forms part of module G10, it is mandatory.

Name of lecturer(s)	Prof. Dr. Susanne Hetterich
Semester	2
Available in	Winter and summer semester
Mode of delivery	Lecture
Language of instruction	German
Course unit title (German)	Investition und Finanzierung
Number of ECTS credits awarded	2.5, this corresponds to a workload of 61,5 hours
Contact hours per week (45 mins each)	2.0
Workload: Contact hours	30
Workload: Independent studies	31,5
Workload details	• Lecture • Case studies, exercises and group work • Self-study • Written exam
Type of assessment	Course-specific combination of assessments; concluded by a written examination
Duration of assessment	60 Minutes
Type of course unit	Mandatory
Prerequisites (see below)	builds on Business Administration I
Planned learning activities and teaching methods	• Lectures • Case studies and joint exercises (as part of the lecture) • Self-study: preparation and follow-up, working on exercises, accompanying exam preparation
Professional competence: In-depth knowledge and comprehension (Bloom)	• The students know the basics of investment and financing accounting • The students can select and apply suitable IuF methods • The students can analyse and evaluate calculation results and derive appropriate measures
Professional competence : conative skills, analysis and synthesis of knowledge	Students can independently evaluate investment projects in their context and define the necessary information and methods.
Personal competence: Social abilities and skills	
Personal competence: Independence / autonomy	Students can weigh up alternatives and framework conditions - also for their own investment decisions - and make economically sensible decisions.
Competence levels according to GQF	6

Course unit contents	• Investment and financing terms • Interest and annuity calculation • Static and dynamic types of investment calculation • Utility analysis for investment projects • Financial requirements • Financial and liquidity planning • Internal and external types of financing
Recommended optional programme components	through interdisciplinary examination parallel to cost and activity accounting
Additional specifics	
Recommended or required reading	• Günther,P./Schittenhelm, F.-A.: Investition und Finanzierung, Schäffer Poeschl, Stuttgart • Götze, U./Bloech, J.: Investitionsrechnung - Modelle und Analysen zur Beurteilung von Investitionsvorhaben, Berlin/ Heidelberg, Springer • Olfert, K.: Investition, Kiehl Friedrich Verlag, Herne
Scheduled	https://splan.hs-heilbronn.de/
Combined assessments	Will be published in the first three weeks of lectures

Module G11 382100 Engineering II

Duration	1 Semester
Contact hours per week (45 mins each)	8
Type of assessment	Module without assessment: Grade includes individual student performances
Number of ECTS credits awarded	10.0
Preconditions for obtaining ECTS credits	Passing the exam performance
Module coordinator	Prof. Dr.-Ing. Michael Dietzel Dr.-Ing. Thomas Kriehn
Professional competence: In-depth knowledge and comprehension	The module "Technical Fundamentals" enables students to describe important fundamentals of engineering topics (design theory, electrical engineering).
Professional competence: conative skills, analysis and synthesis of knowledge	The module "Technical Fundamentals" enables students to analyse technical tasks and apply methods to solve technical problems.
Personal competence: Social abilities and skills	
Personal competence: Independence / autonomy)	
Competence levels according to GQF	6
Prerequisites (see below)	
Module specifics	
Scheduled	https://splan.hs-heilbronn.de/
Combined assessments	Will be published in the first three weeks of lectures

Course unit title G11.1 382101 Electrical Engineering

This course unit forms part of module G11, it is mandatory.

Name of lecturer(s)	Dr.-Ing. Thomas Kriehn
Semester	2
Available in	Winter and summer semester
Mode of delivery	Lecture including integrated exercises
Language of instruction	German
Course unit title (German)	Elektrotechnik
Number of ECTS credits awarded	5.0, this corresponds to a workload of 125 hours
Contact hours per week (45 mins each)	4.0
Workload: Contact hours	60
Workload: Independent studies	63,5
Workload details	• Self-study • Exercises • Literature • Exam preparation
Type of assessment	Course-specific combination of assessments; concluded by a written examination
Duration of assessment	90 Minutes
Type of course unit	Mandatory
Prerequisites (see below)	Enjoyment of technology and engineering.
Planned learning activities and teaching methods	Teaching methods: Lecture with exercises, practical examples Learning methods: Lecture follow-up incl. independent work on exercises, literature study
Professional competence: In-depth knowledge and comprehension (Bloom)	The students can name the three different electric fields and clearly distinguish them from each other. Using practical examples and problems, they can draw conclusions for a solution, e.g. to shield electronics from interference. Likewise, they can identify technical solutions to the essentials, e.g. power transmission in electric motors.
Professional competence : conative skills, analysis and synthesis of knowledge	Students can apply basic calculations of electrical engineering, e.g. solving electrical networks with passive components using Kirchhoff's rules.They can also apply technical theoretical knowledge and calculate tasks, e.g. understanding the phase shift of passive components in alternating current. Students acquire a rather broad-based basic knowledge of electrical engineering. The focus is on independent task processing and problem solving in order to uncover correlations, e.g. in the electrotechnical performance evaluation of logistics systems.

Personal competence: Social abilities and skills	In order to deepen the lecture content, it is sometimes useful to work in groups and to help shape their learning or working environment, to participate in discussions and to offer continuous support.
Personal competence: Independence / autonomy	Setting learning and working goals is very important when working on the exercises accompanying the lectures. Numerous aids are offered in the lecture, e.g. setting up schedules.
Competence levels according to GQF	5
Course unit contents	• Introduction incl. repetition of physical basics • Field theory • Passive components • Alternating current • Electromechanical drives • Sensors
Recommended optional programme components	
Additional specifics	
Recommended or required reading	• Busch, R.: Elektrotechnik und Elektronik, Vieweg+Teubner • Hagmann, G.: Grundlagen der Elektrotechnik, Aula • Ose, R.: Elektrotechnik für Ingenieure, Hanser
Scheduled	https://splan.hs-heilbronn.de/
Combined assessments	Will be published in the first three weeks of lectures

Course unit title G11.2 382102 Construction (Construction Theory with Computer Aided Design)

This course unit forms part of module G11, it is mandatory.

Name of lecturer(s)	Prof. Dr.-Ing. Michael Dietzel
Semester	2
Available in	Winter and summer semester
Mode of delivery	Lecture including integrated exercises
Language of instruction	German and English
Course unit title (German)	Konstruktion (Konstruktionslehre mit Computer Aided Design)
Number of ECTS credits awarded	5.0, this corresponds to a workload of 125 hours
Contact hours per week (45 mins each)	4.0
Workload: Contact hours	60
Workload: Independent studies	63,5
Workload details	• Lecture • Exercise • Homework • Self-study • Written exam
Type of assessment	Course-specific combination of assessments; concluded by a written examination
Duration of assessment	90 Minutes
Type of course unit	Mandatory
Prerequisites (see below)	
Planned learning activities and teaching methods	Teaching methods: Lecture and laboratory exercise, examples from practice Learning methods: Lecture wrap-up, literature study, independent work on exercises, writing a term paper
Professional competence: In-depth knowledge and comprehension (Bloom)	The students are able to, - describe function and effect for selected machine elements, - describe the design process, - explain various methods for creating components, assemblies and drawings using 3D CAD.
Professional competence : conative skills, analysis and synthesis of knowledge	Students will be able to, - use fit and tolerance specifications - dimension simple components and selected machine elements, - apply design rules and principles to simple components and evaluate them, - model workpieces and assemblies with the help of 3D CAD and create standard-compliant production drawings.
Personal competence: Social abilities and skills	

Personal competence: Independence / autonomy	
Competence levels according to GQF	6
Course unit contents	• Normwese • Surface and hardness • Tolerances and fits • Selected machine elements (rolling bearings, screw connections, shaft-hub connection) • Representation of bodies, CAD functions • Modelling of individual parts (3D) • Design of assemblies (3D) • Creation of production drawings • Dimensioning of components • Phases of the design process (analysing, conceptualising, designing and creating) • Design rules • Design principles
Recommended optional programme components	
Additional specifics	CAD-System: SolidWorks
Recommended or required reading	• Labisch, S.; Wählisch, G. (2017): Technisches Zeichnen: Eigenständig lernen und effektiv üben. 5. Aufl., Wiesbaden: Springer • Hoischen, H. (2016): Technisches Zeichnen: Grundlagen, Normen, Beispiele, darstellende Geometrie. 35. Aufl., Berlin: Cornelsen • Böge, A. (2000): Das Techniker Handbuch: Grundlagen und Anwendungen der Maschinenbau-Technik. 16. Aufl., Wiesbaden: Vieweg • Roloff, H.; Matek, W.; Muhs, D.; Wittel, H. (2011): Roloff/Matek Maschinenelemente: Normung, Berechnung, Gestaltung. Wiesbaden: Vieweg • Gomeringer, R. (2014): Tabellenbuch Metall. 46. Aufl.: Europa Lehrmittel • Grote, K.-H. / Feldhusen, J. (Hrsg.) (2013): Pahl/Beitz Konstruktionslehre: Methoden und Anwendung erfolgreicher Produktentwicklung. 8. Aufl., Berlin: Springer • Kurz, U.; Hintzen, H.; Laufenberg, H. (2009): Konstruieren, Gestalten, Entwerfen. 4. Aufl., Wiesbaden: Vieweg+Teubner • Schabacker, M. (2016): SolidWorks - kurz und bündig. 4. Aufl., Wiesbaden: Springer
Scheduled	https://splan.hs-heilbronn.de/
Combined assessments	Will be published in the first three weeks of lectures

Advanced studies

Module H1 382110 Methods & Processes

Duration	1 Semester
Contact hours per week (45 mins each)	4
Type of assessment	Module without assessment: Grade includes individual student performances
Number of ECTS credits awarded	5.0
Preconditions for obtaining ECTS credits	Active participation and involvement in all exercises
Module coordinator	Prof. Dr. Susanne Hetterich Prof. Dr. Bernd-Ole Wartlick
Professional competence: In-depth knowledge and comprehension	Students learn different methodological approaches to the analysis and design of logistical processes, work systems, organisations and specific sub-problems.
Professional competence: conative skills, analysis and synthesis of knowledge	Students can analyse, evaluate and re-model operational processes. They can select and apply problem- and goal-oriented analysis and design methods.
Personal competence: Social abilities and skills	The students work on problems in groups, jointly analyse and discuss the potentials and possible solutions and jointly develop concepts.
Personal competence: Independence / autonomy)	The students independently learn the appropriate choice of methods as well as the argumentation of their approach and your solution approaches.
Competence levels according to GQF	6
Prerequisites (see below)	
Module specifics	Practical work and exercises, i.w.S. laboratory
Scheduled	s. Subjects, timetable
Combined assessments	Will be published in the first three weeks of lectures

Course unit title H1.1 382111 Process Modeling

This course unit forms part of module H1, it is mandatory.

Name of lecturer(s)	Prof. Dr. Susanne Hetterich Prof. Dr. Bernd-Ole Wartlick
Semester	3
Available in	Winter and summer semester
Mode of delivery	Lecture including integrated exercises
Language of instruction	German and English
Course unit title (German)	Methoden & Prozesse
Number of ECTS credits awarded	5.0, this corresponds to a workload of 62,5 hours
Contact hours per week (45 mins each)	4.0
Workload: Contact hours	30
Workload: Independent studies	31,5
Workload details	• Self-study • Exercises • Literature
Type of assessment	Course-specific combination of assessments; concluded by a written examination
Duration of assessment	90 Minutes
Type of course unit	Mandatory
Prerequisites (see below)	
Planned learning activities and teaching methods	Lecture to teach the modelling languages, practical examples and exercises, project-based elaboration of posed and self-selected modelling cases.
Professional competence: In-depth knowledge and comprehension (Bloom)	Students understand the importance of the process view and learn various modelling languages with which processes can be represented. In this context, selected applications for modelling processes are learned. The students acquire routine in dealing with process models and can use them in practice for design, analysis and optimisation purposes.
Professional competence : conative skills, analysis and synthesis of knowledge	The students acquire routine in dealing with process models through exercises and can use them in practice for design, analysis and optimisation purposes.
Personal competence: Social abilities and skills	The development takes place in groups and thus trains social competence. The students work responsibly in expert teams. They are able to guide the professional development of others and deal with problems in a team with foresight. Represent complex subject-related problems and solutions argumentatively to experts and develop them further with them.

Personal competence: Independence / autonomy	Independence is achieved through regular participation and completion and submission of homework. The students are able to reflect on their own learning and work goals and those of others, to evaluate them, to pursue them in a self-directed manner and to take responsibility for them, as well as to draw consequences for the work processes in the team.
Competence levels according to GQF	6
Course unit contents	• Introduction and basic terms • Basics of process modelling • Flowcharts based on DIN 66001 • Representation variants of flow diagrams • Process representations within the framework of DIN EN ISO 9001 • Event-driven process chains (EPK) • Basic principles of process optimisation and orientation • Excursions into, among others, reference models • Recording processes • Modelling of business processes • Reference models • Process indicators and optimisation • Process documentation and implementation
Recommended optional programme components	
Additional specifics	
Recommended or required reading	• Wilhelm, R.: Prozessorganisation, Oldenbourg, München • Spiller, D.: Effiziente Arbeitsabläufe: Schwachstel-len erkennen - Prozesse optimieren, Gabler, Wies-baden • Eversheim, W.: Prozeßorientierte Unternehmens-organisation, Springer, Berlin • Allweyer, T.: Geschäftsprozessmanagement, W3l
Scheduled	https://splan.hs-heilbronn.de/
Combined assessments	Will be published in the first three weeks of lectures

Module H2 382120 Material Flow Engineering

Duration	1 Semester
Contact hours per week (45 mins each)	4
Type of assessment	Module without assessment: Grade includes individual student performances
Number of ECTS credits awarded	5.0
Preconditions for obtaining ECTS credits	Passing the exam performance
Module coordinator	Prof. Dr.-Ing. Michael Dietzel
Professional competence: In-depth knowledge and comprehension	The students are able to - explain the systematics of materials handling equipment, - explain the structure and mode of operation of components and selected machines of conveying and handling technology, - describe the dynamic behaviour of selected materials handling equipment.
Professional competence: conative skills, analysis and synthesis of knowledge	The students are able to - design (calculate and select) components (such as wire ropes, impellers, drives) of materials handling machinery, - use dynamic factors in the design of the conveying equipment, - calculate the throughputs of the conveying equipment.
Personal competence: Social abilities and skills	Students are able to develop joint solutions in teams and discuss them.
Personal competence: Independence / autonomy)	
Competence levels according to GQF	6
Prerequisites (see below)	
Module specifics	
Scheduled	https://splan.hs-heilbronn.de/
Combined assessments	Will be published in the first three weeks of lectures

Course unit title H2.1 382121 Material Flow Engineering

This course unit forms part of module H2, it is mandatory.

Name of lecturer(s)	Prof. Dr.-Ing. Michael Dietzel
Semester	3
Available in	Winter and summer semester
Mode of delivery	Lecture including integrated exercises
Language of instruction	German and English
Course unit title (German)	Materialflusstechnik
Number of ECTS credits awarded	5.0, this corresponds to a workload of 125 hours
Contact hours per week (45 mins each)	4.0
Workload: Contact hours	60
Workload: Independent studies	63,5
Workload details	• Lecture • Exercise • Self-study • Written exam
Type of assessment	Course-specific time-constraint assignment
Duration of assessment	90 Minutes
Type of course unit	Mandatory
Prerequisites (see below)	
Planned learning activities and teaching methods	Teaching methods: Lecture with exercises, practical examples Learning methods: Lecture wrap-up, literature study
Professional competence: In-depth knowledge and comprehension (Bloom)	The students are able to - explain the systematics of materials handling equipment, - explain the structure and mode of operation of components and selected machines of conveying and handling technology, - describe the dynamic behaviour of selected materials handling equipment.
Professional competence : conative skills, analysis and synthesis of knowledge	The students are able to - design (calculate and select) components (such as wire ropes, impellers, drives) of materials handling machinery, - use dynamic factors in the design of the conveying equipment, - calculate the throughputs of the conveyors
Personal competence: Social abilities and skills	
Personal competence: Independence / autonomy	
Competence levels according to GQF	6

Course unit contents	• Introduction (tasks conveyor technology, material to be conveyed) • Systematics of conveying and handling equipment • Structure, function and design of components of conveying and handling technology (rollers, wheels, ropes, chains, belts, electric drives, hydraulic drives) • Structure, function and design of selected machines in conveying and handling technology • Dynamic behaviour of machines in conveying and handling technology (vibration coefficients, dynamic coefficients) • Material flow calculation (cycle times, technical throughputs)
Recommended optional programme components	
Additional specifics	
Recommended or required reading	• Arnold, D.; Furmans, K. (2009): Materialfluss in Logistiksystemen. 6. Aufl., Berlin: Springer • Martin, H.; Römisch, P.; Weidlich, A. (2008): Materialflusstechnik. 9. Aufl., Wiesbaden: Vieweg • Jodin, M.; ten Hompel, M. (2012): Sortier- und Verteilsysteme. 2. Aufl., Berlin: Springer • Grote, K.-H.; Feldhusen, J. (Hrsg.) (2014): DUBBEL: Taschenbuch für den Maschinenbau. 24. Aufl., Berlin: Springer
Scheduled	https://splan.hs-heilbronn.de/
Combined assessments	Will be published in the first three weeks of lectures

Module H3 382130 Company Organization

Duration	1 Semester
Contact hours per week (45 mins each)	4
Type of assessment	Module without assessment: Grade includes individual student performances
Number of ECTS credits awarded	5.0
Preconditions for obtaining ECTS credits	The grade is calculated out of the presentation points and the points of the 90-minute written examination.
Module coordinator	Prof. Dr.-Ing. Annett Großmann
Professional competence: In-depth knowledge and comprehension	Students will be able to - assess operational organisational contexts and analyse and develop organisational processes - to design processes in development, production and logistics - understand and critically evaluate operational documents (e.g. parts lists, work plans, calculations) - understand and plan organisational structures in production, assembly and logistics. The students acquire an operational overview knowledge of 1. legal forms of organisation 2. business planning 3. the structure of management systems 4. strategic and operational business planning
Professional competence: conative skills, analysis and synthesis of knowledge	The students are able to apply the instruments of business organisation and have a very broad spectrum of methods for dealing with complex problems in the field of business organisation. A practical case study is worked out to accompany the course and leads to the students being able to better identify and solve operational issues.
Personal competence: Social abilities and skills	Students are able to work responsibly in expert teams with the help of methods of activating teaching. They can guide the subject-related development of others and deal with problems in teams with foresight. They can further argue complex subject-related problems and solutions to experts and develop them further with them.
Personal competence: Independence / autonomy)	The students are able to enrich the knowledge base of an event with presentations. They are able to reflect on their own and others' learning and work goals, evaluate them, pursue them in a self-directed manner and take responsibility for them as well as draw consequences for the work processes in the team.
Competence levels according to GQF	6
Prerequisites (see below)	none

Module specifics	This is a completed module "Business Organisation for Engineering".
Scheduled	https://splan.hs-heilbronn.de/ Schedule of the presentations will be published in the first three weeks of the lectures
Combined assessments	Will be published in the first three weeks of lectures

Course unit title H3.1 382131 Company Organization for Engineers

This course unit forms part of module H3, it is mandatory.

Name of lecturer(s)	Prof. Dr.-Ing. Annett Großmann
Semester	3
Available in	Winter and summer semester
Mode of delivery	Lecture including integrated exercises
Language of instruction	German and English
Course unit title (German)	Betriebsorganisation für das Ingenieurwesen
Number of ECTS credits awarded	5.0, this corresponds to a workload of 125 hours
Contact hours per week (45 mins each)	4.0
Workload: Contact hours	60
Workload: Independent studies	63,50
Workload details	Lectures, exercises, topic assignment with presentations, case study accompanying the lecture, excursion if necessary.
Type of assessment	Course-specific combination of assessments; concluded by a written examination
Duration of assessment	90 Minutes
Type of course unit	Mandatory
Prerequisites (see below)	
Planned learning activities and teaching methods	- Lecture-accompanying exercises, - group work - lectures - Intermediate tests
Professional competence: In-depth knowledge and comprehension (Bloom)	Students are enabled to understand and critically consider operational organisational contexts as well as processes in development, production and logistics as well as operational documents.
Professional competence : conative skills, analysis and synthesis of knowledge	Students are able to apply the tools of business organisation, they have a wide range of methods for dealing with complex problems in the field of business organisation. A practical case study leads to the students being able to better identify and solve operational issues.
Personal competence: Social abilities and skills	Students are able to work in expert teams with the help of methods of activating teaching.
Personal competence: Independence / autonomy	Students are able to enrich the knowledge base of the course with presentations and are able to reflect, evaluate, pursue and take responsibility for their own and others' learning and work objectives.
Competence levels according to GQF	6

Course unit contents	Topics within the focus on business organisation for engineering.
Recommended optional programme components	
Additional specifics	LKBK = Intermediate tests and lectures accompanying lectures
Recommended or required reading	Koether, Reinhard: Taschenbuch der Logistik; 4. und erweiterte Auflage, Carl Hanser Verlag München, 2011 Küpper, Hans-Ulrich; Hofmann, Christian; Gutiérrez Michael: Übungsbuch Beschaffung, Produktion und Logistik, 5., vollständig überarbeitete und erweiterte Auflage, Verlag Franz Vahlen München 2014 Wiendahl, H. P.: Betriebsorganisation für Ingenieure, 9. überarbeitete Auflage, Carl Hanser Verlag München, 2020
Scheduled	https://splan.hs-heilbronn.de/ Schedule of intermediate tests will be published in the first three weeks of lectures
Combined assessments	Will be published in the first three weeks of lectures

Module H4 382140 Databases

Duration	1 Semester
Contact hours per week (45 mins each)	4
Type of assessment	Module without assessment: Grade includes individual student performances
Number of ECTS credits awarded	5.0
Preconditions for obtaining ECTS credits	
Module coordinator	Prof. Dr. Stefan Kuhlins
Professional competence: In-depth knowledge and comprehension	Students will be able to explain database models and commands as well as database applications such as data mining and data warehousing.
Professional competence: conative skills, analysis and synthesis of knowledge	Students are able to develop solutions for simple problems in the areas of database models and commands as well as database applications such as data mining and data warehousing.
Personal competence: Social abilities and skills	Students are able to work in teams to develop solutions to simple problems in the areas of database models and commands as well as database applications such as data mining and data warehousing.
Personal competence: Independence / autonomy)	Students are able to independently develop solutions to simple problems in the areas of database models and commands as well as database applications such as data mining and data warehousing.
Competence levels according to GQF	6
Prerequisites (see below)	
Module specifics	
Scheduled	Timetable StarPlan
Combined assessments	Will be published in the first three weeks of lectures

Course unit title H4.1 382141 Databases

This course unit forms part of module H4, it is mandatory.

Name of lecturer(s)	Prof. Dr. Stefan Kuhlins
Semester	3
Available in	Winter and summer semester
Mode of delivery	Lecture including integrated exercises
Language of instruction	German and English
Course unit title (German)	Datenbanken
Number of ECTS credits awarded	5.0, this corresponds to a workload of 125 hours
Contact hours per week (45 mins each)	4.0
Workload: Contact hours	60
Workload: Independent studies	63,5
Workload details	
Type of assessment	Course-specific combination of assessments; concluded by a written examination
Duration of assessment	90 Minutes
Type of course unit	Mandatory
Prerequisites (see below)	
Planned learning activities and teaching methods	Lecture with integrated exercises, regular homework assignments
Professional competence: In-depth knowledge and comprehension (Bloom)	Students will be able to explain database models and commands as well as database applications such as data mining and data warehousing.
Professional competence : conative skills, analysis and synthesis of knowledge	Students are able to develop solutions for simple problems in the areas of database models and commands as well as database applications such as data mining and data warehousing.
Personal competence: Social abilities and skills	Students are able to work in teams to develop solutions to simple problems in the areas of database models and commands as well as database applications such as data mining and data warehousing.
Personal competence: Independence / autonomy	Students are able to independently develop solutions to simple problems in the areas of database models and commands as well as database applications such as data mining and data warehousing.
Competence levels according to GQF	6

Course unit contents	• Database basics • Database languages • Database design • Database applications • Data Warehouse • Data mining
Recommended optional programme components	
Additional specifics	
Recommended or required reading	• Preiß, N.: Entwurf und Verarbeitung relationaler Datenbanken, Oldenbourg • Elmasri, R. und Navathe, S.: Grundlagen von Datenbanksystemen, Pearson Studium • Faeskorn-Woyke, H. et al.: Datenbanksysteme, Pearson Studium • Kudraß, T.: Taschenbuch Datenbanken, Hanser • Vossen, G.: Datenmodelle, Datenbanksprachen und Datenbankmanagementsysteme, Oldenbourg Wissenschaftsverlag • Bauer, A./Günzel, H. (Hrsg): Data-Warehouse-Systeme: Architektur, Entwicklung, Anwendung; dpunkt Verlag, Heidelberg • Otte, R./Otte, V./Kaiser, V.: Data Mining für die industrielle Praxis, Hanser, München • Petersohn, H.: Data Mining, Oldenbourg, München
Scheduled	Timetable StarPlan
Combined assessments	Will be published in the first three weeks of lectures

Module H5 382150 Statistics

Duration	Semester
Contact hours per week (45 mins each)	4
Type of assessment	Module without assessment: Grade includes individual student performances
Number of ECTS credits awarded	5.0
Preconditions for obtaining ECTS credits	
Module coordinator	Prof. Dr. Bernd-Ole Wartlick
Professional competence: In-depth knowledge and comprehension	Students are able to -recognize combinatorial problems -differentiate between different probability concepts, -Assign probability distributions -Describe statistics.
Professional competence: conative skills, analysis and synthesis of knowledge	The students are able to -analyze statistical distributions, -classifying logistic processes in statistical models, -review and evaluate statistics.
Personal competence: Social abilities and skills	
Personal competence: Independence / autonomy)	The students can evaluate statistical methods. They are still able to critically question statistics.
Competence levels according to GQF	6
Prerequisites (see below)	
Module specifics	
Scheduled	regular
Combined assessments	Will be published in the first three weeks of lectures.

Course unit title H5.1 382151 Statistics

This course unit forms part of module H5, it is mandatory.

Name of lecturer(s)	Prof. Dr. Bernd-Ole Wartlick
Semester	3
Available in	Winter and summer semester
Mode of delivery	Lecture including integrated exercises
Language of instruction	German
Course unit title (German)	Statistik
Number of ECTS credits awarded	5.0, this corresponds to a workload of 125 hours
Contact hours per week (45 mins each)	4.0
Workload: Contact hours	60
Workload: Independent studies	63,5
Workload details	
Type of assessment	Course-specific combination of assessments; concluded by a written examination
Duration of assessment	90 Minutes
Type of course unit	Mandatory
Prerequisites (see below)	
Planned learning activities and teaching methods	Lecture and exercise as well as discussions.
Professional competence: In-depth knowledge and comprehension (Bloom)	Students are able to -recognize combinatorial problems, -differentiate between different probability concepts, -assign probability distributions, -describe statistics.
Professional competence : conative skills, analysis and synthesis of knowledge	The students are able to -analyze statistical distributions, -classifying logistic processes in statistical models, -review and evaluate statistics.
Personal competence: Social abilities and skills	
Personal competence: Independence / autonomy	The students can evaluate statistical methods. They are still able to critically question statistics.
Competence levels according to GQF	6

Course unit contents	-Combinatorics Basic concepts of probability theory -Probability distributions -Descriptive statistics -Closing statistics and tests
Recommended optional programme components	
Additional specifics	
Recommended or required reading	• Papula, L.: Mathematik für Ingenieure und Naturwissenschaftler, Band 3, Springer Vieweg Verlag • Lindenberg, A., Wagner, I. und Frejes, P.: Statistik macchiato: Cartoonkurs für Schüler und Studenten, Pearson Verlag • Krämer, W.: So lügt man mit Statistik, Piper Verlag • Krämer, W.: Statistik für alle, Springer Spektrum Verlag • Dubben, H.-H. und Beck-Bornholdt, H.-P.: Mit an Wahrscheinlichkeit grenzender Sicherheit, Rowohlt Verlag
Scheduled	regular
Combined assessments	Will be published in the first three weeks of lectures

Module VA 382160 Concentration Field Technic and AI Lab

Duration	1 Semester
Contact hours per week (45 mins each)	
Type of assessment	Module without assessment: Grade includes individual student performances
Number of ECTS credits awarded	20.0
Preconditions for obtaining ECTS credits	see Individual events
Module coordinator	Dr.-Ing. Thomas Kriehn
Professional competence: In-depth knowledge and comprehension	see Individual events
Professional competence: conative skills, analysis and synthesis of knowledge	see Individual events
Personal competence: Social abilities and skills	see Individual events
Personal competence: Independence / autonomy)	see Individual events
Competence levels according to GQF	6
Prerequisites (see below)	• Successfully completed basic studies • Enjoyment of technology and engineering
Module specifics	
Scheduled	https://splan.hs-heilbronn.de/
Combined assessments	Will be published in the first three weeks of lectures

Course unit title VA.1 382161 Automation Systems

This course unit forms part of module VA, it is mandatory.

Name of lecturer(s)	Dr.-Ing. Thomas Kriehn
Semester	4
Available in	Winter and summer semester
Mode of delivery	Lecture including integrated exercises
Language of instruction	German
Course unit title (German)	Automatisierungstechnik
Number of ECTS credits awarded	5.0, this corresponds to a workload of 125 hours
Contact hours per week (45 mins each)	4.0
Workload: Contact hours	60
Workload: Independent studies	63,5
Workload details	• Self-study • Exercises • Literature • Exam preparation
Type of assessment	Course-specific combination of assessments; concluded by a written examination
Duration of assessment	90 Minutes
Type of course unit	Mandatory
Prerequisites (see below)	• Successfully completed basic studies • Enjoyment of technology and engineering
Planned learning activities and teaching methods	Teaching methods: Lecture with exercises, practical examples. Learning methods: Lecture wrap-up incl. independent work on exercises, literature study
Professional competence: In-depth knowledge and comprehension (Bloom)	The students can name the automation systems that occur in practice and classify them with regard to their advantages and disadvantages, e.g. the appropriate selection of drive systems such as electromechanics and hydraulics. They can design the structure of simple automation systems, e.g. they can read simple hydraulic circuit diagrams or they know how hierarchical communication structures are structured. Furthermore, they can design simple project planning steps in the design of systems, e.g. for an electromechanical drive.
Professional competence : conative skills, analysis and synthesis of knowledge	Students have an integrated knowledge with which they can put together a complex solution, i.e. they can, for example, differentiate between various industrial drive technologies and design simple drive axes.
Personal competence: Social abilities and skills	Students are able to plan the basic features of an automation system in an interdisciplinary manner, i.e. they are able to understand the design, control and project planning of a system.

Personal competence: Independence / autonomy	The lecture contents are to be deepened independently.
Competence levels according to GQF	6
Course unit contents	• Drive systems (hydraulics, pneumatics, electromechanics) • Communication systems (e.g. CAN bus) • Robotics and path planning • Sensor technology and filtering of data • Introduction to programmable logic control
Recommended optional programme components	
Additional specifics	
Recommended or required reading	• Wellenreuther, G. et al.: Automatisieren mit SPS - Theorie und Praxis, Vieweg • Hesse, S. et al.: Sensoren für die Prozess- und Fabrikautomation; Vieweg • Weidauer, J.: Elektrische Antriebstechnik, Publicis Publishing • Will, D. et al.: Hydraulik; Springer • Zacher, S.: Automatisierungstechnik kompakt; Vieweg
Scheduled	https://splan.hs-heilbronn.de/
Combined assessments	Will be published in the first three weeks of lectures

Course unit title VA.2 382162 Control Theory (Closed Loop Control Systems)

This course unit forms part of module VA, it is mandatory.

Name of lecturer(s)	Prof. Dr.-Ing. Dr.-Ing. h Javier Villalba-Diez
Semester	4
Available in	Winter and summer semester
Mode of delivery	Lecture including integrated exercises
Language of instruction	German and Spanish
Course unit title (German)	Regelungstechnik
Number of ECTS credits awarded	5.0, this corresponds to a workload of 125 hours
Contact hours per week (45 mins each)	4.0
Workload: Contact hours	60
Workload: Independent studies	63,5
Workload details	• Self-study • Exercises • Literature • Exam preparation
Type of assessment	Course-specific combination of assessments; concluded by a written examination
Duration of assessment	90 Minutes
Type of course unit	Mandatory
Prerequisites (see below)	• Successfully completed basic studies • Enjoyment of technology and engineering
Planned learning activities and teaching methods	Teaching methods: Lecture with exercises, practical examples. Learning methods: Lecture wrap-up incl. independent work on exercises, literature study

Professional competence: In-depth knowledge and comprehension (Bloom)	1. fundamentals of control engineering: - Understanding of basic terms and concepts in control engineering such as controlled system, control loop, controlled variable, manipulated variable, control deviation, control algorithms, etc. 2. Mathematical Modeling: - Ability to model physical systems using differential equations or transfer functions. 3. block diagrams and signal flow diagrams: - Ability to analyze and understand systems using block diagrams and signal flow diagrams. 4. stability and stability criteria: - Understanding of stability concepts and criteria for stability of control loops. 5. controller design: - Ability to select and design controllers to achieve desired control objectives. 6. controlled systems: - Understanding of the different types of controlled systems and their mathematical models. 7. frequency response analysis: - Ability to analyze the behavior of control loops in the frequency domain, including Bode diagrams and Nyquist plots. 8. time domain analysis: - Ability to analyze the behavior of control loops in the time domain, including response to unit step responses and other input signals. 9. control loop design under special requirements: - Ability to design controllers that meet specific requirements such as speed, damping, overshoot, etc. 10. digital control: - Basic understanding of digital control and implementation of controllers.
Professional competence : conative skills, analysis and synthesis of knowledge	The students are able to plan control engineering processes and to evaluate them taking into account alternatives, i.e. to assess the control quality appropriately.
Personal competence: Social abilities and skills	Complex interdisciplinary issues are to be included in a structured, goal-oriented and addressee-related manner.
Personal competence: Independence / autonomy	The learning success is to be evaluated independently via the numerous exercise possibilities.
Competence levels according to GQF	6

Course unit contents	• Fundamentals of control engineering • Mathematical modeling of systems • Block diagrams and signal flow diagrams • Stability and stability criteria • Controller design • Types of controlled systems and their models • Frequency response analysis (Bode diagrams, Nyquist diagrams) • Time domain analysis (response to unit step responses, etc.) • Controller design under special requirements (speed, damping, overshoot) • Digital control • Practical implementation and experiments • Simulation and analysis of control loops (e.g. with Python)
Recommended optional programme components	
Additional specifics	
Recommended or required reading	Serge Zacher, Manfred Reuter (auth.) - Regelungstechnik fur Ingenieure_ Analyse, Simulation und Entwurf von Regelkreisen-Vieweg+Teubner (2011)
Scheduled	https://splan.hs-heilbronn.de/
Combined assessments	Will be published in the first three weeks of lectures

Course unit title VA.3 382163 AI Lab

This course unit forms part of module VA

Name of lecturer(s)	Dr.-Ing. Thomas Kriehn
Semester	6
Available in	Winter and summer semester
Mode of delivery	Type of course unit: unknown
Language of instruction	German and English
Course unit title (German)	KI Lab
Number of ECTS credits awarded	10.0, this corresponds to a workload of 250 hours
Contact hours per week (45 mins each)	8.0
Workload: Contact hours	120
Workload: Independent studies	130
Workload details	• Cooperation of the students in the technology + AI laboratory • Self-study • Exercises • Literature • Exam preparation
Type of assessment	Course-specific combination of assessments; concluded by a written examination
Duration of assessment	90 Minutes
Type of course unit	Mandatory course unit
Prerequisites (see below)	The successful completion of at least one of the two modules VA.1 382161 Automation technology and VA.2 382162 Control technology.
Planned learning activities and teaching methods	Work in the AI laboratory. Teaching methods: Lecture with exercises, practical examples. Learning methods: Lecture wrap-up incl. independent work on exercises, literature study.
Professional competence: In-depth knowledge and comprehension (Bloom)	Students can abstract and represent real machines in AI models. Students can analyse and evaluate technical, dynamic AI systems and build or use them in the AI laboratory. Through model building, students are able to solve technical problems.
Professional competence : conative skills, analysis and synthesis of knowledge	Students are able to plan AI processes and evaluate them with the inclusion of alternatives.
Personal competence: Social abilities and skills	Complex interdisciplinary issues can be included in a structured, goal-oriented and addressee-related manner in a team.
Personal competence: Independence / autonomy	The learning success is evaluated independently via the numerous exercise options.

Competence levels according to GQF	6
Course unit contents	• Introduction incl. preliminary considerations on AI technology • Modelling • Construction and realisation of AI models based on examples, e. g. with the help of Lego models
Recommended optional programme components	
Additional specifics	
Recommended or required reading	
Scheduled	https://splan.hs-heilbronn.de/ As a weekly block course
Combined assessments	Will be published in the first three weeks of lectures

Module VA 382170 Concentration Field Business

Duration	Semester
Contact hours per week (45 mins each)	
Type of assessment	Module without assessment: Grade includes individual student performances
Number of ECTS credits awarded	20.0
Preconditions for obtaining ECTS credits	See individual events
Module coordinator	Prof. Dr. Susanne Hetterich
Professional competence: In-depth knowledge and comprehension	see individual events
Professional competence: conative skills, analysis and synthesis of knowledge	see individual events
Personal competence: Social abilities and skills	see individual events
Personal competence: Independence / autonomy)	see individual events
Competence levels according to GQF	6
Prerequisites (see below)	Business Administration I and II from the basic studies
Module specifics	
Scheduled	see Timetable
Combined assessments	Will be published in the first three weeks of lectures

Course unit title VB.1.1 382171 Logistics Operations Management

This course unit forms part of module VA, it is mandatory.

Name of lecturer(s)	Prof. Dr. Susanne Hetterich
Semester	3
Available in	Winter and summer semester
Mode of delivery	Lecture including integrated exercises
Language of instruction	German and English
Course unit title (German)	Logistik Operations Management
Number of ECTS credits awarded	2.5, this corresponds to a workload of 61,5 hours
Contact hours per week (45 mins each)	2.0
Workload: Contact hours	30
Workload: Independent studies	31,5
Workload details	
Type of assessment	Course-specific combination of assessments; concluded by a written examination
Duration of assessment	60 Minutes
Type of course unit	Mandatory
Prerequisites (see below)	Mathematical and business knowledge
Planned learning activities and teaching methods	Lecture practical exercises case studies independent exercises in Ilias
Professional competence: In-depth knowledge and comprehension (Bloom)	The students know and understand - typical optimisation problems in company and inter-company logistics - typical decision problems and their parameters - optimisation methods and algorithms - Decision-making procedures, scenarios - Challenge of uncertainty due to complexity and time horizon
Professional competence : conative skills, analysis and synthesis of knowledge	The students can methodically classify optimisation and decision-making problems, apply adequate solution strategies and evaluate the solutions appropriately with regard to uncertainty and meaningfulness.
Personal competence: Social abilities and skills	
Personal competence: Independence / autonomy	Students can independently evaluate decision-making situations and develop and apply adequate solution strategies.
Competence levels according to GQF	6

Course unit contents	Basics of business management goal setting Mathematical implementation of the problems Application of optimisation methods to concrete business management/logistical problems - Mathematical procedures - OR procedures for solving specific concrete logistics problems (route planning, Knapsack,...) Decision-making procedures Evaluation of uncertainties in the operational environment Scenario techniques
Recommended optional programme components	should be attended at the same time as the Applied Logistics Operations course, as it is based on theory.
Additional specifics	
Recommended or required reading	- Domschke, Wolfgang et al: Einführung in Operations Research, Springer Verlag - Domsch,e, Wolfgang et al.: Übungen und Fallstudien zum Operations Research, Springer Verlag - Werners, Brigitte: Grundlagen des Operation Research, Springer Verlag - Schwenkert, Rainer; Stry, Ivonne: Operations Research kompakt, Springer Verlag - Jungnickel, Dieter: Optimierungsmethoden, Springer Verlag - Grimme, Christian; Bossek, Jakob: Einführung in die Optimierung, Springer Verlag - Gavalek, Martin: Decision Making and Optimization, Springer Verlag - Stevenson, William: Operations Research, Mc Graw Hill
Scheduled	see Timetable
Combined assessments	Will be published in the first three weeks of lectures

Course unit title VB.1.2 382172 Applied Logistic Operations

This course unit forms part of module VA, it is mandatory.

Name of lecturer(s)	Prof. Dr. Susanne Hetterich
Semester	3
Available in	Winter and summer semester
Mode of delivery	Simulation game
Language of instruction	German and English
Course unit title (German)	Applied Logistic Operations
Number of ECTS credits awarded	2.5, this corresponds to a workload of 61,5 hours
Contact hours per week (45 mins each)	2.0
Workload: Contact hours	30
Workload: Independent studies	31,5
Workload details	
Type of assessment	Course-specific practice-related assignment
Duration of assessment	0 Minutes
Type of course unit	Mandatory
Prerequisites (see below)	Business and mathematical knowledge
Planned learning activities and teaching methods	Business game, case studies in supervised group work Alternation of work and joint discussion, discussion in plenary, comparison of results
Professional competence: In-depth knowledge and comprehension (Bloom)	Students know and understand typical business logistic decision-making and optimisation problems.
Professional competence : conative skills, analysis and synthesis of knowledge	Students analyse the problem, select adequate problem-solving strategies and methods and apply them to make optimal decisions. They can critically review the result and evaluate the success of the decision.
Personal competence: Social abilities and skills	Students work out common solution strategies in groups and discuss and argue them.
Personal competence: Independence / autonomy	The students decide independently which procedures and methods to use and learn from the results whether these decisions were purposeful.
Competence levels according to GQF	6
Course unit contents	Business games (Fresh Connection) Case studies
Recommended optional programme components	at the same time as the lecture Logistics Operations Management

Additional specifics	
Recommended or required reading	Business game and case study materials Supplementary literature of the lecture Logistics Operations Management
Scheduled	see Timetable
Combined assessments	Will be published in the first three weeks of lectures

Course unit title VB.1.3 382173 Logistic Controlling

This course unit forms part of module VA, it is mandatory.

Name of lecturer(s)	Prof. Dr. Susanne Hetterich
Semester	4
Available in	Winter and summer semester
Mode of delivery	Lecture
Language of instruction	German
Course unit title (German)	Logistic Controlling
Number of ECTS credits awarded	2.5, this corresponds to a workload of 61,5 hours
Contact hours per week (45 mins each)	2.0
Workload: Contact hours	30
Workload: Independent studies	31,5
Workload details	• Lecture • Self-study • Case studies and exercises • Exam preparation and written exam
Type of assessment	Course-specific combination of assessments; concluded by a written examination
Duration of assessment	60 Minutes
Type of course unit	Mandatory
Prerequisites (see below)	builds on cost and activity accounting
Planned learning activities and teaching methods	• Lecture • Case studies, exercises and group work (approx. 6h outside the lecture) • Self-study
Professional competence: In-depth knowledge and comprehension (Bloom)	• Students understand the importance of logistics controlling. • Students understand logistics cost accounting and can analyse and evaluate the results appropriately. • Students are able to apply instruments of operative and strategic logistics controlling in a context- and goal-oriented manner. • Students can identify decision-relevant logistical control variables and their interdependencies. • Students will be able to develop logistical performance measurement systems. • Students know the special features of the structure and necessity of supply chain controlling.
Professional competence : conative skills, analysis and synthesis of knowledge	The students can appropriately derive and evaluate a logistics concept from framework conditions. They are able to apply the appropriate analysis and control instruments and draw the corresponding conclusions for corporate logistics and the further development of the controlling system.

Personal competence: Social abilities and skills	
Personal competence: Independence / autonomy	
Competence levels according to GQF	6
Course unit contents	• Basics of logistics controlling • Special features of logistics cost accounting, especially process and target cost accounting • Logistical key figures and systems • Methods of operational logistics controlling • Methods of strategic logistics controlling • Trends and supply chain controlling
Recommended optional programme components	
Additional specifics	Complete accompanying logistics controlling case study
Recommended or required reading	• Blum, H.S.: Logistik-Controlling: Kontext, Ausgestaltung und Erfolgswirkungen, Wiesbaden • Delfmann, W.; Reihlen, M.(Hrsg.): Controlling von Logistikprozessen, Schäffer-Poeschel, Stuttgart, i.Z.m. BVL • Horváth, P.: Controlling, München • Kaplan, R.; Cooper, R.: Prozesskostenrechnung als Managementinstrument, Frankfurt • Kuepper, H.-U.: Controlling: Konzeption, Aufgaben, Instrumente, Schäffer Poeschel, Stuttgart • Pfohl, H.-C. (2004a + b): Logistikmanagement:, Berlin/ Heidelberg/New York • Piontek, J.: Bausteine des Logistikmanagements: Supply Chain Management, E-Logistics, Logistikcontrolling • Piontek, J.; Czenskowsky, T.: Logistikcontrolling: Marktorientieres Controlling der Logistik und der Supply Chain,o.O. • Schneider , C. (Hrsg.):Controlling für Logistikdienstleister: Konzepte, Instrumente, Anwendungsbeispiele, Trends, Hamburg • Vahrenkamp, R.: Logistik: Management und Strategien, München/Wien/Oldenburg • Weber, J.; Wallenburg, C. M.: Logistik-und Supply-Chain-Controlling, aktuelle Ausgabe • Werner, H.: Supply-chain-Management: Grundlagen, Strategien, Instrumente und Controlling,Wiesbaden
Scheduled	https://splan.hs-heilbronn.de/ weekly regular lecture
Combined assessments	Will be published in the first three weeks of lectures

Course unit title VB.2.2 382174 Supply Chain Management

This course unit forms part of module VA, it is mandatory.

Name of lecturer(s)	Prof. Dr. Susanne Hetterich
Semester	4
Available in	Winter and summer semester
Mode of delivery	Lecture
Language of instruction	German and English
Course unit title (German)	Supply-Chain-Management
Number of ECTS credits awarded	2.5, this corresponds to a workload of 61,5 hours
Contact hours per week (45 mins each)	2.0
Workload: Contact hours	30
Workload: Independent studies	31,5
Workload details	
Type of assessment	Course-specific combination of assessments; concluded by a written examination
Duration of assessment	60 Minutes
Type of course unit	Mandatory
Prerequisites (see below)	builds on Logistics Operations Management
Planned learning activities and teaching methods	• Lecture • Exercises • Business games
Professional competence: In-depth knowledge and comprehension (Bloom)	Students are able to explain processes and modules of supply chain management.
Professional competence : conative skills, analysis and synthesis of knowledge	Students are able to explain processes and modules of supply chain management.
Personal competence: Social abilities and skills	Students are able to evaluate and develop the inter-functional and inter-organisational interfaces in a supply chain in teams.
Personal competence: Independence / autonomy	Students are able to independently evaluate and further develop the inter-functional and inter-organisational interfaces in a supply chain.
Competence levels according to GQF	6

Course unit contents	• Basics of SCM (operational/responsive/strategic) • Sales order process • Demand and capacity management • Purchasing and procurement • Supplier management • Warehouse management • Transport logistics • Load carrier and container management • Risk management • Modelling and optimisation of supply chains
Recommended optional programme components	
Additional specifics	
Recommended or required reading	• Werner, H.: Supply Chain Management: Grundlagen, Strategien, Instrumente und Controlling, Gabler • Poluha, R. G.: Quintessenz des Supply Chain Managements, Die Quintessenz-Reihe, Springer, Berlin • Becker, T.: Prozesse in Produktion und Supply Chain optimieren, Springer, Berlin • Bolstorff, P. A./Rosenbaum R. G./Poluha, R. G.: Spitzenleistungen im Supply Chain Management. Ein Praxishandbuch zur Optimierung mit SCOR, Springer, Berlin • Poluha, R. G.: Anwendung des SCOR-Modells zur Analyse der Supply Chain, Eul
Scheduled	https://splan.hs-heilbronn.de/
Combined assessments	Will be published in the first three weeks of lectures

Course unit title VB.3 382175 Innovation Business Projects

This course unit forms part of module VA, it is mandatory.

Name of lecturer(s)	Prof. Dr. Susanne Hetterich
Semester	6
Available in	Winter and summer semester
Mode of delivery	Practical Work
Language of instruction	German and English
Course unit title (German)	Innovationsprojekte Wirtschaft
Number of ECTS credits awarded	10.0, this corresponds to a workload of 250 hours
Contact hours per week (45 mins each)	8.0
Workload: Contact hours	120
Workload: Independent studies	130
Workload details	• Topic preparation with supervisor and company • Implementation of change projects in working groups • Accompanying supervision by course supervisor • Preparation and presentation of interim and final presentations • Preparation of a project report as part of the graded performance • Oral examination • Joint colloquium with (short) presentation
Type of assessment	Course-specific practice-related assignment
Duration of assessment	0 Minutes
Type of course unit	Mandatory
Prerequisites (see below)	Completion of at least one of the two subject modules of the field of study Economics
Planned learning activities and teaching methods	• Clear agreement on objectives for change projects • Cooperation within the team and with the company contact persons • Application of project management methods • Learning through practical change projects in the partner companies of the study programme • Coaching by university lecturers and company representatives • Presentations and discussions
Professional competence: In-depth knowledge and comprehension (Bloom)	• Students will be able to methodically implement innovation and change projects in a targeted manner. • Students know the methods and tools they have learned for change and can select and apply them in context
Professional competence : conative skills, analysis and synthesis of knowledge	Students can identify innovation and optimisation potentials in context and optimise systems by developing and evaluating alternatives, independently searching for solutions incl. research techniques.

Personal competence: Social abilities and skills	The students know the challenges of project work and can work in a team and customer-oriented manner. The students understand the dynamics and challenges of innovation and change processes and know adequate options for action.
Personal competence: Independence / autonomy	• Students can independently record and analyse the problem environment and the weak points. • Students can independently conduct targeted and creative research and develop and evaluate alternative solutions • Students can document, present and argue solutions/ recommendations in a target group-oriented manner.
Competence levels according to GQF	6
Course unit contents	• Project definition with partner companies • Learning to structure projects • Structuring projects in a team with distribution of tasks • Analysis of improvement potentials • Development of alternative solutions, evaluation and derivation of recommendations • Implementation of change projects in partner companies • Presentation and argumentation of project results
Recommended optional programme components	
Additional specifics	
Recommended or required reading	
Scheduled	https://splan.hs-heilbronn.de/ As a weekly block course
Combined assessments	Will be published in the first three weeks of lectures

Module H6 382180 Data Analytics

Duration	1 Semester
Contact hours per week (45 mins each)	4
Type of assessment	Module without assessment: Grade includes individual student performances
Number of ECTS credits awarded	5.0
Preconditions for obtaining ECTS credits	Participation in the exercises and completion of the tasks
Module coordinator	Prof. Dr. Susanne Hetterich
Professional competence: In-depth knowledge and comprehension	Knowledge of the essential procedures for - data collection and evaluation - data analysis - Predictions, recommendations - grouping, clustering, basket formation - self-learning systems
Professional competence: conative skills, analysis and synthesis of knowledge	Problem-oriented selection of data collection and analysis Development and adaptation of algorithms and their programming
Personal competence: Social abilities and skills	Understanding of human perception and inference errors (bias)
Personal competence: Independence / autonomy)	Analytical competence, critical reflection on data and methods
Competence levels according to GQF	6
Prerequisites (see below)	Knowledge of statistics, basics of Excel are assumed
Module specifics	
Scheduled	see Timetable
Combined assessments	Will be published in the first three weeks of lectures

Course unit title H6.1 382181 Data Analysis and Basics AI

This course unit forms part of module H6, it is mandatory.

Name of lecturer(s)	Prof. Dr. Susanne Hetterich
Semester	4
Available in	Winter and summer semester
Mode of delivery	Lecture including integrated exercises and laboratory
Language of instruction	German and English
Course unit title (German)	Datenanalyse und Grundlagen KI
Number of ECTS credits awarded	5.0, this corresponds to a workload of 123,5 hours
Contact hours per week (45 mins each)	4.0
Workload: Contact hours	60
Workload: Independent studies	63,5
Workload details	
Type of assessment	Course-specific combination of assessments; concluded by a written examination
Duration of assessment	90 Minutes
Type of course unit	Mandatory
Prerequisites (see below)	Knowledge in statistics
Planned learning activities and teaching methods	Lectures Demonstration of application and programming examples Joint practical exercises on the computer with Excel, Phython case studies independent exercises via Ilias
Professional competence: In-depth knowledge and comprehension (Bloom)	Knowledge of the essential procedures for - Data collection and evaluation - Data analysis - predictions, recommendations - grouping, clustering, basket formation - self-learning systems
Professional competence : conative skills, analysis and synthesis of knowledge	- Problem-oriented selection of data collection and analysis - Development and adaptation of algorithms and their programming
Personal competence: Social abilities and skills	Understanding of human perception and inference errors (bias)
Personal competence: Independence / autonomy	Analytical competence, critical reflection on data and methods
Competence levels according to GQF	6

Course unit contents	Statistical / analytical methods with exercises such as: -Application-oriented data analysis -Data collection and analysis -Sampling procedures -Hypothesis testing -Correlation and regression methods -Forecasting methods Basics of AI methods Programming small examples with R/Phython
Recommended optional programme components	
Additional specifics	
Recommended or required reading	• www.udemy.com: Kurs Statistik für Data Science und Data Analytics • www.udemy.com: Kurs Pivot • www.udacity.com: Kurs Intro into AI • openHPI: Data Science • openHPI: Grundlagen Künstliche Intelligenz • Seiters, Mischa: Business Analytics, VahlenVerlag, 2017 • Helling & Storch: Zertifikatskurs Black Belt Lean Six Sigma • Buxmann, Schmidt (Hrsg): Künstliche Intelligenz – mit Algorithmen zum wirtschaftlichen Erfolg, Springer/Gabler • Albrecht, Schlüter: Erfolgsmodell Data Analytics, Erich Schmidt Verlag, 2020 • Excel-Datenanalyse für Dummies * Predictive Analytics für Dummies • VDI Statusreport Künstliche Intelligenz, Okt 2018
Scheduled	see Timetable
Combined assessments	Will be published in the first three weeks of lectures

Module H7 382190 Planning of Logistics Systems

Duration	1 Semester
Contact hours per week (45 mins each)	4
Type of assessment	Module without assessment: Grade includes individual student performances
Number of ECTS credits awarded	5.0
Preconditions for obtaining ECTS credits	
Module coordinator	Prof. Dr.-Ing. Markus Fittinghoff
Professional competence: In-depth knowledge and comprehension	Students gain an understanding of the necessity of professional project management. They can prepare projects, set project goals and learn to structure projects and delineate tasks on a case-by-case basis. Planning projects are worked on in small teams. Here, the students create project structure plans, plan the time frame, calculate the budget and determine possible risks. The students are able to go through the various planning phases in a small planning project for a logistics system within the framework of the systematic approach and can apply the associated tools and methods. The focus here is on the material flow-technical aspects of planning.
Professional competence: conative skills, analysis and synthesis of knowledge	The focus of the course is on the independent application of project management methods. The students plan and design simple logistics systems based on realistic data and key figures. In doing so, they create process and structure plans, select work equipment, dimension these incl. the required areas and personnel.
Personal competence: Social abilities and skills	Students can work responsibly on planning tasks in small groups of up to four students in a team. Group-internal coordination requires the ability to solve problems, decision-making or compromise-finding skills as well as interpersonal skills of the individual students.
Personal competence: Independence / autonomy)	Students can responsibly work on sub-tasks independently and contribute their results to a documentation in the context of a complex task. They can reflect on their own goals and those set by others, evaluate them, pursue them in a self-directed manner and take responsibility for them as well as draw consequences for the work processes in the team.
Competence levels according to GQF	6
Prerequisites (see below)	Successful participation in modules G1, H1, H2 and H3 is recommended.
Module specifics	
Scheduled	regular

Combined assessments	Will be published in the first three weeks of lectures

Course unit title H7.1 382191 Planning of Logistics Systems and Project Management

This course unit forms part of module H7, it is mandatory.

Name of lecturer(s)	Prof. Dr.-Ing. Markus Fittinghoff
Semester	4
Available in	Winter and summer semester
Mode of delivery	Lecture, Seminar including exercises
Language of instruction	German and English
Course unit title (German)	Logistiksystemplanung und Projektmanagement
Number of ECTS credits awarded	5.0, this corresponds to a workload of 125 hours
Contact hours per week (45 mins each)	4.0
Workload: Contact hours	60
Workload: Independent studies	65
Workload details	The examination performance can be achieved in team or individual work. The solution space with regard to the planning tasks is almost unlimited. Therefore, the workload of the individual or the group may vary.
Type of assessment	Course-specific practice-related assignment
Duration of assessment	0 Minutes
Type of course unit	Mandatory
Prerequisites (see below)	
Planned learning activities and teaching methods	Lecture with integrated exercises and case studies, planning of a logistics system within the framework of a project for an (external) client, preparation of homework using project management methods, coaching sessions with the lecturer.
Professional competence: In-depth knowledge and comprehension (Bloom)	Students gain an understanding of the importance of professional project management. They will be able to prepare projects, define project goals, learn to structure projects and to define tasks. Planning projects are worked on in small teams. Here, the students create project structure plans, plan the timetable, calculate the budget and determine possible risks. The students are able to go through the various planning phases in a small planning project for a logistics system within the framework of the systematic approach and can apply the associated tools and methods. The focus here is on the material flow-technical aspects of planning.
Professional competence : conative skills, analysis and synthesis of knowledge	The independent application of methods in the field of project management is the goal of the course. The students plan and design simple logistics systems based on realistic data and key performance indicators. In doing so, they create process and structure plans, select work equipment, dimension these including the required areas and personnel.

Personal competence: Social abilities and skills	Students can work responsibly on planning tasks in small groups of up to four students in a team. Group-internal coordination requires the ability to solve problems, decision-making or compromise-finding skills as well as interpersonal skills of the individual students.
Personal competence: Independence / autonomy	Students will be able to independently and responsibly complete subtasks and incorporate their findings into documentation as part of a more complex assignment. They can reflect on their own goals and those set by others, evaluate them, pursue them in a self-directed manner and take responsibility for them as well as draw consequences for the work processes in the team.
Competence levels according to GQF	6
Course unit contents	Basics of project management, Service provision, framework of action, project management as a success factor, Project planning, project implementation and control, project completion and save experience, Risk analysis, stakeholder analysis, schedule and process planning, effort and cost planning, Forms of project organisation, Introduction, triggers and basics of factory and logistics system planning, Problem-solving cycle and procedure models, Planning phases, tools and methods, Planning and design of a simple logistics system as a team based on realistic data and key performance indicators.
Recommended optional programme components	It is advisable to take the module H8 Production Systems and Ergonomics & Occupational Safety in parallel.
Additional specifics	
Recommended or required reading	VDI guidelines 4490, 4499, 5200 Beuth, Berlin Wiendahl: Handbuch Fabrikplanung, Carl Hanser Verlag, München, Wien, 2. Auflage, 2014 Burggräf, Schuh: Fabrikplanung: Handbuch Produktion und Management 4. Springer Verlag, Berlin Heidelberg. 2. Auflage 2021.
Scheduled	regular
Combined assessments	Will be published in the first three weeks of lectures

Module H8 382200 Production Systems and Occupational Science & Work Safety

Duration	1 Semester
Contact hours per week (45 mins each)	4
Type of assessment	Module without assessment: Grade includes individual student performances
Number of ECTS credits awarded	5.0
Preconditions for obtaining ECTS credits	
Module coordinator	Prof. Dr.-Ing. Markus Fittinghoff Prof. Dr.-Ing. Annett Großmann
Professional competence: In-depth knowledge and comprehension	The students are able to name key terms of production systems and to explicate advantages and disadvantages of different production concepts. They can classify and describe concepts of the different types of production and forms of organisation. They can differentiate methods for designing lean production systems. Advantages of cyber physical production systems as well as potentials of 3D printing in the context of Industry 4.0 can be demonstrated. The students are furthermore able to understand and apply the stress and strain model of occupational science, they gain knowledge of occupational health and safety as well as the assessment of hazards and the creation of remedial measures, especially in logistics, storage and transport. Further knowledge includes ergonomics in production and the interfaces to other areas (work equipment, workplace, working environment). The EU Machinery Directive is understood and can be applied.
Professional competence: conative skills, analysis and synthesis of knowledge	The students independently acquire information and knowledge about production systems as well as ergonomics & occupational safety using self-learning materials. The students are able to develop and apply approaches to solving practice-relevant tasks.
Personal competence: Social abilities and skills	Students are able to work responsibly in teams with experts, e.g. through group work with other students. They can guide the professional development of other team members and deal with problems in the team with foresight.
Personal competence: Independence / autonomy)	The students are able to reflect on their own learning and work objectives and those of others, to evaluate them, to pursue them in a self-directed manner and to take responsibility for them, as well as to draw consequences for the team. They are able to independently revise the course material in preparation for examinations.
Competence levels according to GQF	6
Prerequisites (see below)	
Module specifics	

Scheduled	Timetable StarPlan: https://splan.hs-heilbronn.de/ regular
Combined assessments	Will be published in the first three weeks of lectures

Course unit title H8.1 382201 Production Systems

This course unit forms part of module H8, it is mandatory.

Name of lecturer(s)	Prof. Dr.-Ing. Markus Fittinghoff
Semester	4
Available in	Winter and summer semester
Mode of delivery	Lecture including integrated exercises
Language of instruction	German
Course unit title (German)	Produktionssysteme
Number of ECTS credits awarded	2.5, this corresponds to a workload of 62,5 hours
Contact hours per week (45 mins each)	2.0
Workload: Contact hours	30
Workload: Independent studies	31,5
Workload details	
Type of assessment	Course-specific time-constraint assignment
Duration of assessment	60 Minutes
Type of course unit	Mandatory
Prerequisites (see below)	
Planned learning activities and teaching methods	Lecture with integrated exercises and case studies
Professional competence: In-depth knowledge and comprehension (Bloom)	The students are able to name key terms of production systems and to explicate advantages and disadvantages of different production concepts. They can classify and describe concepts of the different types of production and forms of organisation. They can differentiate methods for designing lean production systems. Advantages of cyber physical production systems as well as potentials of 3D printing in the context of Industry 4.0 can be demonstrated.
Professional competence : conative skills, analysis and synthesis of knowledge	The students independently acquire information and knowledge about production systems using self-learning materials. The students are able to develop and apply approaches to solving practice-relevant tasks.
Personal competence: Social abilities and skills	
Personal competence: Independence / autonomy	
Competence levels according to GQF	6

Course unit contents	1. Introduction 2. Product creation 3. Process consideration 4. Production types 5. Production organisation 6. Industry 4.0 7. Lean production
Recommended optional programme components	
Additional specifics	
Recommended or required reading	Günther, H.-O.; Tempelmeier, H.: Produktion und Logistik, BoD Books on Demand, 12. Auflage, Norderstedt 2016 Kummer, S. (Hrsg.), unter Mitarbeit von O. Grün und W. Jammernegg: Grundzüge der Beschaffung, Produktion und Logistik, 4. Auflage, München 2019 Kellner, F., Lienland, B. und Lukesch, M.: *Produktionswirtschaft : Planung, Steuerung und Industrie 4.0*. 2., aktualisierte und erweiterte Auflage. Springer Gabler, Berlin, Heidelberg 2020 Lukesch, M. und Kellner, F.: Übungsbuch Produktionswirtschaft. Springer Gabler, Berlin, Heidelberg 2019 Wiendahl, H.-P.: *Betriebsorganisation für Ingenieure*. Hanser Fachbuchverlag, 5. Auflage, München 2019
Scheduled	regular, https://splan.hs-heilbronn.de/
Combined assessments	Will be published in the first three weeks of lectures

Course unit title H8.2 382202 Occupational Science & Work Safety

This course unit forms part of module H8, it is mandatory.

Name of lecturer(s)	Prof. Dr.-Ing. Annett Großmann
Semester	4
Available in	Winter and summer semester
Mode of delivery	Lecture including exercises
Language of instruction	English
Course unit title (German)	Ergonomie & Arbeitssicherheit
Number of ECTS credits awarded	2.5, this corresponds to a workload of 62,5 hours
Contact hours per week (45 mins each)	2.0
Workload: Contact hours	30
Workload: Independent studies	31,5
Workload details	• Self-study • Exercises • Literature • Exam preparation
Type of assessment	Course-specific time-constraint assignment
Duration of assessment	60 Minutes
Type of course unit	Mandatory
Prerequisites (see below)	
Planned learning activities and teaching methods	Lecture with integrated exercises
Professional competence: In-depth knowledge and comprehension (Bloom)	• Understand and apply the stress and strain model of occupational science, • Understand and apply human conditions and be able to assess ways of influencing human performance, • Have knowledge of occupational health and safety and how to assess hazards and take corrective action, especially in logistics, storage and transport, • have knowledge of ergonomics in production and the interfaces with other areas (work equipment, workplace, working environment), • EU Machinery Directive
Professional competence : conative skills, analysis and synthesis of knowledge	The students have a very broad spectrum of methods for solving complex tasks in the field of occupational safety and ergonomics. They can develop new solutions and evaluate them taking into account different standards. An example of this is the Leitmerkmalmethode (LMM) for determining stresses and strains in everyday work.
Personal competence: Social abilities and skills	Students are able to work responsibly in teams with experts, e.g. through group work with other students. They can guide the professional development of other team members and deal with problems in the team with foresight.

Personal competence: Independence / autonomy	The students are able to reflect on their own learning and work objectives and those of others, to evaluate them, to pursue them in a self-directed manner and to take responsibility for them, as well as to draw consequences for the team. They are able to independently revise the course material in preparation for examinations.
Competence levels according to GQF	6
Course unit contents	1. Stress and strain model of occupational science 2. The human being - constitution, disposition, qualification and adaptation 3. Methods of analysis of work 4. Occupational safety and health 5. Forms of human work (energetic-effectoric, informational-mental) 6. Ergonomics as an economic factor, digitalisation in ergonomics 7. Ergonomics in production (work equipment, workplace, working environment)
Recommended optional programme components	
Additional specifics	
Recommended or required reading	Schlick, Christopher; Bruder, Ralph; Luczak, Holger: Arbeitswissenschaft, Springer-Verlag, Berlin, Heidelberg, 2010 Koether, Reinhard; Kurz, Bernhard; Seidel, Uwe; Weber, Franz: Betriensstättenplanung und Ergonomie, Carl Hanser Verlag München 2010 Fischer, G.; Kirchner, A.; Kaufmann, H.; Schmid, D.: Qualitätsmanagement, Arbeitsschutz und Umweltmanagement, Verlag Europa-Lehrmittel, Haan-Gruiten 2013
Scheduled	regular Timetable StarPlan: https://splan.hs-heilbronn.de/
Combined assessments	Will be published in the first three weeks of lectures

Module H9 382210 Quality, Environmental and Energy Management, Sustainability

Duration	1 Semester
Contact hours per week (45 mins each)	4
Type of assessment	Module without assessment: Grade includes individual student performances
Number of ECTS credits awarded	5.0
Preconditions for obtaining ECTS credits	Active participation in this international COIL Projekt (online) and production of small videos about sustainability --> requirement to participate in exam
Module coordinator	Prof. Dr.-Ing. Annett Großmann
Professional competence: In-depth knowledge and comprehension	• Sustainability • Definition and meaning of quality • Understanding the basic elements of quality management as well as quality management systems. • Getting to know the contents of ISO 9001 and the certification of quality management systems according to ISO 9001 as well as the approaches of total quality management and its tools • Becoming familiar with environmental management, environmental management systems and the requirements of ISO 14001 • Getting to know energy management and energy management systems as well as DIN EN ISO 50001 • Integration of the QM, UM, EnMs
Professional competence: conative skills, analysis and synthesis of knowledge	The students have a very broad spectrum of methods for dealing with complex problems in the subject of quality management with the related subjects of environmental and energy management. They are able to develop new solutions and assess them taking into account different standards and are able to develop knowledge by working through the subject matter together with other students as well as lectures.
Personal competence: Social abilities and skills	The students are able to work responsibly in expert teams, internationally through the COIL project, and to represent complex subject-related problems and solutions to experts in an argumentative manner and to develop them further with them. Joint work takes place with other students in groups.
Personal competence: Independence / autonomy)	Independence is guaranteed through revision of the subject matter and independent preparation for examinations. Own and externally set learning and work goals can be reflected, evaluated, pursued in a self-directed manner and taken responsibility for. Consequences for the work processes in the team can be drawn.
Competence levels according to GQF	6
Prerequisites (see below)	

Module specifics	
Scheduled	https://splan.hs-heilbronn.de/ regular
Combined assessments	Will be published in the first three weeks of lectures

Course unit title H9.1 382211 Quality, Environmental and Energy Management, Sustainability

This course unit forms part of module H9, it is mandatory.

Name of lecturer(s)	Prof. Dr.-Ing. Annett Großmann
Semester	4
Available in	Winter and summer semester
Mode of delivery	Lecture
Language of instruction	German and English
Course unit title (German)	Qualitäts- und Umwelt- und Energiemanagement, Nachhaltigkeit
Number of ECTS credits awarded	5.0, this corresponds to a workload of 125 hours
Contact hours per week (45 mins each)	4.0
Workload: Contact hours	60
Workload: Independent studies	63,50
Workload details	• Self-study • Literature • Exam preparation • COIL Project
Type of assessment	Course-specific combination of assessments; concluded by a written examination
Duration of assessment	90 Minutes
Type of course unit	Mandatory
Prerequisites (see below)	
Planned learning activities and teaching methods	• Lecture • Joint exercises with other students to work through the course material
Professional competence: In-depth knowledge and comprehension (Bloom)	• Definition and meaning of quality • Understanding the basic elements of quality management as well as quality management systems. • Getting to know the contents of ISO 9001 and the certification of quality management systems according to ISO 9001 as well as the approaches of total quality management and its tools • Becoming familiar with environmental management, environmental management systems and the requirements of ISO 14001 • Getting to know energy management and energy management systems as well as DIN EN ISO 50001 • Integration of the QM, UM, EnMs systems • Sustainability

Professional competence : conative skills, analysis and synthesis of knowledge	The students have a very broad spectrum of methods for dealing with complex problems in the subject of quality management with the related subjects of environmental and energy management as well as sustainability. They are able to develop new solutions and assess them taking into account different standards and are able to develop knowledge by working through the subject matter together with other students as well as lectures.
Personal competence: Social abilities and skills	The students are able to work responsibly in expert teams and to represent complex subject-related problems and solutions to experts in an argumentative manner and to develop them further with them. Joint work takes place with other students in groups.
Personal competence: Independence / autonomy	Independence is guaranteed through revision of the subject matter and independent preparation for examinations. Own and externally set learning and work goals can be reflected, evaluated, pursued in a self-directed manner and taken responsibility for. Consequences for the work processes in the team can be drawn.
Competence levels according to GQF	6
Course unit contents	1. definition of quality / definition of processes, customer, supplier etc. / sustainability 2. quality as a management task / basic elements of quality management systems 3. standardisation and contents of ISO 9001:2008 4. certification of a company according to ISO 9001:2008 5. TQM, tools of TQM 6. kaizen / CIP / quality circles 7. environmental management according to ISO 14001, contents of DIN EN ISO 14001 and certification of a company 8. energy management according to DIN EN ISO 50001, contents of the standard and certification of a company / aspects of the energy transition 9. integrated systems QM, UM and EnMs / aspects of sustainability
Recommended optional programme components	
Additional specifics	Participation in internaional online COIL Project in Co-Operation with american Studets für the duration of 6-7 weeks (40 Points) Production of short videos about sustainability, which apear in a learning plattform for further use (10 Points) Exam (90 Points)

Recommended or required reading	• Benes, Georg; Groh, Peter: Grundlagen des Qualitätsmanagements, Fachbuchverlag Leipzig im Carl Hanser Verlag, München 2017 • Fischer, G./Kirchner, A./Kaufmann, H./Schmid, D.: Qualitätsmanagement, Arbeitsschutz und Umweltmanagement, Verlag Europa-Lehrmittel, Haan-Gruiten 2013 • Brüggemann, Holger; Bremer, Peik: Grundlagen Qualitätsmanagement, Springer Vieweg Verlag, 2015 • DIN EN ISO 9001 – Qualitätsmanagementsysteme – Anforderungen (ISO 9001:2008) uDIN EN ISO 14001 – Umweltmanagementsysteme – Anforderungen mit Anleitung zur Anwendung (ISO 14001:2004 + Cor 1:2009) • DIN EN ISO 50001:2011 Energiemanagementsysteme – Anforderungen mit Anleitung zur Anwendung (ISO 50001:2011)
Scheduled	https://splan.hs-heilbronn.de/ regular
Combined assessments	Will be published in the first three weeks of lectures

Module H10 382220 Business Law and Ethics

Duration	1 Semester
Contact hours per week (45 mins each)	4
Type of assessment	Module without assessment: Grade includes individual student performances
Number of ECTS credits awarded	5.0
Preconditions for obtaining ECTS credits	
Module coordinator	Prof. Dr. Sabine Boos
Professional competence: In-depth knowledge and comprehension	The students are able to understand legally and ethically relevant scenarios from the industrial practice. They know the essential basics of corporate ethical regulatory systems and their terminology. The students are able to describe the basics of German private business law in the areas of (i) contract and tort / product liability law, (ii) commercial law, (iii) labour law and (iv) intellectual property law and to classify these areas in the context of the German legal system. The students also have basic knowledge of European and international legal sources that are relevant in practice and can distinguish them from national legal sources.
Professional competence: conative skills, analysis and synthesis of knowledge	The students are able to recognize, evaluate and analyze legal problems and corporate liability risks in practice. They can independently understand the relevant legal sources and apply them to legal issues in professional practice. The students are also enabled to critically assess entrepreneurial activities on the basis of established rules of business ethics.
Personal competence: Social abilities and skills	The students are able to communicate about their acquired knowledge and analyses in the areas of law and ethics by using appropriate specialist terminology. They are able to recognize different legal and ethical points of view and to discuss these issues with others in an argumentative manner.
Personal competence: Independence / autonomy)	The students are able to develop their own ideas and solutions vis-à-vis legal and ethical questions, to present them in a balanced manner by way of verbal contributions and to comment on arguments.
Competence levels according to GQF	6
Prerequisites (see below)	None
Module specifics	
Scheduled	https://splan.hs-heilbronn.de
Combined assessments	

Course unit title H10.1 382221 Business Law and Ethics

This course unit forms part of module H10, it is mandatory.

Name of lecturer(s)	Prof. Dr. Sabine Boos
Semester	4
Available in	Winter and summer semester
Mode of delivery	Lecture including integrated exercises
Language of instruction	German and English
Course unit title (German)	Wirtschaftsrecht & Ethik
Number of ECTS credits awarded	5.0, this corresponds to a workload of 125 hours
Contact hours per week (45 mins each)	4.0
Workload: Contact hours	60
Workload: Independent studies	63
Workload details	
Type of assessment	Course-specific time-constraint assignment
Duration of assessment	120 Minutes
Type of course unit	Mandatory
Prerequisites (see below)	
Planned learning activities and teaching methods	• Lecture with integrated excercises and case studies • Guided self study • Written exam
Professional competence: In-depth knowledge and comprehension (Bloom)	The students are able to understand legally and ethically relevant scenarios from the industrial practice. They know the essential basics of corporate ethical regulatory systems and their terminology. The students are able to describe the basics of German private business law in the areas of (i) contract and tort / product liability law, (ii) commercial law, (iii) labour law and (iv) intellectual property law and to classify these areas in the context of the German legal system. The students also have basic knowledge of European and international legal sources that are relevant in practice and can distinguish them from national legal sources.
Professional competence : conative skills, analysis and synthesis of knowledge	The students are able to recognize, evaluate and analyze legal problems and corporate liability risks in practice. They can independently understand the relevant legal sources and apply them to legal issues in professional practice. The students are also enabled to critically assess entrepreneurial activities on the basis of established rules of business ethics.
Personal competence: Social abilities and skills	The students are able to communicate about their acquired knowledge and analyses in the areas of law and ethics by using appropriate specialist terminology. They are able to recognize different legal and ethical points of view and to discuss these issues with others in an argumentative manner.

Personal competence: Independence / autonomy	The students are able to develop their own ideas and solutions vis-à-vis legal and ethical questions, to present them in a balanced manner by way of verbal contributions and to comment on arguments.
Competence levels according to GQF	6
Course unit contents	• Basics in law and ethics • Technique of practical case studies • Contract law including e-commerce • Liability risks for defective products (warranty law and tort/ product liability law) • European and international aspects of the cross-border movement of goods • Basics in commercial law • Basics in employment Law • Basics in intellectual property Law • Compliance management and corporate governance
Recommended optional programme components	
Additional specifics	
Recommended or required reading	Legal sources and literature will be presented at the beginning of lecture
Scheduled	https://splan.hs-heilbronn.de
Combined assessments	Wird in den ersten drei Vorlesungswochen veröffentlicht

Module P 382230 Practical semester and colloquium for the practical semester

Duration	1 Semester
Contact hours per week (45 mins each)	24
Type of assessment	Module without assessment: Grade includes individual student performances
Number of ECTS credits awarded	30.0
Preconditions for obtaining ECTS credits	
Module coordinator	Prof. Dr. Stefan Kuhlins
Professional competence: In-depth knowledge and comprehension	Students are able to understand tasks typical of the degree programme in professional practice and to present the most important results and experiences of their practical study semester in writing and orally.
Professional competence: conative skills, analysis and synthesis of knowledge	The students are able to develop solutions for tasks typical of the course of study in professional practice and to evaluate the most important results and experiences of their practical study semester in writing and orally.
Personal competence: Social abilities and skills	The students are able to develop solutions in teams for tasks in professional practice that are typical for the course of study.
Personal competence: Independence / autonomy)	Students are able to independently develop solutions for tasks typical of the degree programme in professional practice and to present the most important results and experiences of their practical semester in writing and orally.
Competence levels according to GQF	6
Prerequisites (see below)	
Module specifics	
Scheduled	outside the lecture period
Combined assessments	Will be published in the first three weeks of lectures

Course unit title P1 382231 Supervised practical phase

This course unit forms part of module P, it is mandatory.

Name of lecturer(s)	Prof. Dr. Stefan Kuhlins
Semester	5
Available in	Winter and summer semester
Mode of delivery	Practical Work
Language of instruction	German and English
Course unit title (German)	Betreute Praxisphase
Number of ECTS credits awarded	28.0, this corresponds to a workload of 700 hours
Contact hours per week (45 mins each)	
Workload: Contact hours	700
Workload: Independent studies	
Workload details	
Type of assessment	Preliminary examination based on a practice-related assignment
Duration of assessment	0 Minutes
Type of course unit	Mandatory
Prerequisites (see below)	Successfully completed basic studies. Admission by the Internship Office upon application. Information and documents can be found in ILIAS.
Planned learning activities and teaching methods	Independent but supervised work in a company with targets.
Professional competence: In-depth knowledge and comprehension (Bloom)	Students are able to understand tasks in professional practice that are typical for the course of study.
Professional competence : conative skills, analysis and synthesis of knowledge	Students are able to develop solutions for tasks in professional practice that are typical for the course of study.
Personal competence: Social abilities and skills	The students are able to develop solutions in teams for tasks in professional practice that are typical for the course of study.
Personal competence: Independence / autonomy	Students are able to independently develop solutions for tasks in professional practice that are typical for the course of study.
Competence levels according to GQF	6
Course unit contents	• Application of the acquired professional, personal, methodological and social competences in a company • Working on projects • Reporting
Recommended optional programme components	
Additional specifics	

Recommended or required reading	
Scheduled	not applicable
Combined assessments	Will be published in the first three weeks of lectures

Course unit title P2 382232 Colloquium for the internship semester

This course unit forms part of module P, it is mandatory.

Name of lecturer(s)	Prof. Dr. Stefan Kuhlins
Semester	5
Available in	Winter and summer semester
Mode of delivery	Seminar
Language of instruction	German
Course unit title (German)	Kolloquium zum Praxissemester
Number of ECTS credits awarded	2.0, this corresponds to a workload of 50 hours
Contact hours per week (45 mins each)	2.0
Workload: Contact hours	15
Workload: Independent studies	35
Workload details	
Type of assessment	Preliminary examination based on a paper / a presentation
Duration of assessment	0 Minutes
Type of course unit	Mandatory
Prerequisites (see below)	
Planned learning activities and teaching methods	Preparation of a report and presentation
Professional competence: In-depth knowledge and comprehension (Bloom)	Students are able to present the most important results and experiences of their practical study semester in writing and orally.
Professional competence : conative skills, analysis and synthesis of knowledge	Students are able to evaluate the most important results and experiences of their practical study semester in writing and orally.
Personal competence: Social abilities and skills	
Personal competence: Independence / autonomy	Students are able to independently present the most important results and experiences of their practical study semester in writing and orally.
Competence levels according to GQF	6
Course unit contents	• Preparation and presentation of student field reports • Reflection of the results
Recommended optional programme components	
Additional specifics	
Recommended or required reading	
Scheduled	Outside the lecture period as a block course

Combined assessments	Will be published in the first three weeks of lectures

Module H11 382240 Applied Computer Science in Logistics

Duration	1 Semester
Contact hours per week (45 mins each)	4
Type of assessment	Module without assessment: Grade includes individual student performances
Number of ECTS credits awarded	5.0
Preconditions for obtaining ECTS credits	
Module coordinator	Prof. Dr. Stefan Kuhlins
Professional competence: In-depth knowledge and comprehension	Students are able to explain business software and e-business applications.
Professional competence: conative skills, analysis and synthesis of knowledge	Students are able to develop enterprise software and e-business applications.
Personal competence: Social abilities and skills	Students are able to develop and apply enterprise software and e-business applications in teams.
Personal competence: Independence / autonomy)	Students are able to independently develop business software and e-business applications.
Competence levels according to GQF	6
Prerequisites (see below)	
Module specifics	
Scheduled	TimeTable StarPlan
Combined assessments	Will be published in the first three weeks of lectures

Course unit title H11.1 382241 Enterprise Software

This course unit forms part of module H11, it is mandatory.

Name of lecturer(s)	Prof. Dr. Stefan Kuhlins
Semester	6
Available in	Winter and summer semester
Mode of delivery	Lecture
Language of instruction	German and English
Course unit title (German)	Unternehmenssoftware
Number of ECTS credits awarded	2.5, this corresponds to a workload of 62,5 hours
Contact hours per week (45 mins each)	2.0
Workload: Contact hours	30
Workload: Independent studies	31,5
Workload details	
Type of assessment	Course-specific time-constraint assignment
Duration of assessment	60 Minutes
Type of course unit	Mandatory
Prerequisites (see below)	
Planned learning activities and teaching methods	- Lecture - Practical exercises based on case studies - exercises
Professional competence: In-depth knowledge and comprehension (Bloom)	Students are able to explain business software.
Professional competence : conative skills, analysis and synthesis of knowledge	Students are able to develop and implement solutions for simple problems in the field of business software.
Personal competence: Social abilities and skills	Students are able to develop and use enterprise software in teams.
Personal competence: Independence / autonomy	Students are able to independently develop and use business software.
Competence levels according to GQF	6

Course unit contents	Business software such as: - Merchandise management systems - Enterprise application software - Standard software - Industry software Enterprise application software such as: - Office applications - Spreadsheets - Image processing Outsourcing e.g.: - Cloud computing and services - Application Service Providing (ASP)
Recommended optional programme components	
Additional specifics	
Recommended or required reading	Kees & Markowski: Open Source Enterprise Software - Grundlagen, Praxistauglichkeit und Marktübersicht quelloffener Unternehmenssoftware, Springer Vieweg Lindner & Niebler & Wenzel: Der Weg in die Cloud - ein Leitfaden für Unternehmer und Entscheider, Springer Gabler Reinheimer (Hrsg): Cloud Computing - Die Infrastruktur der Digitalisierung, Springer Vieweg Tiemeyer (Hrsg): Handbuch IT-Management - Konzepte, Methoden, Lösungen und Arbeitshilfen für die Praxis, Hanser
Scheduled	Timetable StarPlan
Combined assessments	Will be published in the first three weeks of lectures

Course unit title H11.2 382242 Electronic Business

This course unit forms part of module H11, it is mandatory.

Name of lecturer(s)	Prof. Dr. Stefan Kuhlins
Semester	6
Available in	Winter and summer semester
Mode of delivery	Lecture
Language of instruction	German and English
Course unit title (German)	E-Business
Number of ECTS credits awarded	2.5, this corresponds to a workload of 62,5 hours
Contact hours per week (45 mins each)	2.0
Workload: Contact hours	30
Workload: Independent studies	31,5
Workload details	
Type of assessment	Course-specific time-constraint assignment
Duration of assessment	60 Minutes
Type of course unit	Mandatory
Prerequisites (see below)	
Planned learning activities and teaching methods	Lecture
Professional competence: In-depth knowledge and comprehension (Bloom)	Students are able to explain e-business applications.
Professional competence : conative skills, analysis and synthesis of knowledge	Students are able to use e-business applications.
Personal competence: Social abilities and skills	Students are able to use e-business applications in teams.
Personal competence: Independence / autonomy	Students are able to use e-business applications independently.
Competence levels according to GQF	6
Course unit contents	• Basics • eProducts & eServices • eProcurement • eMarketing • eContracting • eDistribution • ePayment • mBusiness • eSociety
Recommended optional programme components	
Additional specifics	

Recommended or required reading	• Bächle, M./Lehmann, F.: E-Business, Oldenbourg • Kollmann, T.: E-Business: Grundlagen elektronischer Geschäftsprozesse in der Net Economy, Gabler • Meier, A./Stormer, H.: eBusiness & eCommerce - Management der digitalen Wertschöpfungskette, Springer-Verlag • Wirtz, B.: Electronic Business, Gabler
Scheduled	Timetable StarPlan
Combined assessments	Will be published in the first three weeks of lectures

Module H12 382250 Warehouse Management Systems & Simulation

Duration	1 Semester
Contact hours per week (45 mins each)	4
Type of assessment	Module without assessment: Grade includes individual student performances
Number of ECTS credits awarded	5.0
Preconditions for obtaining ECTS credits	
Module coordinator	Prof. Dr.-Ing. Markus Fittinghoff
Professional competence: In-depth knowledge and comprehension	Students acquire knowledge about the core functions of warehouse management systems, their areas of application and current use cases/systems. They know the detailed processes in warehouses and different warehouse areas up to yard management. They know strategies for optimising storage and retrieval. The advantages and disadvantages of different inventory procedures are mastered. They are aware of the necessity of superordinate and subordinate control systems (ERP, real-time) in companies and the associated communication methods (synchronous, asynchronous). The functioning of event-oriented simulation software and the methodical approach in simulation studies are understood.
Professional competence: conative skills, analysis and synthesis of knowledge	Students will be able to select software systems available on the market on a case-by-case basis. They acquire the ability to examine the dynamic behaviour of logistics systems through the use of simulation. They can model and evaluate warehouse systems incl. storage and retrieval strategies with a 3D simulation programme. You will be able to conduct experiments, interpret the results and learn to quantify the potential of different control strategies.
Personal competence: Social abilities and skills	Students become aware of the effort required to familiarise themselves with more complex software systems.
Personal competence: Independence / autonomy)	Students can independently model logistics systems with the required control strategies in the simulation software and carry out experiments.
Competence levels according to GQF	6
Prerequisites (see below)	Programming skills and knowledge of Structured Query Language (SQL) are assumed.
Module specifics	It is recommended to take the module "H11 Applied Computer Science in Logistics" in parallel.
Scheduled	regular
Combined assessments	Will be published in the first three weeks of lectures

Course unit title H12.1 382251 Warehouse Management Systems & Simulation

This course unit forms part of module H12, it is mandatory.

Name of lecturer(s)	Prof. Dr.-Ing. Markus Fittinghoff
Semester	6
Available in	Winter and summer semester
Mode of delivery	Lecture including integrated exercises and laboratory
Language of instruction	English
Course unit title (German)	Warehouse Management Systems & Simulation
Number of ECTS credits awarded	5.0, this corresponds to a workload of 125 hours
Contact hours per week (45 mins each)	4.0
Workload: Contact hours	60
Workload: Independent studies	65
Workload details	
Type of assessment	Course-specific practice-related assignment
Duration of assessment	0 Minutes
Type of course unit	Mandatory
Prerequisites (see below)	
Planned learning activities and teaching methods	Lecture with integrated exercises and case studies, execution of a simulation study (project) with implementation of different storage and retrieval strategies and quantification of the effects.
Professional competence: In-depth knowledge and comprehension (Bloom)	Students acquire knowledge of the core functions of warehouse management systems, their areas of application and current use cases. They know the detailed processes in warehouses and different warehouse areas up to yard management. They know strategies for optimizing storage and retrieval. The advantages and disadvantages of different inventory procedures are mastered. The requirement of higher (ERP)a nd lower-level control systems (real-time PLC) in companies is realized and the associated communication methods (synchronous, asynchronous) are known. The functionality of event-oriented simulation software and the methodical approach in simulation studies are understood.
Professional competence : conative skills, analysis and synthesis of knowledge	Students will be able to formulate case-related functionalities for WMS specifications. They acquire the ability to investigate the dynamic behavior of logistics systems through the use of simulation. They will be able to model and evaluate warehouse systems including storage and retrieval strategies using a 3D simulation program. They will be able to conduct experiments, interpret the results and learn to quantify the potential of different control strategies.
Personal competence: Social abilities and skills	Students become aware of the training required for more complex software systems.

Personal competence: Independence / autonomy	Students can independently model logistics systems with the required control strategies in simulation software and do experiments.
Competence levels according to GQF	6
Course unit contents	1. Introduction and relevance of the WMS 2. Basic functions of a WMS 3. Processes in the warehouse 4. Inventory management and warehousing 5. Market requirements for WMS 6. Introduction to simulation 7. Simulation tools 8. Procedure of simulation on a practical example 9. Modeling with verification,validation and execution of simulation experiments for a warehouse system incl. WMS 10. Interpretation of results and evaluations
Recommended optional programme components	It is recommended to take the module "H11 Applied Computer Science in Logistics" in parallel.
Additional specifics	
Recommended or required reading	VDI guidelines 3601, 3633, 4490, 4499, Beuth, Berlin Gutenschwager, K.: *Simulation in Produktion und Logistik:* Grundlagen und Anwendungen. Berlin, Heidelberg: Springer Vieweg, 2017 ten Hompel, Schmidt: Warehouse Management, Springer Verlag,Berlin, Heidelberg, 2010 Weiterführende Literatur: Law, A. M.: *Simulation modeling and analysis*. Boston, McGraw-Hill. 2007 Banks, J.: *Discrete-event system simulation*. Upper Saddle River, NJ; Munich, Pearson Prentice Hall, 2010
Scheduled	regular
Combined assessments	Will be published in the first three weeks of lectures

Module H13 382260 Human Resources Management & Leadership

Duration	Semester
Contact hours per week (45 mins each)	4
Type of assessment	Module without assessment: Grade includes individual student performances
Number of ECTS credits awarded	5.0
Preconditions for obtaining ECTS credits	
Module coordinator	Prof. Dr.-Ing. Annett Großmann
Professional competence: In-depth knowledge and comprehension	The students know the modern instruments of personnel management and can apply them.
Professional competence: conative skills, analysis and synthesis of knowledge	Students are able to use presented knowledge. They are able to develop new solutions and evaluate them taking into account different benchmarks, even in the case of frequently changing requirements.
Personal competence: Social abilities and skills	Students are able to work responsibly in teams. They can deal with problems in teams with foresight and solve them. Knowledge is imparted in this lecture with the help of group work and especially through role plays.
Personal competence: Independence / autonomy)	Students are able to reflect on their own and others' learning and work goals, evaluate them, pursue them in a self-directed manner and take responsibility for them, as well as draw consequences for the work processes in the team. Lectures by the students enrich the knowledge base of the course.
Competence levels according to GQF	6
Prerequisites (see below)	
Module specifics	
Scheduled	Regular according to timetable StarPlan: https://splan.hs-heilbronn.de/
Combined assessments	Will be published in the first three weeks of lectures

Course unit title H13.1 382261 Human Resources Management & Leadership and Ethics

This course unit forms part of module H13, it is mandatory.

Name of lecturer(s)	Prof. Dr.-Ing. Annett Großmann
Semester	6
Available in	Winter and summer semester
Mode of delivery	Lecture including exercises
Language of instruction	German and English
Course unit title (German)	Personalmanagement, Führung und Ethik
Number of ECTS credits awarded	5.0, this corresponds to a workload of 125 hours
Contact hours per week (45 mins each)	4.0
Workload: Contact hours	60
Workload: Independent studies	63,50
Workload details	• Self-study • Exercises • Literature • Exam preparation • Presentation • Intermediate tests if necessary
Type of assessment	Course-specific combination of assessments; concluded by a written examination
Duration of assessment	90 Minutes
Type of course unit	Mandatory
Prerequisites (see below)	
Planned learning activities and teaching methods	• Lectures • Exercises • Role plays • Speeches
Professional competence: In-depth knowledge and comprehension (Bloom)	The students know the modern instruments of personnel management and can apply them.
Professional competence : conative skills, analysis and synthesis of knowledge	Students are able to use presented knowledge. They are able to develop new solutions and evaluate them taking into account different benchmarks, even in the case of frequently changing requirements.
Personal competence: Social abilities and skills	Students are able to work responsibly in teams. They can deal with problems in teams with foresight and solve them. Knowledge is imparted in this lecture with the help of group work and, if necessary, through role plays.

Personal competence: Independence / autonomy	Students are able to reflect on their own and others' learning and work goals, evaluate them, pursue them in a self-directed manner and take responsibility for them, as well as draw consequences for the work processes in the team. Lectures by the students enrich the knowledge base of the course.
Competence levels according to GQF	6
Course unit contents	• Basic knowledge of leadership (meaning, personnel management, leadership styles and leadership techniques, theoretical approaches at a glance). • Basics of successful leadership, rules and characteristics of successful leadership • Employees (motivation, willingness to perform, personnel development, satisfaction, gifts and talents) • Ethics • Communication (goals, feedback, appraisal interviews) • Self- and time management • Shop Floor Management and Leadership 4.0 (theoretical basics, application of management methods in SFM & Leadership 4.0, shop floor management in logistics)
Recommended optional programme components	
Additional specifics	
Recommended or required reading	• Ueberschaer, Norbert: Führung, Carl Hanser Verlag München, 2014 Thompson, L., Making the Team, Pearson Education • McCall, M. & Lombardo, M. 1983: Off the track: Why and how successful executives get derailed (Tech. Rep. No. 21). Greensboro, NC: Center for Creative Leadership. • Brunner, Franz J.: Japanische Erfolgskonzepte, Hanser Verlag, München, Wien 2014 • Peters, Remco: Shopfloor Management. Führen am Ort der Wertschöpfung. LOG_X Verlag, Stuttgart 2009
Scheduled	Regular according to timetable StarPlan: https://splan.hs-heilbronn.de/
Combined assessments	Will be published in the first three weeks of lectures

Module WL 382270

Duration	1 Semester
Contact hours per week (45 mins each)	2
Type of assessment	Module without assessment: Grade includes individual student performances
Number of ECTS credits awarded	5.0
Preconditions for obtaining ECTS credits	none
Module coordinator	Dr.-Ing. Thomas Kriehn Prof. Dr.-Ing. Annett Großmann
Professional competence: In-depth knowledge and comprehension	In the electives module, the students should show that they have acquired more in-depth technical knowledge in two focal points of their own choice from technology and logistics, which also enables them to deal with complex technical issues from these areas. They are able to retrieve this knowledge in different forms.
Professional competence: conative skills, analysis and synthesis of knowledge	The students demonstrate their ability to systematically work on a defined technical scope under guidance, to write down and present the results of their analyses. A final written exam serves to test the acquired knowledge.
Personal competence: Social abilities and skills	Elaboration and discussion of results in groups, also with the aim of mutual support in exam preparation.
Personal competence: Independence / autonomy)	The students learn to deepen the competence acquired in previous courses, to be able to work independently on various topics, taking into account different aspects, and to develop approaches to solutions, in a specific, self-chosen subject area.
Competence levels according to GQF	6
Prerequisites (see below)	none
Module specifics	
Scheduled	see StarPlan
Combined assessments	Will be published in the first three weeks of lectures

Course unit title W1 382271 Elective I (Technic)

This course unit forms part of module WL

Name of lecturer(s)	Dr.-Ing. Thomas Kriehn
Semester	6
Available in	Winter and summer semester
Mode of delivery	Lecture
Language of instruction	German and English
Course unit title (German)	Wahlmodul I (Technik)
Number of ECTS credits awarded	2.5, this corresponds to a workload of 62,50 hours
Contact hours per week (45 mins each)	2.0
Workload: Contact hours	30
Workload: Independent studies	31,50
Workload details	
Type of assessment	Course-specific combination of assessments; concluded by a written examination
Duration of assessment	60 Minutes
Type of course unit	Mandatory course unit
Prerequisites (see below)	
Planned learning activities and teaching methods	Lecture with project work
Professional competence: In-depth knowledge and comprehension (Bloom)	The students are able to present and classify the legal framework alongside technical and organisational elements of disposal logistics. The students are able to select the right systems and equipment and to evaluate offers according to technical and economic criteria. Thus, they can plan the disposal processes in the company and organise their operation. Furthermore, the students can name ecological framework conditions. Thus, they can classify and assess the company's area of responsibility in the planning, control and monitoring of the logistical service processes for residues.
Professional competence : conative skills, analysis and synthesis of knowledge	Students are able to describe logistical processes of disposal systems and are able to adapt and improve them.
Personal competence: Social abilities and skills	The students work in groups on projects with public or private waste management companies. They independently arrange group appointments, milestones to be reached and on-site appointments and regularly coordinate their work.
Personal competence: Independence / autonomy	The students work independently on projects with public or private waste management companies. They can develop a recommendation for action for the project partner and present it.
Competence levels according to GQF	6

Course unit contents	Topic Disposal Logistics - Goals, functions & delimitation of waste disposal logistics - Concepts, terminology - Political objectives and legal framework of waste management logistics: Recycling and Waste Management Act Eco-Audit Ordinance / Life Cycle Assessment Packaging Ordinance - Types of waste and disposal processes - Collection, transport and handling: Container / collection, settlement structures, vehicles, methods - Treatment - Storage and landfill - Environmental management - In-house waste management
Recommended optional programme components	
Additional specifics	
Recommended or required reading	• Richtlinie 2010/75/EU des EU Parlaments und des Rates über Industrieemissionen (integrierte Vermeidung und Verminderung der Umweltverschmutzung) • Richtlinie 2008/98/EG des EU Parlaments und des Rates über Abfälle und zur Aufhebung bestimmter Richtlinien • Gesetz zur Förderung der Kreislaufwirtschaft und Sicherung der umweltverträglichen Beseitigung von Abfällen (Kreislaufwirtschafts- und Abfallgesetz - KrW-/AbfG) • Heiserich, O.-E.; Helbig, K.; Ullmann, W. (Hrsg.): Logistik: Eine praxisorientierte Einführung. 4. Auflage, Gabler, Wiesbaden , 2011 • Ohlig, B.: Kreislauforientierte Entsorgungslogistik, GRIN-Verlag Koether, R.: Taschenbuch der Logistik, Hanser Fachbuch
Scheduled	https://splan.hs-heilbronn.de/
Combined assessments	Will be published in the first three weeks of lectures

Course unit title W2 382272 Elective I (Logistics)

This course unit forms part of module WL, it is mandatory.

Name of lecturer(s)	Prof. Dr. Susanne Hetterich
Semester	6
Available in	Winter and summer semester
Mode of delivery	Lecture
Language of instruction	German and English
Course unit title (German)	Wahlmodul I (Logistik)
Number of ECTS credits awarded	2.5, this corresponds to a workload of 62,50 hours
Contact hours per week (45 mins each)	2.0
Workload: Contact hours	30
Workload: Independent studies	31,50
Workload details	• Lecture • Practical case studies • Exercises • Excursions
Type of assessment	Course-specific combination of assessments; concluded by a written examination
Duration of assessment	60 Minutes
Type of course unit	Mandatory
Prerequisites (see below)	Basic knowledge of logistics and business organisation.
Planned learning activities and teaching methods	Logistics in the Automotive Industry • Lecture • Practical case studies • Exercises • Excursions
Professional competence: In-depth knowledge and comprehension (Bloom)	The students can interpret the special features of logistics in the automotive industry on the basis of a detailed insight. They can explain and classify current design principles of logistics planning for the areas of procurement, production, distribution and spare parts management.
Professional competence : conative skills, analysis and synthesis of knowledge	Students can calculate various key figures for controlling complex production systems (e.g. sequence distances and errors in the bead chain).
Personal competence: Social abilities and skills	
Personal competence: Independence / autonomy	
Competence levels according to GQF	6

Course unit contents	• Introduction to the Automotive Industry • Trends in the automotive industry • Complexity management • Logistics-specific challenges and the importance of logistics-oriented planning ("Design for Logistics") • Basics of simultaneous engineering • Logistics planning: Technical aspects of storage, conveying, handling, transhipment and order picking • Processes and special features along the order processing chain: procurement, production, distribution, spare parts management • Special logistics concepts in the automotive industry (JIS, supermarket, eKanban, pearl chain, ...) • Data management • Strategic challenges in logistics management
Recommended optional programme components	
Additional specifics	The content of the event will be covered by guest lecturers from Audi.
Recommended or required reading	
Scheduled	https://splan.hs-heilbronn.de/
Combined assessments	Will be published in the first three weeks of lectures

Course unit title W3 382273 Elective II (Technic)

This course unit forms part of module WL

Name of lecturer(s)	Dr.-Ing. Thomas Kriehn
Semester	6
Available in	Winter and summer semester
Mode of delivery	Lecture
Language of instruction	German and English
Course unit title (German)	Wahlmodul II (Technik)
Number of ECTS credits awarded	2.5, this corresponds to a workload of 62,50 hours
Contact hours per week (45 mins each)	2.0
Workload: Contact hours	30
Workload: Independent studies	31,50
Workload details	• Self-study • Exercises • Literature • Exam preparation
Type of assessment	Course-specific combination of assessments; concluded by a written examination
Duration of assessment	60 Minutes
Type of course unit	Mandatory course unit
Prerequisites (see below)	Recommendation: Completed course Automation and Control Engineering
Planned learning activities and teaching methods	Teaching method: Lecture, exercises and case studies Learning method: Lecture wrap-up, independent solution of exercises and case studies
Professional competence: In-depth knowledge and comprehension (Bloom)	
Professional competence : conative skills, analysis and synthesis of knowledge	Students can create and calculate simple energy balances, e.g. the recuperative energy of logistics facilities.
Personal competence: Social abilities and skills	Students have the opportunity to help shape the learning and working environment by contributing to discussions.
Personal competence: Independence / autonomy	In less familiar contexts, students independently and responsibly evaluate the use of energy.
Competence levels according to GQF	6

Course unit contents	Topic Energy Efficiency • Physics basics: Energy • Drive technology: Technical solutions for increasing energy efficiency • Systematic approach to increasing energy efficiency • Incentive to increase energy efficiency
Recommended optional programme components	
Additional specifics	
Recommended or required reading	• Müller, E. et al.: Energieeffiziente Fabriken planen und betreiben, Springer, Berlin Heidelberg • Pehnt, M.: Energieeffizienz, Springer, Berlin Heidelberg
Scheduled	https://splan.hs-heilbronn.de/
Combined assessments	Will be published in the first three weeks of lectures

Course unit title W4 382274 Elective II (Logistics)

This course unit forms part of module WL

Name of lecturer(s)	Prof. Dr. Susanne Hetterich
Semester	6
Available in	Winter and summer semester
Mode of delivery	Lecture
Language of instruction	German and English
Course unit title (German)	Wahlmodul II (Logistik)
Number of ECTS credits awarded	2.5, this corresponds to a workload of 62,50 hours
Contact hours per week (45 mins each)	2.0
Workload: Contact hours	30
Workload: Independent studies	31,50
Workload details	
Type of assessment	Course-specific combination of assessments; concluded by a written examination
Duration of assessment	60 Minutes
Type of course unit	Mandatory course unit
Prerequisites (see below)	none
Planned learning activities and teaching methods	Lecture, joint exercises at attendance times, presentations on special aspects
Professional competence: In-depth knowledge and comprehension (Bloom)	Trade logistics deals with the logistical processes of a trading company. The objective of this module is to acquire knowledge in the area of procurement, materials management and distribution. Students are enabled to plan and control the logistical processes in procurement and distribution of a company in all their complexity. This includes warehouse management, procurement management, disposition management as well as the planning of quantities, deadlines and the associated costs. The interrelationships of distribution as an element in the marketing mix can be explained by the students in terms of "distribution follows sales policy".
Professional competence : conative skills, analysis and synthesis of knowledge	Students can prepare strategic procurement tasks such as make-or-buy decisions. They can apply selected methods of transport planning and route planning.
Personal competence: Social abilities and skills	
Personal competence: Independence / autonomy	
Competence levels according to GQF	6

Course unit contents	Distribution and trade logistics - Procurement - Materials Management - Distribution - Storage - Order picking - Packaging - Transport - Distribution - Determination of distribution channels - Distribution structures (warehouse locations/delivery areas) - Transport scheduling and route planning - Returns processing - Trade logistics - Information management in distribution
Recommended optional programme components	
Additional specifics	
Recommended or required reading	• Lasch, R.; Janker, Ch.: Übungsbuch Logistik, 2013 • Domschke, W.: Logistik, Bd. 1, Transport, München, Wien, 2007 • Domschke, W.: Logistik, Bd. 2, Rundreisen und Touren, München, Wien, 2010 • Skript und die dort angegebene Literatur
Scheduled	https://splan.hs-heilbronn.de/
Combined assessments	Will be published in the first three weeks of lectures

Module H14 382280 Transfer Competence

Duration	1 Semester
Contact hours per week (45 mins each)	10
Type of assessment	Module without assessment: Grade includes individual student performances
Number of ECTS credits awarded	15.0
Preconditions for obtaining ECTS credits	
Module coordinator	Prof. Dr. Susanne Hetterich
Professional competence: In-depth knowledge and comprehension	Students can formulate requirements and project goals based on given problems.
Professional competence: conative skills, analysis and synthesis of knowledge	Students can apply knowledge and methodological skills to new questions and tasks.
Personal competence: Social abilities and skills	Students are able to solve tasks in a team and in a practical learning environment.
Personal competence: Independence / autonomy)	The students are able to formulate technical and economic contents as well as to represent and present processes. They expand their field of vision beyond the logistically technical perspective and can thus draw broader conclusions.
Competence levels according to GQF	6
Prerequisites (see below)	The practical semester should have been successfully completed.
Module specifics	
Scheduled	https://splan.hs-heilbronn.de/
Combined assessments	Will be published in the first three weeks of lectures

Course unit title H14.1 382281 Student research project

This course unit forms part of module H14, it is mandatory.

Name of lecturer(s)	Prof. Dr. Susanne Hetterich
Semester	7
Available in	Winter and summer semester
Mode of delivery	Seminar
Language of instruction	German and English
Course unit title (German)	Studienarbeit
Number of ECTS credits awarded	9.0, this corresponds to a workload of 200 hours
Contact hours per week (45 mins each)	4.0
Workload: Contact hours	60
Workload: Independent studies	140
Workload details	Preparation and follow-up of the course are included in the self-study workload.
Type of assessment	Course-specific practice-related assignment
Duration of assessment	0 Minutes
Type of course unit	Mandatory
Prerequisites (see below)	The practical study semester (P) and the specialisation module V should have been successfully passed.
Planned learning activities and teaching methods	• Projects from practice-oriented problems • Independent problem definition, situation analysis • Coaching for independent project work • Learning to work out complex goals • Reporting
Professional competence: In-depth knowledge and comprehension (Bloom)	Students are able to present and delineate complex, practical problems.
Professional competence : conative skills, analysis and synthesis of knowledge	The students can apply methods to analyse the current situation and structure subtasks to achieve goals. They can abstract and differentiate complex tasks. They can conduct literature research and show the level of knowledge achieved so far in the subject area. The students are able to combine knowledge of several subjects in one paper and thus design new solutions.
Personal competence: Social abilities and skills	The students master communication with employees in companies, in some cases across departmental or hierarchical boundaries. They can help solve a problem in a company team under practical conditions.

Personal competence: Independence / autonomy	The students can independently apply the theoretical knowledge acquired in the different modules to practical tasks. They can methodically prepare, discuss and evaluate solutions to their task independently under time and factual constraints.
Competence levels according to GQF	6
Course unit contents	• Individual, practice-oriented topics in the field of logistics, generally in preparation for the Bachelor's thesis. • The scientific methods and specialist knowledge learned during the degree programme are applied within the framework of the analytically designed work.
Recommended optional programme components	
Additional specifics	
Recommended or required reading	DIN ISO 690, Information und Dokumentation, Richtlinien für Titelangaben und Zitierung von Informationsressourcen (ISO 690:2010) [Anmerkung: Die Lehrenden im Studiengang empfehlen die Zitierweise gemäß Anhang A.2 Namen-Datum-System (Harvard-System)]
Scheduled	In consultation with the supervising professor
Combined assessments	Will be published in the first three weeks of lectures

Course unit title H14.2 382282 General studies

This course unit forms part of module H14, it is mandatory.

Name of lecturer(s)	Prof. Dr. Susanne Hetterich
Semester	7
Available in	Winter and summer semester
Mode of delivery	Lecture including integrated exercises
Language of instruction	German
Course unit title (German)	Studium Generale
Number of ECTS credits awarded	6.0, this corresponds to a workload of 180 hours
Contact hours per week (45 mins each)	6.0
Workload: Contact hours	90
Workload: Independent studies	90
Workload details	
Type of assessment	Preliminary examination based on a paper / a presentation
Duration of assessment	0 Minutes
Type of course unit	Mandatory
Prerequisites (see below)	Successfully completed basic studies
Planned learning activities and teaching methods	Proof of the Studium Generale preliminary examination performance is provided by participation in extracurricular courses to the extent of 6 ECTS credits offered by Heilbronn University and/or cooperating institutions. The type of preliminary examination performance will be announced to the students in good time in accordance with § 3 Para. 4 Sentence 2. In case of doubt, the responsible examination board decides on the creditability.
Professional competence: In-depth knowledge and comprehension (Bloom)	depending on individual choice
Professional competence : conative skills, analysis and synthesis of knowledge	depending on individual choice
Personal competence: Social abilities and skills	depending on individual choice
Personal competence: Independence / autonomy	depending on individual choice
Competence levels according to GQF	5
Course unit contents	depending on individual choice
Recommended optional programme components	
Additional specifics	

Recommended or required reading	depending on individual choice
Scheduled	https://splan.hs-heilbronn.de/
Combined assessments	Will be published in the first three weeks of lectures

Module B 382300 Thesis

Duration	1 Semester
Contact hours per week (45 mins each)	0
Type of assessment	Module without assessment: Grade includes individual student performances
Number of ECTS credits awarded	15.0
Preconditions for obtaining ECTS credits	
Module coordinator	Prof. Dr. Susanne Hetterich
Professional competence: In-depth knowledge and comprehension	The students are able to work on extensive, real or practical tasks - preferably in companies -, prepare the associated state of science and technology and solve them independently using scientific methods.
Professional competence: conative skills, analysis and synthesis of knowledge	The Bachelor Thesis module is an examination consisting of the thesis and the subsequent colloquium. The students are able to independently work on a problem from the subject within a given period of time using scientific methods and to scientifically document, present and defend a subject-related topic within the framework of the colloquium under tight time constraints. They can • structure and organise complex tasks, • conduct literature research and comprehensibly classify the state of knowledge in the subject area, • uncover connections between different subjects and sub-disciplines, • derive (partial) solutions, assess them on the basis of qualitative aspects and quantitatively calculated key figures and • design, check and decide on overall solutions. The students can work on more extensive, real or practical tasks - preferably in companies -, prepare the associated state of science and technology and solve them independently using scientific methods.
Personal competence: Social abilities and skills	Students master communication and coordination with people in companies, in some cases across departmental or hierarchical boundaries in the sense of the cross-sectional function of logistics.
Personal competence: Independence / autonomy)	With the Bachelor Thesis as an examination performance, the students show that they can independently work on a problem from the field of logistics using scientific methods within a specified period of time: - Preparation of solution approaches with the theoretical knowledge acquired in different modules in practical tasks. - Assumption of personal responsibility and decision-making under time and factual constraints
Competence levels according to GQF	6

Prerequisites (see below)	The topic of the Bachelor Thesis is to be handed out at the earliest in the sixth semester and at the latest six months after the end of the semester in which the last module examination was successfully taken (cf. also Study and Examination Regulations of Heilbronn University - Technology - Economics - Computer Science - FOR BACHELOR STUDIES WITH A REGULAR STUDY DURATION OF 7 SEMESTERS dated 26 January 2016). Completion of at least one of the two modules before registering the bachelor thesis. • VA.3 Technology + AI Lab or • VB.3 Innovation Projects Economy
Module specifics	
Scheduled	none, individual determination
Combined assessments	Will be published in the first three weeks of lectures

Course unit title B1 382301 Bachelor Thesis

This course unit forms part of module B, it is mandatory.

Name of lecturer(s)	Prof. Dr.-Ing. Annett Großmann
Semester	7
Available in	Winter and summer semester
Mode of delivery	Type of course unit: unknown
Language of instruction	German and English
Course unit title (German)	Bachelor Thesis
Number of ECTS credits awarded	12.0, this corresponds to a workload of 300 hours
Contact hours per week (45 mins each)	
Workload: Contact hours	10
Workload: Independent studies	290
Workload details	
Type of assessment	Bachelor Thesis
Duration of assessment	0 Minutes
Type of course unit	Mandatory
Prerequisites (see below)	• The practical semester must have been completed. • At least one of the two modules in the specialisations VA.3 Technology + AI Lab or VB.3 Business Innovation Projects should have been completed.
Planned learning activities and teaching methods	Independent scientific work under supervised conditions: - Working on given practical problems - Application of scientific methods - Literature research - Development of alternative solutions - Evaluation of alternatives and decision-making Coaching sessions with the examiner/supervisor
Professional competence: In-depth knowledge and comprehension (Bloom)	The students are able to work on extensive, real or practical tasks - preferably in companies -, prepare the associated state of science and technology and solve them independently using scientific methods.
Professional competence : conative skills, analysis and synthesis of knowledge	Structuring complex tasks Combining knowledge of individual subjects in one paper Carrying out literature research and comprehensible preparation of the state of knowledge in the subject area
Personal competence: Social abilities and skills	Communication and coordination with persons in companies, in some cases across departmental or hierarchical boundaries in the sense of the cross-sectional function of logistics

Personal competence: Independence / autonomy	The Bachelor Thesis as an examination paper should show that a problem from the field of logistics can be worked on independently using scientific methods within a specified period of time. • Preparation of solution approaches with the theoretical knowledge acquired in different modules in practical tasks. • Assumption of personal responsibility and decision-making under time and factual constraints
Competence levels according to GQF	6
Course unit contents	Practical, individual questions in the field of logistics
Recommended optional programme components	
Additional specifics	
Recommended or required reading	DIN ISO 690, Information und Dokumentation, Richtlinien für Titelangaben und Zitierung von Informationsressourcen (ISO 690:2010) [Anmerkung: Die Lehrenden im Studiengang empfehlen die Zitierweise gemäß Anhang A.2 Namen-Datum-System (Harvard-System)] Heesen, B., 2014. Wissenschaftliches Arbeiten: Methodenwissen für das Bachelor-, Master- und Promotionsstudium, 3., durchges. und erg. Aufl. ed. Springer Gabler, Berlin ; Heidelberg.
Scheduled	none, individual determination
Combined assessments	Will be published in the first three weeks of lectures

Course unit title B2 382302 Bachelor Thesis Colloquium

This course unit forms part of module B, it is mandatory.

Name of lecturer(s)	Prof. Dr. Susanne Hetterich
Semester	7
Available in	Winter and summer semester
Mode of delivery	Type of course unit: unknown
Language of instruction	German and English
Course unit title (German)	Kolloquium zur Bachelor Thesis
Number of ECTS credits awarded	3.0, this corresponds to a workload of 50 hours
Contact hours per week (45 mins each)	2.0
Workload: Contact hours	10
Workload: Independent studies	40
Workload details	Workload Preparation/ follow-up is included in the workload Self-study
Type of assessment	Preliminary examination based on a paper / a presentation
Duration of assessment	0 Minutes
Type of course unit	Mandatory
Prerequisites (see below)	Completion of the Bachelor Thesis
Planned learning activities and teaching methods	Coaching sessions with the supervisor or examiner
Professional competence: In-depth knowledge and comprehension (Bloom)	The students are able to deepen what they have learned during their studies in a specific topic and to interpret it for their task.
Professional competence : conative skills, analysis and synthesis of knowledge	Within the framework of the colloquium, the students can scientifically document, present and defend a subject-related topic under tight time constraints. They can • structure and organise in-depth assignments, • conduct literature research and comprehensibly demonstrate the state of knowledge in the subject area, • derive solutions, assess them on the basis of qualitative aspects and quantitatively calculated key figures and • design, present and defend overall solutions.
Personal competence: Social abilities and skills	The students can deal with criticism in a discussion. They are able to understand their own approaches from other perspectives and take a stand.
Personal competence: Independence / autonomy	The students can independently create a presentation on a specific, scientific topic in a limited amount of time.
Competence levels according to GQF	6

Course unit contents	• Elaboration of a given topic - based on the Bachelor Thesis - under tight time constraints • Scientifically precise preparation of a presentation • Presentation (20 to 30 minutes) followed by discussion (15 to 20 minutes)
Recommended optional programme components	
Additional specifics	
Recommended or required reading	DIN ISO 690, Information und Dokumentation, Richtlinien für Titelangaben und Zitierung von Informationsressourcen (ISO690:2010) [Anmerkung: Die Lehrenden im Studiengang empfehlen die Zitierweise gemäß Anhang A.2 Namen-Datum-System(Harvard-System)]
Scheduled	Individual appointments with supervisors
Combined assessments	Will be published in the first three weeks of lectures