

Courses taught in English at Albstadt-Sigmaringen University, Germany
as of 25.03.2021.

Bachelor level (for Master level see last page)

If not mentioned otherwise, the classes will be offered during **each semester**. The number in the right hand column with the column title **Sem.** indicates the semester level (i.e. 3 = 2nd year, 1st semester; 6 = 3rd year, 1st semester). **Students can mix classes from each semester level (Bachelor students only on Bachelor level, Master students on both Bachelor and Master level) and also from different campuses.**

Courses related to Business:

a) Albstadt campus:

Lecturer	Title	Code	Credits	Sem.
Prof. Gerhards	<p>Quality Management I:</p> <ul style="list-style-type: none"> • The students get an overview of the different aspects of quality and quality management. • The students get an overview of processes in product- an quality management of clothing companies and their influence to quality • The students learn the link between quality and sewing faults. • The students learn different methods to find the reasons for bad quality 	IP 20090	2 ECTS	4
Prof. Gerhards	<p>Quality Management II:</p> <ul style="list-style-type: none"> • The students learn the necessity of quality-management-systems in companies • The students get an overview of the ISO 9000 ff family and learn to work with it • The students can develop the philosophy of Total Quality Management out of ISO 9004 	IP 20100	3 ECTS	6
Prof. Kimmerle	<p>Textile Ecology and sustainability</p> <p>In the lecture, we examine and elaborate possible strategies for textile and clothing companies, how to setup an efficient working CSR team. We compare certification facilities and best available technologies within the complete global textile supply chain. From the idea, through efficient product development processes of garments and textile products, social and sustainable production processes and facilities, logistics to the retail and end of use of the products, we try to leave as little as possible footprint.</p> <p>Keywords: Case Studies, Eco labels, Textile Alliances, Green Technologies, Restricted Substance lists, EMAS, GRI, GOTS, Bluesign, Ökotex, Fair Wear Foundation, SA8000, Carbon Footprint, Textile Exchange,</p>	IP 20055	4 ECTS	6

Dr. Thudium	International Business Studies / Global Economy: <ul style="list-style-type: none"> • Economic systems • Basics on microeconomics as well as macroeconomics • Monetary policy 	IP 40021+ IP 40022	8 ECTS	7
Prof. Dr. Sommer	Practical Research Project I/ Introduction to Scientific Research Students learn how to do research in the first part of the semester and then start a project to demonstrate their acquired knowledge in a technical or business-related area	IP 40015	5 ECTS	4
To be determined	Project work for Bachelor thesis Topics to be discussed (only for students in their final year with major in Business)	WI 51010	12 ECTS	7

b) Campus Sigmaringen (detailed module descriptions below)

Lecturer	Title	Code	ECTS	Sem.
Prof. Dr. Wolf	International Business 1 Global trade/FDI, global markets, international strategies, internationalisation theory, intercultural aspects, country assessment, ethics, etc.	IP 60020	6	6
Prof. Dr. Sachse	International Business 2 Corporate Governance, CSR, risk management, International Human Relations, International Marketing, International Operations Management, International Organisational Design, etc.	IP 60030	6	7

Courses related to Textile (Albstadt campus only):

Lecturer	Title	Code	Credits	Sem.
Prof. Gerhards	Textile Manufacturing I <ul style="list-style-type: none"> • The students learn basic sewing methods • The students learn how to sew pockets, cuffs and collars. • The final project will be the production of a men's shirt. 	IP 20121	4 ECTS	1
Prof. Baum	Pattern Construction <ul style="list-style-type: none"> • Basic pattern construction for blouse, dress and skirt • Modifications of darts, variation of sleeves • Size charts for different product groups (men, women, children) • Mass costumization 	IP 20010	3 ECTS	1
Prof. Gerhards	Textile Manufacturing IV <ul style="list-style-type: none"> • The students learn the sewing of a men's jacket step by step. • The final project will be the production of a women's jacket according to self-chosen sizes. ! Only for students who have a solid knowledge of sewing.	IP 20080	5 ECTS	4
To be determined	Industry-related project Textile-related Only for students with a background in textile who know how to design and sew garments.	IP 20110	12 ECTS	6

To be determined	Project work for Bachelor thesis Topics to be discussed, please contact us in advance. Only for Textile students in their final semester.	BT 51010	12 ECTS	7
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Courses related to Engineering (Albstadt campus only):

Lecturer	Title	Code	Credits	Semester
Prof. Kimmerle + external lecturer	<p>Environmental Guidelines & Standards Environmental Policy</p> <ul style="list-style-type: none"> - history of environmental policy in Germany, - foundation of the Federal Environment Agency and its tasks • - Topics: Climate and energy, health, chemicals, traffic / noise, economy / consumption, waste / resources, air, water, soil / agriculture, sustainability / strategies • Immission control law • Nature conservation law • Soil protection law • Climate protection law • Water protection law • Waste law • Environmental standards: DIN EN ISO 14001 - environmental management systems & EMAS certification • Environmental policy in and outside Europe • Conventions: Basel, Rotterdam, Stockholm • Overview of world organizations and their responsibilities: United Nations, WHO, EU Commission & NGOs .. • UN Sustainable Development Goals - The 2030 Agenda for Sustainable Development • DIN EN ISO 14091 Adaptation to Climate Change - Vulnerability, Impact and Risk Assessment <p>Targets:</p> <p>The students have integrated specialist knowledge in the field of environmental policy and current environmental specifications and standards. This also includes in-depth specialist theoretical knowledge. They know the country-specific and European environmental regulations and standards, can apply and interpret them and are able to have a say in environmental issues. The students develop an awareness of the problem of ecological, social, economic and aesthetic interactions between production and consumption in a global context (understanding). They are able to use the laws and obligations along the entire supply chain to assess the quality of production processes in a responsible manner and to specify examination methods.</p>	ST (Sustainable Engineering)	3 ECTS	1

Prof. Baum + external lecturer	Social Aspects and Ethics <ul style="list-style-type: none"> ▪ The students get an overview of morally valuable acting guidelines ▪ The students get an overview of the 17 UN Sustainable Development Goals • A current industrial or social ethical problem will be discussed related to its social, ecological and economical aspects <p>Study cases from the areas: Work Ethic, Corporate Social Responsibility, Technology Ethics</p>	ST (Sustainable Engineering)	2 ECTS	1
To be determined	Project work for Bachelor thesis Topics to be discussed Only for students who are in their final year in Mechanical Engineering.	MA51010	12 ECTS	7
To be determined	Project Topics to be discussed, only for students with background in Mechanical Engineering	IP 30010	10 ECTS	6
Dr. Tijani	Matlab (description see below)	IP 33525	2,5 ECTS	6

Courses related to Computing (Albstadt campus only) (all module descriptions please see below)

Lecturer	Title	Code	Credits	Sem.
to be determined	Project in Computing Independent work on a real project with the topic out of the study area, from problem analysis until the final product. This happens in a group. Teams are guided by a professor and teaching assistants.	IP ? (ITSec 23500)	7,5 ECTS	5
to be determined	Project work for Bachelor Thesis Pre-requisite: Student must be proficient in programming in Java, C# and C++, only for students in their final study semester.	IP 51010	12 ECTS	7
Prof. Dr. Eppler	Big data <ul style="list-style-type: none"> - Overview of No-SQL databases - Map Reduce function - Structure of the DBMS Hadoop with <ul style="list-style-type: none"> o Hadoop File System o Map Reduce o YARN o Hive o Partitioning - Distributed databases <ul style="list-style-type: none"> o Vertical / horizontal fragmentation o Fragmentation transparency o transaction control - MySQL clusters <ul style="list-style-type: none"> o Set up a cluster o Partition types 	IP ? (ITSec 23900)	2,5 ECTS	5

Prof. Morgenstern	Digital Forensics: <ul style="list-style-type: none"> - Introduction to forensic sciences in general and digital forensics in particular - Methodical foundation of digital forensics, embedded in classical analogue forensics - Forensic principles in securing and analyzing digital spotting and presentation of forensic investigations (internally and in court) - Practical applications in various areas of digital forensics (e.g., disk forensics, application forensics, digital forensics, mobile devices) 	IP ? (ITSec 24300)	5 ECTS	5
Prof. Morgenstern	IT Security management: <ul style="list-style-type: none"> - Fundamentals and significance of IT security management - Legal requirements - IT security standards - IT security management process - IT security management according to BSI basic protection - Standards and certification - Organizational aspects 	IP ? (ITSec 32400)	2,5 ECTS	7
Prof. Morgenstern	Mobile and Cloud Forensics: <ul style="list-style-type: none"> - Digital forensics in the context of mobile devices (smartphones, navigation devices, etc.) - Special features in the area of forensic backup and analysis of mobile devices (operating systems, file systems, data formats, access options and restrictions) - Digital forensics in the context of cloud computing - Special features in the area of forensic protection and analysis of cloud systems (architectures, service and organizational models, trust models, access options and restrictions) - Practical applications and exercises in digital forensics of mobile devices and cloud systems 	IP ? (ITSec 32500)	2,5 ECTS	7
Prof. Morgenstern	Offensive security measures: <ul style="list-style-type: none"> - Offensive methods and their goals in the context of IT security - Legal and Ethical Framework - Fundamentals, framework conditions and goals of penetration tests - Attacks on the confidentiality, integrity or availability of <ul style="list-style-type: none"> >transmission channels >networks >operating systems >Applications >Hardware components >Web applications 	IP ? (ITSec 24400)	7,5 ECTS	5

	<p>>radio systems</p> <ul style="list-style-type: none"> - Finding vulnerabilities through fuzzing and code analysis <p>Laboratory work The points dealt with in the lecture are practically tested in the internship within an isolated network. Current tools and systems from the penetration test and system analysis area such as Burp Suite, Nmap, and the Metasploit Framework</p>			
Prof. Dr. Rembold	<p>Project Management:</p> <ul style="list-style-type: none"> - Project management: basics, life cycle and phase orientation, development processes, ... - Business process modelling: development of a vision, business proposal, goal fixation, ... - Case study: developing a business proposal, planning of development processes 	IP ? (ITSec 23000)	2,5 ECTS	5
to be determined	Internship semester on request for students who are staying for 2 semesters			

Courses related to Life Sciences (Sigmaringen campus only) (detailed descriptions see below p. 25 ff):

Lecturer	Title	Code	Credits	Semester
To be determined	Project work for Bachelor thesis Topics to be discussed Only for students who are in their final year in Food Technology / Nutrition.	LE51000	12 ECTS	7
Prof. Dr. Winkler	Project: The research project is an in-depth study of an issue or topic from all fields related to food (food technology, food processing, packaging, process control, quality management,...), nutrition, appliance technology and hygiene. It may be in the form of a small-scale research study, a case study, a program evaluation or a report on a field placement.	LE	5 ECTS	5 - 7
Prof. Dr. M. Schmid	Basics in Food Packaging Technology: This seminar presents a basic overview of food packaging technology with emphasis on packaging sustainability.	LE	5 ECTS	7
Prof. Dr. C. Gerhards	Food Technology: Students know how food is composed. They learn how molecular properties influence the physical and chemical properties of foodstuffs. They are informed, how food is being processed, involving their knowledge about molecular properties of food.	LE	5 ECTS	3
Prof. Dr. Klingshirn	Physical Food Analysis: The module covers the theory of as well as practical training in various analytical techniques used in modern physical analysis of food ingredients and processed foods.	LE	2,5	6
Prof. Dr. Klingshirn	Food Development: Continuous product development is a crucial success factor in food industry, from refining of an established product range to developing completely new products.	LE	2,5	6
Prof. Dr. Maier-Nöth	Applied Sensory and Consumer Science: Understanding food choices is of fundamental importance for product development/improvement. Sensory & consumer science can help to understand some of the key factors influencing food choices. This course focuses on real-world expertise and explores new techniques, as well as the foundational theory behind current methods of sensory evaluation & consumer science for both edible and non-edible products.	LE	5	6

Lecturer	Title	Code	Credits	Semester
Prof. Dr. Benjamin Eilts	Hygiene and Environmental Health: Since hygiene as a science considers all factors that influence human health, the interrelationships between humans and their environment are also in focus. Microorganisms (bacteria, viruses, fungi and parasites) exist naturally in the environment and on or within the bodies of animals and people. There are other sources of microorganisms that may cause infection and these include a person's own normal microbial flora and environmental sources such as air, water, or equipment that may have become contaminated.	LE	2,5	7
Prof. Dr. A. Schmid	Sterile Technology: The module is focussing on the manufacture of sterile pharmaceuticals. The participants gain broad practical knowledge about sterilization processes (including validation), aseptic processing conditions and the associated technologies, aseptic transfer and filling, and hygienic design of facilities and machinery. Additional exercises and practical training (focussing on validation of aseptic processes and visual inspection) prepare the participants for future tasks in sterile manufacturing.	PH	5	6
Prof. Dr. I. Müller	Galenics of Biopharmaceuticals: Students know galenic principles of Biopharmaceuticals. They know the specific characteristics of Biopharmaceuticals as well as the main principles of research and development. They are informed, how Biopharmaceuticals are being processed.	PH	5	3
Prof. Dr. I. Müller	Pharmaceutical Technology 2: The module covers the theory of as well as practical training in various fields of Pharmaceutical Technology research topics as well as Manufacturing topics always in respect to Pharmaceutical Industrial Processes.	PH	2,5	7
Tbd	Project thesis: The project thesis is an in-depth study of an issue or topic from all fields related to the pharmaceutical development and production including packaging, process control, quality management,...). It may be in the form of a small-scale research study, a case study, a program evaluation or a report on a field placement. → Only for students with Pharmaceutical /Biomedical/... background	PH	5	6

Language courses (Albstadt campus):

Lecturer	Title	Code	Credits	Sem.
Mrs. Ritter	English 1 (Technical English)	IP 40011	2,5 ECTS	1
Mr. McKinney	English 2 (Business English)	IP 40012	2,5 ECTS	1
Mrs. Rembold	Technical English	IP 10030	2,5 ECTS	1-4
Mr. Schmittinger	Business English	IP 10010	2,5 ECTS	1-4
Mr. Schmittinger	English Conversation and Grammar	IP 10020	2,5 ECTS	1-4
N.N.	German as a Foreign Language – Beginners	IP 11010	2,5 ECTS	1-4
N.N.	German as a Foreign Language – A2 level	IP 11020	2,5 ECTS	1-4
N.N.	German as a Foreign Language – B1 level	IP 11050	2,5 ECTS	1-4
N.N.	German as a Foreign Language – B2 level	IP 11060	2,5 ECTS	1-4

Module: Elective course	Module title: Introduction in MatLab
Semester: Bachelor	Modul-Code: IP33525
Hours / semester: 2	ECTS-credits: 2,5
On offer: semiannual / WS / SS	Language of instruction: English
Lecturer: Dr.-Ing. Yakub Tijani	Responsible Professor: Prof. Dr.-Ing. André Heinrietz
Competences to be acquired:	
Students <ul style="list-style-type: none"> • Have knowledge about MatLab progamme structure • Can transfer mathematical tasks in MatLab algorithms • Can programme error-free MatLab skripts 	
Content: <ul style="list-style-type: none"> • MatLab workbench structure • Data types, handling matrices and vectors • Programming loops • Branching • Subroutines / functions • How to use complex MatLab library functions (data fit, optimization, equation solving) • MatLab – Central user community 	
Literature: <ul style="list-style-type: none"> • MatLab Manual, Ver. 2016 	
Teaching form: Laboratory 15 x 2 h = 30 SWS (blocked, 3 x 10h), exact dates in WebUntis	
Workload: 2,5 ECTS = 75 workload (WL), containing: <ul style="list-style-type: none"> • Lectures 30 WL • Preparation presentation 45 WL 	
Exam: <ul style="list-style-type: none"> • Presentation 	

International Business 1

Course title: International Business 1		Code: 3750	
Courses: International Business 1		Level: 3	
Lecturer: Prof. Dr. Sachse Prof. Dr. Schmidt-Endrullis	Teaching Method: Lecture, Cases, In-class discussion, Group Work	ECTS: 6	SWS: 4
Work Load: Contact time: 45h, Preparation: 45h, Reflection: 35h, Exam preparation: 25h			
Expected Knowledge Courses from the first four semesters Usability of this course: Course 38010: International Business II		Course volume: 150h	Semester: 6
<p>Course objectives</p> <p>With the completion of this course, students will gain an overview of basic aspects of globalization and its impact on international business. The students will developed a basic understanding of the main actors and institutions. They have an overview of international economies and understand the context of political, economical, socio-cultural and institutional environment. They have a basic understanding of relevant internationalization theories, can analyze countries and international customer segments on its attractiveness, know possible internationalization strategies and market entry forms and can comparatively evaluate them.</p> <p>In contrast to "International Business 2", students develop know-how on the main questions on how to start with the internationalization process of the firm and the successful design of international market entry from entrepreneurial/managerial perspective.</p> <p>The presentation charts used in-class as well as cases and readings are available at ILIAS Learning platform of our Faculty Business Science and Management, www.hs-albsig.de.</p>			
<p>Course description</p> <ul style="list-style-type: none"> - Globalisation, foreign direct investment, international trade, emerging markets (Bottom of the Pyramid phenomenon), political, economical, social and institutional environment - International economic regions, Institutions and organisations - Intercultural aspects of international business - Internationalization theories (3Es, Configuration approach, GAINS, Uppsala-Model, Born-Global, network theory) - Country selection, country evaluation, management of country portfolios - International strategies (strategic options for market entry, internationalization process) <p>In each semester guest lecturer speak about current problems and share experiences (recent speakers: Transparency International, Nokia Siemens Network, Ifolor, Walz, Federal Ministry for Economic Cooperation and Development, Daimler)</p>			
<p>Literature:</p> <p>Griffin, R.W./Pustay, M.W.: International Business, Pearson Lassere, P.: Global Strategic Management, Palgrave Peng, M./Meyer, K.: International Business, Cengage Learning Volberda, Henk W./Morgan, Robert E./Reinmoeller, Patrick/Hitt, Michael/Ireland, Duane, R./Hoskisson, Robert E.: Strategic Management, Cengage Learning J. Wild/K. Wild: International Business, Pearson</p>			
Assessment: Written exam (90min.)		Language: English	

International Business 2

Course title: International Business 2		Code: 38010	
Courses: International Business 2		Level: 3	
Lecturer: Prof. Dr. Sachse	Teaching Method: Lecture, Cases, In-class discussion, Group Work	ECTS: 6	SWS: 4
Work Load: Contact time: 45h Preparation: 45h Reflection: 35h Exam preparation: 25h			
Expected Knowledge Modul 37510: International Business I		Course volume: 150h	Semester: 7
Course objectives With the completion of this course, students will gain deeper knowledge on the central functions for developing the international activities abroad after the initial market entry. In contrast to "International Business 1", students develop know-how on the main questions on how to operate and manage international activities (e.g. international human resources and labor relations, procurement, international/export marketing, sales, supply chain management, organizational design, corporate governance) The presentation charts used in-class as well as cases and readings are available at ILIAS Learning platform of our Faculty Business Science and Management, www.hs-albsig.de .			
Course description <ul style="list-style-type: none"> - International Human Resource Management - (International Leadership Concepts, International Staffing, Training, Performance Appraisal, Expatriates) - International Operations Management (Sourcing, Supply Chain, Manufacturing, Logistics) - International Marketing & Export Management (selected aspects on international pricing, international product/branding, international distribution, international communication) - International Organizational Design - International Corporate Governance within the context of CSR and Business Ethics In each semester guest lecturer speak about current problems and share experiences (recent speakers: Transparency International, Nokia Siemens Network, Ifolor, Walz, Federal Ministry for Economic Cooperation and Development, Daimler)			
Literature: Dowling, P.J./Festing, M./Engle, A.D.: International Human Resource Management, Cengage Goergen, Marc: International Corporate Governance, Pearson Griffin, R.W./Pustay, M.W.: International Business, Pearson Hollensen, Svend: Global Marketing, Prentice Hall Lasserre, Philippe: Global Strategic Management, Palgrave Macmillan Peng, M./Meyer, K.: International Business, Cengage Learning Wild/K. Wild: International Business, Pearson			
Assessment: Written exam (90min.)		Language: English	

Module: Studium Generale	Course: German as a foreign language A1
Semester: Bachelor	Module-Code: IP 11010
Teaching hours: 2	ECTS-Credits: 2,5
Course is available: WS / SS	Language of instruction: German
Teaching staff: N.N.	Responsible professor: --
Acquired competences at the end of the course: <p>Can understand and use familiar, everyday expressions and very simple sentences, which relate to the satisfying of concrete needs. Can introduce him/herself and others as well as ask others about themselves – e.g. where they live, who they know and what they own – and can respond to questions of this nature. Can communicate in a simple manner if the person they are speaking to speaks slowly and clearly and is willing to help.</p>	
Content: <p>Introduce yourself / Greetings / numbers / time / talk about your family / going out for dinner / week days / shopping / reading timetables and many more everyday situations</p> <p>Grammar: definite + indefinite articles / conjugation of verbs / cases / possessive pronouns / connectors /</p>	
Literature: <p>Handouts</p>	
Teaching methods: <p>Classroom and online teaching</p>	
Examination: <p>tests every 1-3 weeks, homework, attendance</p>	

Module: Studium Generale	Course: German as a foreign language A2
Semester: Bachelor	Module-Code: IP 11020
Teaching hours: 2	ECTS-Credits: 2,5
Course is available: WS / SS	Language of instruction: German
Teaching staff: N.N.	Responsible professor: --
Acquired competences at the end of the course: Can understand sentences and frequently used expressions related to areas of most immediate relevance (e.g. very basic personal and family information, shopping, local geography, employment). Can communicate in simple and routine tasks requiring a simple and direct exchange of information on familiar and routine matters. Can describe in simple terms aspects of their background, immediate environment and matters in areas of immediate need.	
Content: Family / living together / being mobile / leisure activities / digital environment / past and present situation / work situations / culture / ... Grammar: relative clauses / past tense / conjunctions / indirect questions / verbs with two objects / verbs with different cases/passive sentences	
Literature: Handouts and videos	
Teaching methods: Classroom and online teaching	
Examination: tests every 1-3 weeks, homework, attendance	

Module: Studium Generale	Course: English Conversation and Grammar
Semester: Bachelor	Module-Code: IP 10181
Teaching hours: 2	ECTS-Credits: 2,5
Course is available: WS / SS	Language of instruction: English
Teaching staff: Mr. Gerd Schmittinger	Responsible professor: N.N.
Acquired competences at the end of the course: In addition to acquiring new vocabulary, students will gain more self-confidence using English as medium of communication.	
Content: The main aim of the course is to improve oral communication skills focusing on everyday situations. Off the cuff speaking as well as creative writing on topics of own interest forms the basics of the course. Emphasis will be on idiomatic English and proper pronunciation.	
Literature: Handouts	
Teaching methods: Classroom teaching	
Examination: At the end of the course there is a final oral (80%) and written (20%) evaluation.	

Course Name:	Technical English
Semester:	spring semester + fall semester
Semester hours per week:	2 hours per week
credits:	2,5 ECTS credits
Language of instruction:	English
Instructor:	Lucy Rembold
Course Content:	<p>the following topics are covered during the course:</p> <ul style="list-style-type: none"> ● Technical vocabularies and phrases ● Technical writings ● Technical English Discussions and Debates ● Interview tricks and techniques for Engineers ● Writing Thesis in English ● Presentation techniques ● Improving overall communication skills
Course Objectives:	<p>By the end of the course, the students are expected to be able to:</p> <ul style="list-style-type: none"> ● Increase their knowledge of English in technical fields ● Write and read basic technical reports, emails ● Expand vocabulary related to technical English ● Develop presentation skills in engineering fields ● Familiarize with writing thesis in English ● Build confidence in job interviews using English
Course Format:	Group setting
Exam:	Oral exam

Module: Studium Generale	Course: Business English
Semester: Bachelor	Module-Code: IP 10010
Teaching hours: 2	ECTS-Credits: 2,5
Course is available: WS / SS	Language of instruction: English
Teaching staff: Mr. Gerd Schmittinger	Responsible professor: n.n.
Acquired competences at the end of the course: In addition to acquiring more business related vocabulary and gaining more self-confidence using English as medium of communication, students will be able to write business letters, conduct meetings and compile business presentations using media such as PowerPoint.	
Content: The aim of the course is to improve written and oral communication skills focusing on the business environment. During the lessons students will acquire topic related vocabulary, use this vocabulary in dialogues, write and present their own dialogues, conduct business meetings and write business letters and essays. Emphasis will be on idiomatic English and proper pronunciation.	
Literature: Handouts	
Teaching methods: Classroom teaching	
Examination: At the end of the course there is a final oral (40%) and written (60%) evaluation.	

Module title: Big data						
Code	Workload	Type of Course(s)	Semester		Duration	Frequency
23900	75h	Taught	5			
1	Part(s) of the module:		Language English	Class Contact time (hours) 30h	Self-study time (hours) 45h	Credits (ECTS) 2,5
2	Mode of delivery / Hours per week in term: Taught, 2h per week					
3	Learning outcomes: The students know: <ul style="list-style-type: none"> - Systems and techniques for parallel data processing - Hadoop with the most important addons like Hive - MySQL Cluster 					
4	Course contents: <ul style="list-style-type: none"> - Overview of No-SQL databases - Map Reduce function - Structure of the DBMS Hadoop with <ul style="list-style-type: none"> o Hadoop File System o Map Reduce o YARN o Hive o Partitioning - Distributed databases <ul style="list-style-type: none"> o Vertical / horizontal fragmentation o Fragmentation transparency o transaction control - MySQL clusters <ul style="list-style-type: none"> o Set up a cluster o Partition types 					
5	Prerequisites: None					
6	Exam: Written exam, 60min, graded					
7	Requirement for credits:					
8	Applicability of the module:					
9	Responsible instructor: Prof. Dr. Thomas Eppler					
10	Additional notes and comments:					

Module title: Digital Forensics						
Code	Workload	Type of Course(s)	Semester		Duration	Frequency
24300	150h	Taught	5			
1	Part(s) of the module:		Language	Class Contact time (hours)	Self-study time (hours)	Credits (ECTS)
			English	60h	90h	5
2	Mode of delivery / Hours per week in term: Taught, 4 hours per week					
3	Learning outcomes: The students <ul style="list-style-type: none"> - are familiar with the methodological foundation of digital forensics and its embedding in classical analogue forensics - understand forensic principles in securing and analyzing digital traces - can document and present the forensic examinations, eg. In court - are able to apply the techniques learned in various areas of digital forensics (e.g., disk forensics, application forensics, digital forensics, mobile devices) 					
4	Course contents: <ul style="list-style-type: none"> - Introduction to forensic sciences in general and digital forensics in particular - Methodical foundation of digital forensics, embedded in classical analogue forensics - Forensic principles in securing and analyzing digital spotting and presentation of forensic investigations (internally and in court) - Practical applications in various areas of digital forensics (e.g., disk forensics, application forensics, digital forensics, mobile devices) 					
5	Prerequisites: None					
6	Exam: Oral presentation, 20min					
7	Requirement for credits:					
8	Applicability of the module:					
9	Responsible instructor: Prof. Holger Morgenstern					
10	Additional notes and comments:					

Module title: IT security management						
Code	Workload	Type of Course(s)	Semester		Duration	Frequency
32400	75h	Taught	7			
1	Part(s) of the module:		Language English	Class Contact time (hours) 30h	Self-study time (hours) 45h	Credits (ECTS) 2,5
2	Mode of delivery / Hours per week in term: Taught, 2 hours per week					
3	Learning outcomes: The students <ul style="list-style-type: none"> - know the basics and importance of IT security management - know the legal requirements for IT security - know the IT security standards and IT security management process - Understand IT security management according to BSI-Grundschutz, the standards and the certification process 					
4	Course contents: <ul style="list-style-type: none"> - Fundamentals and significance of IT security management - Legal requirements - IT security standards - IT security management process - IT security management according to BSI basic protection - Standards and certification - Organizational aspects 					
5	Prerequisites: None					
6	Exam: 60min written exam					
7	Requirement for credits:					
8	Applicability of the module:					
9	Responsible instructor: Prof. Holger Morgenstern					
10	Additional notes and comments:					

Module title: Mobile and Cloud forensics						
Code	Workload	Type of Course(s)	Semester	Duration	Frequency	
32500	75h	Taught	7			
1	Part(s) of the module:		Language	Class Contact time (hours)	Self-study time (hours)	Credits (ECTS)
			English	30h	45h	2,5
2	Mode of delivery / Hours per week in term: Taught, 2 hours per week					
3	Learning outcomes: The students <ul style="list-style-type: none"> - know the special methods of forensic backup and analysis of mobile devices - are familiar with the special methods of digital forensics in the context of cloud computing Skills The students <ul style="list-style-type: none"> - can apply the methods of digital forensics of mobile devices and cloud systems in practice 					
4	Course contents: <ul style="list-style-type: none"> - Digital forensics in the context of mobile devices (smartphones, navigation devices, etc.) - Special features in the area of forensic backup and analysis of mobile devices (operating systems, file systems, data formats, access options and restrictions) - Digital forensics in the context of cloud computing - Special features in the area of forensic protection and analysis of cloud systems (architectures, service and organizational models, trust models, access options and restrictions) - Practical applications and exercises in digital forensics of mobile devices and cloud systems 					
5	Prerequisites: None					
6	Exam: 60min written exam					
7	Requirement for credits:					
8	Applicability of the module:					
9	Responsible instructor: Prof. Holger Morgenstern / Prof. Dr. Fein					
10	Additional notes and comments:					

Module title: Offensive Security methods						
Code	Workload	Type of Course(s)	Semester		Duration	Frequency
24400	225h	Taught	5			
1	Part(s) of the module:		Language	Class Contact time (hours)	Self-study time (hours)	Credits (ECTS)
			English	90h	135h	7,5
2	Mode of delivery / Hours per week in term: Taught, 4 hours per week lecture and 2 hours per week laboratory work					
3	Learning outcomes: The students <ul style="list-style-type: none"> - Be aware of offensive methods and their objectives in the context of IT security, including penetration testing, attacks on the confidentiality, integrity or availability of Systems, networks and channels, as well as social engineering - are aware of the legal and ethical framework in the use of offensive methods - can use current offensive methods to penetrate systems - can stabilize access to acquired systems - can identify relevant information from public sources and perform an analysis of the information surface of a target / company - Assess vulnerabilities based on CVSS and other metrics - are able to analyze code for vulnerabilities 					
4	Course contents: <ul style="list-style-type: none"> - Offensive methods and their goals in the context of IT security - Legal and Ethical Framework - Fundamentals, framework conditions and goals of penetration tests - Attacks on the confidentiality, integrity or availability of <ul style="list-style-type: none"> >transmission channels >networks >operating systems >Applications >Hardware components >Web applications >radio systems - Finding vulnerabilities through fuzzing and code analysis <p>Laboratory work The points dealt with in the lecture are practically tested in the internship within an isolated network. Current tools and systems from the penetration test and system analysis area such as Burp Suite, Nmap, and the Metasploit Framework</p>					
5	Prerequisites: None					
6	Exam: Written exam 120min and ungraded laboratory work					
7	Requirement for credits:					
8	Applicability of the module:					
9	Responsible instructor: Prof. Holger Morgenstern / n.n.					
10	Additional notes and comments:					

Module title: Project						
Code	Workload	Type of Course(s)	Semester		Duration	Frequency
23500	225h	Project	5			
1	Part(s) of the module:		Language	Class Contact time (hours)	Self-study time (hours)	Credits (ECTS)
			English	90h	135h	7,5
2	Mode of delivery / Hours per week in term: Part taught, part project, 4 hours per week					
3	Learning outcomes: Students know: <ul style="list-style-type: none"> - Methods of project management - Advanced cryptographic algorithms and/or - Advanced techniques of network security and/or - Advanced techniques of the security of embedded systems 					
4	Course contents: Independent work on a real project with the topic out of the study area, from problem analysis until the final product. This happens in a group. Teams are guided by a professor and teaching assistants.					
5	Prerequisites: None					
6	Exam: Practical work (graded), assignment (graded)					
7	Requirement for credits: None					
8	Applicability of the module:					
9	Responsible instructor: Prof. Nemirovski, Prof. Stauß, Prof. Morgenstern					
10	Additional notes and comments:					

Module title: Project Management						
Code	Workload	Type of Course(s)	Semester		Duration	Frequency
23000	75h	Taught	5			
1	Part(s) of the module:		Language	Class Contact time (hours)	Self-study time (hours)	Credits (ECTS)
			English	30h	45h	2,5
2	Mode of delivery / Hours per week in term: Taught, 2 hours per week					
3	Learning outcomes: Students know: <ul style="list-style-type: none"> - The most important terms and signs for professional project management - Basic concepts for business process modelling - Techniques for project management - Roles of the people that work on the project - Most important methods for software developing processes 					
4	Course contents: <ul style="list-style-type: none"> - Project management: basics, life cycle and phase orientation, development processes, ... - Business process modelling: development of a vision, business proposal, goal fixation, ... - Case study: developing a business proposal, planning of development processes 					
5	Prerequisites: None					
6	Exam: Student research project					
7	Requirement for credits:					
8	Applicability of the module:					
9	Responsible instructor: Prof. Dr. Rembold					
10	Additional notes and comments:					

Degree program Food, Nutrition, Hygiene

Module: Food Technology

Key facts

Workload	Semester	Frequency	ECTS
150 h	3	Every semester	5
Parts of the module		Contact time	Self-study time
		60 h	90 h
Module leader		Assessment	
Prof. Dr. C. Gerhards		Poster presentation, Oral exam	

Curriculum Outline

Students know how food is composed. They learn how molecular properties influence the physical and chemical properties of foodstuffs. They are informed, how food is being processed, involving their knowledge about molecular properties of food.

Key content

- Water in food, water activity
- Properties of sugars and carbohydrates
- Sugar beet processing
- Baking, frying
- Properties of proteins
- Meat, meat products, milk, cheese
- Properties of fats and oils
- Oil seeds processing
- Gums and Stabilizers

Degree program Food, Nutrition, Hygiene

Module: Physical Food Analysis

Key facts

Workload	Semester	Frequency	ECTS
75 h	6	Every semester	2,5
Parts of the module		Contact time	Self-study time
0,5 contact hour lecture 1 contact hour practical training		15 h	52,5 h
Module leader		Assessment	
Prof. Dr. A. Klingshirn		Term paper	

Curriculum Outline

The module covers the theory of as well as practical training in various analytical techniques used in modern physical analysis of food ingredients and processed foods.

Key content

- Physical food properties in focus include water activity, moisture, colour, viscosity, weight, thickness and texture. The analysis parameters act as crucial indicators of food quality and safety.
- In an introductory practical session different physical analysis methods are presented and trained.
- Based on a specific task from food processing, food quality evaluation or benchmarking, relevant physical food analysis parameters are to be defined and a measurement program, specifying the different physical analysis methods, is to be set- up. The physical analysis results will additionally be correlated with sensory analysis methods. As physical properties of a product drive consumer perception and desirability for the product, establishing ideal physical properties is essential in the decision-making process for product developers, marketers and quality controllers.

Degree program Food, Nutrition, Hygiene

Module: Food Development

Key facts

Workload	Semester	Frequency	ECTS
75 h	6	Every semester	2,5
Parts of the module		Contact time	Self-study time
1 contact hour tutorial 1 contact hour practical training		15 h	52,5 h
Module leader		Assessment	
Prof. Dr. A. Klingshirn		Poster presentation	

Curriculum Outline

Continuous product development is a crucial success factor in food industry, from refining of an established product range to developing completely new products.

Key content

- The tutorial provides an introduction and insight to the core elements of product development, namely the business strategy directing product development, the various steps in the product development process based on the 'Stage- Gate- Process', the knowledge required to fuel the process and the need for keeping the product development focused on the consumers needs.
- A focus is placed on the product development process, from ideation to product launch, focusing on the small scale bench development phase. Critical aspects in managing the product development process in practice are covered, including process evaluation and improvement techniques to allow for successful product innovation.
- In the practical training, performed as a collaborative work, a new food product will be developed from concept to prototype or pilot-scale production, with inclusion of a critical analysis of product quality, safety, shelf-life, packaging, labelling (nutrient content calculation, legal aspects) and cost.
- A presentation of the development process outcome (from ideation to the final product) and the product specification, including aspects of, market accessibility and consumer acceptability is given.

Degree program Food, Nutrition, Hygiene

Module: Applied Sensory and Consumer Science

Key facts

Workload	Semester	Frequency	ECTS
150 h	6	Every semester	5
Parts of the module	Contact time	Self-study time	
2 contact hours lecture 1 contact hour tutorial 1 contact hour practical training	60 h	90 h	
Module leader	Assessment		
Prof. Dr. A. Maier-Nöth	Presentation & term paper		

Curriculum Outline

Understanding food choices is of fundamental importance for product development/improvement. Sensory & consumer science can help to understand some of the key factors influencing food choices. This course focuses on real-world expertise and explores new techniques, as well as the foundational theory behind current methods of sensory evaluation & consumer science for both edible and non-edible products.

Key content

- Physiological and psychological bases for sensory evaluation and consumer testing;
- Applied methods and statistical tools that can be used for collecting and extracting useful information from sensory and consumer data, current business applications;
- Theories and approaches used in the execution of sensory evaluation and consumer testing research;
- Recent advances in cognitive psychology applied to sensory and consumer studies on food, beverage, cosmetic, personal care and hygiene products;
- Applied research techniques in sensory and consumer testing along the whole product life cycle (trend research, early prototyping, validated concept proof, final sensory and consumer validation, storage testing);
- A consumer view to food packaging & sustainability.

Degree program Food, Nutrition, Hygiene
 Module: Sustainable Food Packaging Technology

Key facts

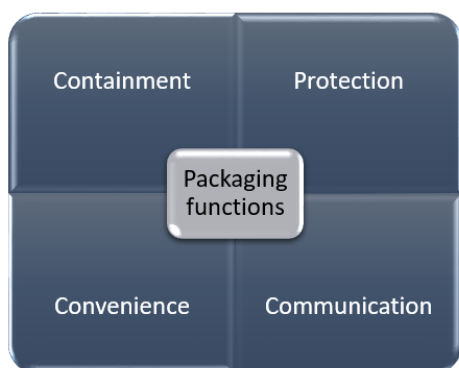
Workload	Semester	Frequency	ECTS
75 h	7	Every semester	2,5
Parts of the module		Contact time	Self-study time
1 contact hours lectures 0,5 contact hour seminars 0,5 contact hour workshops		30 h	45 h
Module leader		Assessment	
Prof. Dr. Markus Schmid		Oral exam (English or German)	

Curriculum Outline

This seminar presents a basic overview of food packaging technology with emphasis on packaging sustainability.

Key Content

- Food packaging as a scientific discipline that applies the principles of materials science, food technology, information science, and socioeconomics to develop useful and packaging concepts for the food industry will be introduced.
- In addition to that, a holistic approach for considering sustainability aspects in food packaging technology will be introduced.
- The students will learn to apply the theoretical basics of packaging production and functionality in several workshops.
-



Degree program Food, Nutrition, Hygiene

Module: Hygiene and Environmental Health

Key facts

Workload	Semester	Frequency	ECTS
75 h	7	Every semester	2,5
Parts of the module		Contact time	Self-study time
1 contact hours lectures 0,5 contact hour seminars 0,5 contact hour workshops		30 h	45 h
Module leader		Assessment	
Prof. Dr. Benjamin Eilts		Presentation & term paper	

Curriculum outline

Since hygiene as a science considers all factors that influence human health, the interrelationships between humans and their environment are also in focus. Microorganisms (bacteria, viruses, fungi and parasites) exist naturally in the environment and on or within the bodies of animals and people. There are other sources of microorganisms that may cause infection and these include a person's own normal microbial flora and environmental sources such as air, water, or equipment that may have become contaminated.

Key Content

- Based on selected areas, the influence of microorganisms and suitable countermeasures are discussed with the help of current specialist literature. The aim is to gain comprehensive knowledge of the literature on the selected topic and to interpret the literature data in terms of their application and to discuss interfaces to other, subject-related aspects (e.g. regulatory framework conditions, market requirements, occupational safety).
- The requirements and measures in the areas of monitoring, hygienic design and decontamination are deepened through additional lab exercises.

Degree program Food, Nutrition, Hygiene

Module: Research Project

Key facts

Workload	Semester	Frequency	ECTS
150 h	5 th , 6 th or 7 th semester	Every semester	5
Parts of the module		Contact time	Self-study time
Research project		7,5 h	142,5 h
Module leader		Assessment	
Prof. Dr. G. Winkler		Term paper or poster and presentation	

Curriculum Outline

The research project is an in-depth study of an issue or topic from all fields related to food (food technology, food processing, packaging, process control, quality management,...), nutrition, appliance technology and hygiene. It may be in the form of a small-scale research study, a case study, a program evaluation or a report on a field placement.

Key content

may cover...

- an analysis of an existing data set in order to test a hypothesis or answer a research question;
- a critical systematic review of a question such as the effectiveness of a policy or intervention;
- an evaluation of the implementation of a new technology in food/ nutrition / hygiene-related industry;
- a small research study, in which data is collected and analyzed.
The report and presentation shows the abilities of ...
- systematically collecting relevant, up-to-date information about the research task;
- analyzing, interpretation and discussion of the information;
- drawing conclusions and making recommendations;
- writing a report in accordance with academic standards.

Degree Programme Pharmaceutical Technology

Module: Sterile Technology

Key facts:

Workload	Semester	Frequency	ECTS
150 h	6	Every semester	5
Parts of the module		Contact time	Self-study time
4 contact hour lecture including exercises and 2 practical trainings		60 h	90 h
Module leader		Assessment	
Prof. Dr. A. Schmid		written exam, presentation and practical training	

The module is focussing on the manufacture of sterile pharmaceuticals. The participants gain broad practical knowledge about sterilization processes (including validation), aseptic processing conditions and the associated technologies, aseptic transfer and filling, and hygienic design of facilities and machinery. Additional exercises and practical training (focussing on validation of aseptic processes and visual inspection) prepare the participants for future tasks in sterile manufacturing.

Key content

Sterilization:

- Sterility testing
- Basic concepts, e. g. SAL, D value, z value, F_0 value
- Technical aspects of sterilization procedures: steam, heat, radiation, chemical, plasma sterilization, sterile filtration
- Validation of sterilization processes

Aseptic Processing:

- Environmental requirements / cleanrooms, class A technologies (isolators, RABS etc.)
- Preparation / washing, CIP / SIP, transfer processes
- Sterile filling and packaging (fill & finish)
- Validation / media fill, quality control / inspection Hygienic

design / sterile design:

- Materials, surfaces, components
- Sterile design using the bioreactor as an example

Degree program Pharmaceutical Engineering

Module: Galenics of Biopharmaceuticals

Key facts

Workload	Semester	Frequency	ECTS
150 h	3	Every semester	5
Parts of the module		Contact time	Self-study time
		60 h	90 h
Module leader		Assessment	
Prof. Dr. I. Mueller		written test, presentation, practical training	

Curriculum Outline

Students know galenic principles of Biopharmaceuticals. They know the specific characteristics of Biopharmaceuticals as well as the main principles of research and development. They are informed, how Biopharmaceuticals are being processed.

Key content

- Characteristics and groups of Biopharmaceuticals
- Characteristics, manufacturing processes and Quality Control of lyophilized products
- Characteristics, manufacturing processes and Quality Control of micro- and nanoparticles
- Characteristics, manufacturing processes and Quality Control of liposomes and special semi-solids
- Characteristics, manufacturing processes and Quality Control of Therapeutic Systems
- Characteristics, manufacturing processes and Quality Control of vaccines
- Characteristics, manufacturing processes and Quality Control inhalers
- Stability studies

Degree program Pharmaceutical Engineering

Module: Pharmaceutical Technology 2

Key facts

Workload	Semester	Frequency	ECTS
75 h	7	Every semester	2,5
Parts of the module		Contact time	Self-study time
1,0 contact hour lecture 1 contact hour practical training		30 h	45 h
Module leader		Assessment	
Prof. Dr. I. Müller		presentation	

Curriculum Outline

The module covers the theory of as well as practical training in various fields of Pharmaceutical Technology research topics as well as Manufacturing topics always in respect to Pharmaceutical Industrial Processes.

Key content

- Manufacturing of medicinal products with high potent Active Pharmaceutical Ingredients
- Spezialization of solid drug delivery systems

Degree program Pharmaceutical Engineering

Module: Modern Pharmaceutical Analytics

Key facts

Workload	Semester	Frequency	ECTS
75 h	7	Optional module	2,5
Parts of the module		Contact time	Self-study time
1,5 contact hours lecture 0,5 contact hours exercises		30 h	45 h
Module leader		Assessment	
Prof. Dr. D. Stoll		Written examination, excercises	

Curriculum Outline

The module covers aspects of modern analytics in pharmaceutical research and industry. Mainly techniques applied in biomarker identification and bioanalytics are presented. Furthermore excercises in GxP compliant analytical validation of simple assays and data sets are performed.

Key content

- HPLC-ESI-mass spectrometry of small drug molecules and metabolites in pharmacokinetics
- ESI-MS mass spectrometry of biologics (antibodies, QC) and peptides (QC, proteomics)
- Multiplex Immunoassays in biomarker research
- ICH and EMA guidelines. Exercises: Definition of simple validation plans + data statistics and interpretation

Degree program Pharmaceutical Engineering Module: Project thesis

Key facts

Workload	Semester	Frequency	ECTS
150 h	5 th , 6 th or 7 th semester	Every semester	5
Parts of the module		Contact time	Self-study time
		7,5 h	142,5 h
Module leader		Assessment	
Professors Pharmaceutical Engineering		Team Paper or oral presentation or... (it depends on the topic)	

The project thesis is an in-depth study of an issue or topic from all fields related to the pharmaceutical development and production including packaging, process control, quality management,...). It may be in the form of a small-scale research study, a case study, a program evaluation or a report on a field placement.

Key content

may cover...

- an analysis of an existing data set in order to test a hypothesis or answer a research question;
- a critical systematic review of a question such as the effectiveness of a policy or intervention;
- an evaluation of the implementation of a new technology in pharmaceutical related industry;
- a small research study, in which data is collected and analyzed. The report and presentation shows the abilities of ...
- systematically collecting relevant, up-to-date information about the research task;
- analyzing, interpretation and discussion of the information;
- drawing conclusions and making recommendations;
- writing a report in accordance with academic standards.

Master level

(Courses are only offered once a year, please check the entry in the column "Sem.")

Sigmaringen campus:

Lecturer	Title	Code	Credits	Sem.
To be determined (all professors from LS)	Innovation project	FPD57010	5 ECTS	M.Sc. spring / winter semester
Prof. Klingshirn Prof. Gerhards	Technology and Innovation Management: Novel food processing technologies, introduction in innovation management, focusing on ideation and idea selection process in food and pharma industry	FPD57500	5 ECTS	winter sem.