HOCHSCHULE HEILBRONN
Reinhold-Würth-Hochschule
Campus Künzelsau



Heilbronn University of Applied Sciences

Reinhold-Würth-Hochschule - Campus Künzelsau

Faculty of Engineering, Business and Social Sciences (TWS)

International Course Offer for Incoming Students

Academic Year 2026/2027

General information

Dear Incomings,

In the following pages you find the international course offer in the fields of Engineering, Business and Social Sciences (TWS) with a short description about courses and modality of assessment. Should you require further information about the courses, please send an email to: international-kuen@hs-heilbronn.de.

Incoming students can register for courses from different study programs / departments. Bachelor students can also choose Master courses after consultation with the lecturer if schedules allow. In case some courses are full and you will not be able to join them, we will assist you in looking for alternative options.

If you are proficient in German and would like to register for some courses taught in German you can find the list of the courses in the Internet pages of the different study programmes (https://www.hs-heilbronn.de/de/studiengaenge-tws) under the link "Modulhandbuch". If you need assistance, please do not hesitate to get in touch at international-kuen@hs-heilbronn.de.



Bachelor business students at Campus Künzelsau can also select some business subjects from Campus Schwäbisch Hall, which is 20 km away from Künzelsau and can be reached by bus (there is a bus every hour). The list of courses offered in Schwäbisch Hall is available at: https://www.hs-heilbronn.de/en/international-course-offer

Please be aware that the possibility to follow the courses in Schwäbisch Hall ultimately depends on the final scheduling of the courses you choose.

AVAILABILITY OF SCHOLARSHIP FOR INCOMINGS AT CAMPUS KÜNZELSAU!

More information at: https://www.hs-heilbronn.de/wuerth-incoming-scholarship

Abbreviation of study programs at Heilbronn University of Applied Sciences Campus Künzelsau

BM: Business, Marketing and Media Management - Bachelor
BK: Business, Culture, Event and Sport Management – Bachelor
MAPS: Management and Applied Psychology in the Social Sector - Bachelor
MBK: Business, Culture, Event and Sport Management - Master
MBM: International Marketing and Communication – Master
IAM: Intercultural Arts Management – Master
WI: Industrial Engineering - Bachelor
ESM: Energy System Engineering and Management - Bachelor
ET: Electrical Engineering – Bachelor
ATM: Automation Technology and Mechatronics - Bachelor
MEE: Electrical Engineering – Master
IMTI: International Master of Technical Innovation – Master

International course offer – BUSINESS

Course ID	Course Title	ECTS credits	Contact hours per week	Dept.	Term
293121	Business Management	3	2	BM	summer
293132	International Management	6	4	BM	winter/summer
293428	International Business Negotiation	2	2	BM	winter
293425	Intercultural Communication	2	2	BM	winter/summer
293416	International Marketing Case Studies (CRM)	2	2	BM	winter/summer
293417	International Marketing Week	2	2	BM	summer
293191	Brand Management	4	4	BM	winter/summer
243094	Culture, Sport and Event Venues Management	2	2	BK	winter
243065	International Aspects of Cultural, Leisure and Sport Management in combination with Applied Foreign Language	6 (4) (2)	6 (4) (2)	BK	winter/summer
295001	Consumer Behavior	5	4	MBM	winter
295002	International Marketing Strategy	5	4	MBM	summer
295011	International Sales Strategy	5	4	MBM	winter
295012	Intercultural Communication	4	3	MBM	summer
295021	Media and Communication Strategy	5	4	MBM	winter
295022	Digital Marketing	5	4	MBM	winter
295041	The Global Marketplace	5	4	MBM	winter
295051	International Leadership	5	4	MBM	winter
295052	Internationalization Simulation	4	4	MBM	summer
295071	Research Methods	5	4	MBM	winter

241051	Current issues in Global Culture	3	2	MBK	summer
241051	Current issues in Global Culture	3	2	MBK	summer
241052	Selected Chapters in Global Culture	3	2	MBK	winter
241061	International aspects of Culture and Leisure Management	2	1,5	MBK	summer
241062	Selected Chapter in Culture and Leisure Management	2	1,5	MBK	winter

International course offer – LANGUAGE COURSES

Course ID	Course Title	ECTS credits	Contact hours per week	Dept.	Term
243036 293031 430381	Business English 1	2	2	BK/BM/MAPS	winter/summer
243037 293211 430382	Business English 2	2	2	BK/BM/MAPS	winter/summer
225122	English for industrial engineers	4	4	WI	summer
226047	Foreign languages	2,5	2	WI	winter/summer
293611	German as a foreign language – A1 (*)	5	4	IMTI	winter/summer
293621	German as a foreign language – A2 (*)	5	4	IMTI	winter/summer
364051	Languages 1 – A1/B1 (winter) Languages 2 A2/B2 (summer) (*)	5	4/8	ESM	winter/summer

(*) The levels of German as a foreign language courses are based on the Common European Framework of Reference for Languages (CEFR). There is a placement test and after the language tests, the students will be grouped according to their level of proficiency. In all German courses presence is mandatory and a minimum attendance of 80% of the classes is required.

International course offer- ENGINEERING

Course ID	Course Title	ECTS credits	Contact hours per week	Dept.	Term
364181	PLC Laboratory	3	2	ESM	summer
364171	Control Engineering	5	4	ESM	summer
364202	Project Management	2	2	ESM	summer
364211	Air Conditioning Technology	2	2	ESM	summer
364212	Heating and Refrigeration Technology	3	2	ESM	summer
364072	Mechanics 2	3	2	ESM	summer
364221	Heating, Ventilation and Air Conditioning Laboratory	5	4	ESM	summer
364191	Introduction to Business Administration	5	4	ESM	summer
364061	Mathematics 2	5	4	ESM	summer
364101	Liberalized Energy and Raw Materials Market	2	2	ESM	summer
364080	Electrical Engineering 2	3	2	ESM	summer
364082	Electrical Engineering Laboratory	2	2	ESM	summer
364102	Public Supply Grids	3	2	ESM	summer
364201	Introduction to Accounting	3	2	ESM	summer
364091	Applied Computer Science	5	4	ESM	summer
364152	Decentralized Energy Systems and Smart Grids	3	2	ESM	winter
364161	Decentralized Energy Systems and Smart Grid Laboratory	5	4	ESM	winter
364112	Communication Technology	2	2	ESM	winter
364111	Automation Systems	3	2	ESM	winter
364121	Electronics Measurement Technology	5	4	ESM	winter
364131	Optimizing of Energy Supply	3	2	ESM	winter
364132	Demand Side Management	2	2	ESM	winter

Course ID	Course Title	ECTS credits	Contact hours per week	Dept.	Term
364141	Thermodynamics	2	2	ESM	winter
364142	Heat Transfer/Fluid Dynamics	3	2	ESM	winter
364151	Central Energy Systems	2	2	ESM	winter
364011	Mathematics 1	8	6	ESM	winter
364021	Physics	5	4	ESM	winter
364031	Electrical Engineering 1	5	4	ESM	winter
364041	Bioenergy, Geothermal Energy and Solar Thermal Energy	2	2	ESM	winter
364012	Mechanics 1	2	2	ESM	winter
364071	Materials Science	2	2	ESM	summer
364042	Photovoltaics and Wind Energy	3	2	ESM	winter
364231	Environmental Economics, Management and Ethics	5	4	ESM	summer
364241	Modelling and Simulation of Energy Systems	3	2	ESM	summer
364242	Modelling and Simulation of Energy Systems Laboratory	2	2	ESM	summer
364251	Electric Power Systems	5	4	ESM	summer
364261	International Accounting Standards and Business Analysis	3	2	ESM	summer
364262	Start-up Management	2	2	ESM	summer
226127	Laboratory Automation and PLC Systems	2,5	2	WI	summer
226112	Laboratory Manufacturing Techniques	2,5	2	WI	winter
226196	Integrative Project Laboratory (Mandatory introductory event during the first week of lectures)	7	4	WI	winter/summer
226128	Materials Laboratory	2,5	2	WI	summer
226166	International accounting and Business Analysis	2,5	2	WI	winter/summer

Course ID	Course Title	ECTS credits	Contact hours per week	Dept.	Term
226176	Advanced Engineering Studies	5	4	WI	winter/summer
226177	Advanced Business Studies	5	4	WI	winter/summer
226400	Bachelor´s Thesis (laboratory-based, final evaluation through home university)	13		WI	winter/summer
211799 310796	Bachelor Thesis (laboratory-based, final evaluation through home university)	12		ET/ATM	winter/summer
310754	Methods of product development	2	2	ATM	summer
212101	Innovation Lab	3	2	ET/ATM	winter/summer
212191	Project Lab	8	6	ET/ATM	winter/summer
331332	Magnetic Measurement Technology	2	2	MEE (Master)	summer
331312	Electro-magneto-mechanical energy converters with applications)*	2	2	MEE (Master)	winter
331311	Theory of electromagnetic fields with applications*	4	4	MEE (Master)	winter
293551	Innovation Management	2,5	2	IMTI	winter
293552	Sustainability and Ethics	2,5	2	IMTI	winter
293571	Embedded and Edge Systems	2,5	2	IMTI	winter
293572	Industrial Software Engineering	2,5	2	IMTI	winter
293591	Development of Power Electronics	2,5	2	IMTI	winter
293592	Electric, Magnetic and Mechanic Energy Converters	2,5	2	IMTI	winter
293631	Entrepreneurship in R&D	2,5	2	IMTI	winter
293632	Research Project	7,5	6	IMTI	winter

Course ID	Course Title	ECTS credits	Contact hours per week	Dept.	Term
293561	Product and Engineering Design	2,5	2	IMTI	summer
293581	AI in Technical Systems	2,5	2	IMTI	summer
293582	Industrial Data Analytics	2,5	2	IMTI	summer
293601	Computer Vision	2,5	2	IMTI	summer
293602	Assembly and Handling Systems	2,5	2	IMTI	summer
293641	Leadership in R&D	2,5	2	IMTI	summer
293642	Development Project	7,5	6	IMTI	summer
293562	Intercultural Communication	2,5	2	IMTI	summer

*Both courses are at Master level and have a combined examination. Students who take both courses receive 7 ECTS

COURSES DESCRIPTION

293121 Business Management

Semester: 4
Hrs/ week: 2
ECTS: 3
Lecturer: Prof. Dr. Marcus Drescher

Course description

The course business management focuses on diverse aspects of the management process. It involves principles of management.

- Basics of management/corporate management
- Normative corporate management (terms, meaning, elements)
- Strategic corporate management (term, meaning, elements)
- Value-based corporate management (shareholder value management)
- Operative corporate management (planning and check, organization and organizational transformation)

Pronounced focus is set on the strategy development process both analyzing different strategic options and providing tools for analyzing organizations and their environment. The course closes with the strategy implementation and the role of leadership throughout the process. The course expects active contributions and uses case studies for illustrating overall concepts.

Assessment

Written exam

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293122 Business Simulation*

Semester: 4
Hrs/ week: 5
ECTS: 6
Lecturer: Prof. Dr. Marcus Drescher

Course description

In the business simulations, student teams take over the top-management of a manufacturing company. Students apply knowledge from prior lectures and make decisions covering the whole value creation process including procurement, sales & production planning, HR planning, finance, research & development. Student teams compete in the same markets for customers. They experience that their company's success is not only dependent on their own decisions, but also from the strategies of other competing student teams. The course is enriched by theory input, performance reviews as well as regular analytical assignment and presentations.

Assessment

Simulation result (20%)
Midterm presentation (30%)
Presentation (50%)

* Solid knowledge of cost accounting and good Excel skills required to join the course.

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293132 International Management

Semester: 6
Hrs/ week: 4
ECTS: 5
Lecturer: Prof. Dr. Simona Gentile-Lüdecke

Course description

The course provides students with the necessary knowledge and skills to critically analyze the dynamics of the global market in which an international company operates. The aim of this course is to enable students to better analyze and understand the opportunities and challenges that companies face when expanding their activities internationally and when dealing with international competitors in their home markets.

An instructional unit involves lectures, class discussions, case analyses. The topics of the course look at three main areas:

- International environment challenges. Focus is placed on the analysis of country differences in political economy and political risks as well as cultural and social heterogeneities. In this segment, the course covers the major facets of the international management environment (legal, political, economic, and cultural). The central debates surrounding the culture construct, formal and informal institutions, economic development, and regional integrations are presented in class, along with the major frameworks that have been used to describe these phenomena
- Global organizational forms and international strategies. Focus is placed on the strategic challenges confronting firms that compete in the global economy. Aim is to develop understanding of how to gain competitive advantage and compete successfully in the international marketplace.
- International management operations. The course covers an array of organizational issues such as international human resource staffing and management, global R&D, global supply chain, global leadership.

Assessment

Midterm written assignment (50%)
Presentation (50%)

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293428 International Business Negotiation

Semester: 6/7
Hrs/ week: 2
ECTS: 2
Lecturer: Prof. Dr. Simona Gentile-Lüdecke

Course description

Business negotiations are increasingly recognized as a full part of the managerial process, highly relevant to the implementation of business strategies. International business managers are now increasingly business negotiators, who constantly discuss deals across borders with a variety of people, be it consumers, intermediaries or competitors. The course aims to provide students with necessary tools to succeed in international negotiations.

After the course students should be able to:

- Understand the process of international business negotiation
- Develop knowledge of the issues at stake and the main variables
- Understand the impact of culture in international business negotiations
- Develop skills for being a successful negotiator

The following topics will be object of discussion and analysis:

- Background factors
- The role of culture in international business negotiation
- Negotiating power (options and concessions)
- The pre-negotiation stage
- Negotiator preparation and negotiating teams
- Communication in negotiations
- Exploring interests and positions
- Negotiation strategy and tactics
- Conflict in negotiations
- Negotiations with China
- Negotiation in different settings

Assessment

Written assignment (30%)
Presentation (70%)

<< Back

293425 Intercultural Communication

Semester: 6/7
Hrs/ week: 2
ECTS: 2
Lecturer: Prof. Dr. Simona Gentile-Lüdecke

Course description

After following this course, students should be able to:

- Understand the role of culture in the organization and review the major aspects of culture
- Look at how culture influences management practices
- Raise awareness of how culture guides the way managers look at problems as well as the solutions they find
- Analyze the leadership across cultures and multicultural teams
- Learn how to develop intercultural competences

The following topics will be object of discussion and analysis:

- The meaning of culture
- Different dimensions of culture
- The international company
- Culture and human resource management
- Intercultural communication
- Managing intercultural conflicts
- Managing intercultural teams
- Intercultural leadership

Assessment

Written assignment (30%)
Presentation (70%)

<< Back

293436 Global Leadership

Semester: 6/7
Hrs/ week: 2
ECTS: 2
Lecturer: Prof. Dr. Simona Gentile-Lüdecke

Course description

With the knowledge acquired in the course students should be able to:

- review and analyze a selected number of leadership theories, giving special attention to how each theoretical approach can be applied in real-world organizations
- understand the influence of culture on leadership
- understand what shapes individual and group decision making, what enhances or weakens team performance

In the lectures following topics will be object of analysis and discussion:

- Leadership – basic definition of the concept and components of leadership
- Trait approach
- Skills approach
- Behavioural approach
- Situational leadership
- Transactional and transformational leadership
- Authentic leadership
- Servant leadership
- Intercultural aspects of leadership
- Models of relation between leadership and followership. LMX theory.
- Leadership of workgroups and teams.
- Gender and leadership
- Leadership and ethics.
- Toxic leadership: the dark side of leadership

Assessment

Written assignment (30%)
Presentation (70%)

<< Back

293416 International Marketing Case Studies (CRM)

Semester: 6/7
Hrs/ week: 2
ECTS: 2
Lecturer: Prof. Dr. Joachim Link

Course description

Subject of the elective is the understanding and training of the Anglo-Saxon case study method. International case studies with selected management problems are treated according to a special structure and discussed. The main focus are problems of strategic marketing.

The elective is a preparation for the NIBS Case Study Competition, which takes place annually. Selected BM students compete against students from other universities in a worldwide case study competition.

Assessment

Written case solution / presentation

<< Back

293417 International Marketing Week

Semester: 4
Hrs/ week: 2
ECTS: 2
Lecturer: Prof. Dr. Joachim Link

Course description

The "International Marketing Week" network is an association of twelve European universities (in Belgium, Great Britain, Denmark, Germany, Finland, France, Latvia, the Netherlands, Austria and Spain) which arrange an International Marketing Week for marketing students every year. In this week, the students are requested to work on a marketing topic (e.g., participation in a logo contest, creation of a marketing concept, development of a viral marketing campaign or realization of market analyses for new products), mostly in connection with a business partner, and to use their knowledge of different marketing aspects and techniques.

Due to their international participants, the International Marketing Week creates an international setting where intercultural dialogue and cooperation are the key to success. Company visits as well as cultural and social activities are organized to give the students the possibility to meet their fellow students from other countries.

Assessment

Presentation

<< Back

293191 Brand Management

Semester: 4
Hrs/ week: 4
ECTS: 4
Lecturer: Prof. Dr. Joachim Link

Course description

Brand Management is an important topic in the field of Marketing. The students learn to know the decisions that have to be taken by a company to create and nurture a brand. The contents of the course include an introduction into the definitions and concepts of brand management with a specific focus on strategic decisions like brand positioning. Several instruments and KPIs to control the success of brand management are discussed. The students illustrate the theoretical concepts of Brand Management with a brand of their choice.

Assessment

Presentation and written exam

<< Back

243094 Culture, Sport and Event Venues Management

Semester: 6
Hrs/ week: 2
ECTS: 2
Lecturer: Prof. Dr. Louise Bielzer

Course description
Students who have successfully participated in this module will be able to:

- differentiate culture, sport and event venues according to their history, specific characteristics, functions and requirements of the various stakeholders
- identify, differentiate and evaluate the different stages “planning”, “financing”, “construction” and “operation” of an event venue
- recognize relationships between an event location’s structural conditions and its operation, identify critical factors and compare and evaluate various practical examples
- analyze the current market position of an event location in competition and strategically (re-)position it successfully vs. its competitors in the future

The course content is organized in three sections:

Culture, Sport and Event Venue Management – General Introduction

- Overview of the Historic Development of Selected Event Venue Clusters
- Typical Features of Selected Event Venue Clusters
- Significance of Architecture and Room Layouts for Operations
- Stakeholder of Culture, Sport and Event Venues: Requirements of Investors, Owners, Operators, Event Organizers, Visitors etc.
- Interdependencies between “Construction” and “Operation”

Planning, Financing and Construction of Culture, Sport and Event Venues

- Market, Demand and Competition Analyses
- Feasibility Studies as Basis for Planning
- Location Factors and Site Selection
- Development of Suitable Room Layouts as Basis for Architectural Competitions
- Project Development and Architectural Competition
- Business Planning
- Life-Cycle of Event Venues

Strategic and Operative Management of Culture, Sport and Event Venues

- Application of Strategic Management Methods on Event Venues: Successful Strategic Positioning and Repositioning of Event Venues on the Market
- Selected Management Challenges in Operative Event Venue Management
- Sustainability as Key Issue

Assessment
Written examination (60 minutes)
<< Back

243066 International Aspects of Cultural, Leisure and Sports Management (only in combination with 243067 Applied Foreign Language)

Semester: 4
Hrs/ week: 4
ECTS: 4
Lecturer: Prof. Dr. Raphaela Henze

Course description

By following this course students acquire knowledge of the social and economic peculiarities of cultural organizations in international comparison as well as an understanding of the special challenges faced in international cultural management.

The following topics will be object of analysis:

- Culture Financing
- Art and culture in societal change/ reflection on the (self-) conception of the cultural manager
- Cultural management approaches in international comparison (including historical/postcolonial, sociological, ethnological, geographical discourses)
- External cultural policy/critical reflection on funding models
- Audience development and community engagement
- Perspectives of the leisure sector

Assessment

Presentation

<< Back

243067 Applied Foreign Language (only in combination with 243065 International Aspects of Cultural, Leisure and Sports Management)

Semester: 4
Hrs/ week: 2
ECTS: 2
Lecturer: Brigitte Brath

Course description

Students develop language competencies, which enable them to function in an academic and professional environment. They can:

- Interpret and classify statements made in the foreign language
- Identify what is relevant in terms of contents
- Transfer and apply what they have learnt to hands-on situations
- Describe and explain facts

The course content will focus on:

- Basics in academic writing
- Writing a literature review
- Solving complex assignments in the area of marketing, fundraising, sponsoring, intercultural communication based on case studies
- Idiomatic phrases as well as presentation techniques considering international audiences

Assessment

Written Exam

<< Back

243036 / 293031 / 430381 Business English 1

Semester: 2
Hrs/ week: 2
ECTS: 2
Lecturer: Melanie Gish

Course Description

Office Communication:

- Written correspondence and telephoning
- Formal/ informal language
- General business correspondence phrases
- Enquiries
- Structure and specific phrases
- Making arrangements
- Complaints
- Structure and specific phrases
- Reasons for complaints
- General telephoning phrases

General Business Vocabulary

- Company profiles
- Company structures

Facts and Figures

- How to read numbers in English
- Describing graphs
- Interpretation of graphs and identifying trends

Grammar

- Review of tenses
- Adverbs

Assessment

Written exam (90 min)

<< Back

243037 / 293211 / 430382 Business English 2

Semester: 4
Hrs/ week: 2
ECTS: 2
Lecturer: Melanie Gish

Course description

Meetings

- General meeting vocabulary
- Types of meetings and roles in a meeting
- Meeting phrases
- Meeting simulations

Complaints Management

- Responding to a complaint/ Adjustment of complaints
- Phrases used when handling a complaint

Report Writing

- Types of reports
- Structure and purpose of reports

Marketing and Advertising

- Vocabulary

Presentation Techniques

- Structuring a presentation
- Phrases used in presentations
- Highlighting information in presentations
- Slide design
- Cultural differences in presentations

Assessment

Presentation

<< Back

959100 / 959110 German as a foreign language (beginner / advanced)

Lecturer: Ulrike Letzgus

The placement to the different levels of the German as a foreign language with be carried out during the introduction week.

The levels of the German as a Foreign Language courses are based on the Common European Framework of Reference for Languages (CEFR).

In all German courses, attendance is mandatory and you need to attend 80% of the classes. In case of higher level of absence, you cannot attend the exam and will not receive any ECTS.

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295001 Consumer Behaviour

Semester: 1
Hrs/ week: 4
ECTS: 5
Lecturer: Prof. Dr. Joachim Link

Course description

Students will be able to understand the social and psychological factors influencing consumer behavior using marketing theory. They will be able to apply the knowledge of the driving forces of consumer behavior for the development of marketing measures.

The course focuses on the following topics:

- Factors influencing consumer behavior
- Benchmarks for analysis of consumer behavior
- Psychological factors in consumer behavior (Perception, motivation, involvement, attitude, purchase intention)
- Conditioning- and learning processes
- Reference groups and social effects
- Consumer decision-making
- Measuring consumer behaviour (e.g. eye contact)
- Consumer behaviour in different target groups (age groups, gender, lifestyles)
- Consumer behaviour in different countries and cultures
- Marketing implications of consumer behaviour

Assessment
Written exam

<< Back

295002 International Marketing Strategy

Semester: 2
Hrs/ week: 4
ECTS: 5
Lecturer: Prof. Dr. Marcus Meyer

Course description

At the end of the course students will know all relevant alternatives of international market entry strategies. They will understand the underlying parameters and master the corresponding planning tools for a market entry.

The course is structured in the following way:

Introduction

- Theoretical basics
- State of research
- Contemporary developments in International Marketing Strategies (IMS)

Developments in IMS

- Planning components
- Planning processes
- Deriving strategy scenarios
- Selecting suitable strategy options

Implementing IMS

- Factors influencing strategy implementation
- Strategy implementation
- Control and adaptation of implemented strategies
- Timing and organization of international activities

(Topical) case studies and exercises

Assessment

Presentation

<< Back

295011 International Sales Strategy

Semester: 1
Hrs/ week: 4
ECTS: 5
Lecturer: Prof. Dr. Simona Gentile-Lüdecke

Course description

A firm lives or dies by what it sells. The sales function is the engine of growth and sustainability and is increasingly recognized as a strategic function of growing importance within the firm. The aim of the course is to prepare students for analyzing, selecting and organizing sales activities with a special focus at international sales. At the end of the course participants should be able to present the influencing factors and challenges of international sales. Moreover, they should be able to confidently describe the necessary strategic and operational measures that are fundamental to the successful internationalization of companies' sales.

Following topics will be discussed and analyzed in the course

- Introduction to sales and the role of selling
- Relation between sales and marketing
- Customer definition and segmentation
- Sales channels and channel choice at international level
- Designing sales organization, Key account management
- Pricing policy
- Negotiation tactics and strategies
- Reward and compensation of sales people

Assessment:
Midterm paper/presentation (30%)
Final exam (70%)

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295012 Intercultural Communication

Semester: 2
Hrs/ week: 3
ECTS: 4
Lecturer: Prof. Dr. Simona Gentile-Lüdecke

Course description

Globalization made intercultural communication inevitable and the success of every international business depends on the effectiveness of the communication with other cultures. Although the challenges of an increasingly diverse world are great, the benefits are even greater. Communicating and establishing relationships with people from different cultures can lead to a whole host of benefits, including healthier communities, increased international, national, and local commerce, reduced conflict, and personal growth through increased tolerance.

After following this course students should be able to:

- Develop awareness of their own culture's influence on their communications
- Gain knowledge of multiple perspectives, processes and best practices for effective intercultural communication
- Critically discuss the fundamental principles and topics in intercultural communication
- Apply the acquired knowledge and skills in various communication contexts

The following topics will be object of discussion and analysis:

- The need of intercultural communication
- The cultural context
- The verbal and non-verbal code
- The environmental context
- The perceptual context
- The socio-relational context
- Theories of intercultural communication
- Intercultural communication in intercultural conflicts
- Intercultural communication in intercultural business negotiations
- Intercultural communication in managing and leading multicultural (virtual) teams

Assessment
Midterm assignment (30%)
Presentation (70%)

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295021 Media and Communication Strategy

Semester: 1
Hrs/ week: 4
ECTS: 5
Lecturer: Prof. Dr. Marcus Meyer

Course description

After following this course students will have comprehensive knowledge of alternative media strategies in international markets. In addition, they will be familiar with all the relevant tools and methods required to develop them.

The course content is organized as follows:

Introduction

- Media types, selection and use
- Strategy development and –evaluation
- Communicative objectives and strategy development

International analysis (domestic market)

- Analysis of demand and target groups
- Analysis of advertising messages
- Analysis of media deployment

External analysis (potential foreign markets)

- Environmental and competitor analysis
- Analysis of target segments and their needs
- Analysis of media law
- Analysis of the media landscape
- Deducing advertising messages
- Deducing uses of media

Exercises

Assessment
Presentation

<< Back

295022 Digital Marketing

Semester: 1
Hrs/ week: 4
ECTS: 5
Lecturer: Prof. Dr. Christian Pohl

Course description

At the end of the course students will be able to apply the knowledge of innovative electronic communication in case studies or real-life practical projects. In teamwork students will develop solutions (e.g., in the form of prototypes, descriptions of requirements, concept evaluations, etc.) that are based on current problems of practical relevance. For example, they can optimize existing online systems, design suitable marketing strategies, or analyze and evaluate the acceptance and usability of such solutions.
Students must independently analyze the task, identify problems, form teams and develop solutions. This requires a high degree of organizational and teamwork skills, communication and cooperation.

Following topics are at the core of the course:

- Design, development and evaluation of innovative communication solutions within digital marketing based on case studies and real projects
- Team-based working through practice-relevant issues
- Management presentations of results

Assessment

Presentation

<< Back

295041 The Global Marketplace

Semester: 1
Hrs/ week: 4
ECTS: 5
Lecturer: Prof. Dr. Simona Gentile-Lüdecke

Over the past five decades, the world economy has gone through a process of transformation commonly referred to as globalization, characterized by a decline of barriers to cross-border trade and investment. At the same time, the recent political world events (Brexit, trade frictions USA-China, global pandemic, Russia-Ukraine conflict) in addition to the sustainability and environmental challenges create tensions and uncertainty regarding the future of global activities.

This course provides students with the necessary knowledge and skills to enable them to critically analyze the dynamics of global marketplace within which an international firm operates.

The course will focus on the following topics:

- Globalization (and deglobalization?)
- National differences in political, legal, economic systems (formal institutions)
- National differences in cultures (informal institutions)
- Firm resources: competitiveness and growth
- Ethics, corporate social responsibilities and sustainability
- Foreign direct Investment
- Entry strategy and strategic alliances
- Digital multinational, global strategies and acquisitions
- Global supply chains
- Global R&D
- Global Human Resource Management

As a part of the course, students participate in the **X-Culture project** (www.x-culture.org). They will work on a real case international challenge in global virtual teams. Students from 110 universities and 35 countries take part to the project. Each student will be assigned to a team of 5/6 students from different countries. Each week there will be a deliverable and an assessment. Students that present the best final report will be invited to the annual symposium of X-Culture and will be able to meet face-to-face with their team members. Each student will receive an official certificate that will acknowledge the participation to this unique project.

Assessment
Midterm paper (X-Culture report, 30%)
Final exam (70%)

<< Back

295051 International Leadership

Semester: 1
Hrs/ week: 4
ECTS: 5
Lecturer: Prof. Dr. Marcus Drescher

Course description

Through the course, students gain a comprehensive knowledge of leadership in companies. Along the historical development of leadership research, different approaches are explained, discussed and applied. Building on this knowledge, challenges of leadership in an international context are dealt with, in particular leadership of virtual and multicultural teams.

The content of the course includes following topics:

- Leadership versus management
- Trait theories
- Behavior theories
- Leadership styles
- Contingency theories
- Leader-follower theories
- Team leadership
- Culture
- Diversity
- Virtual teams

Assessment

Presentation during semester (50%)
Written exam (50%)

<< Back

295052 Internationalization Simulation

Semester: 2
Hrs/ week: 4
ECTS: 5
Lecturer: Prof. Dr. Marcus Drescher

Course description

Student teams apply previously learned knowledge in a business simulation previously learned knowledge. Teams take over the management of companies located in different regions of the world. In this simulation, students experience the challenges that arise in internationalization, especially due to different requirements of the locations, internal factors, competitors and environmental influences.

The content of the course focuses on:

- Assuming leadership of a fictitious company
- Decision making under uncertainty in competition with other teams and changing economic conditions
- Operative and strategic planning as well as decision making on a broad range of issues: international marketing-mix, expansion decisions, investment decisions, HR planning, capacity planning, procurement management, competition analysis and financial planning

Assessment

Simulation result (20%)
Midterm presentation (30%)
Presentation (50%)

<< Back

295071 Research Methods

Semester: 1
Hrs/ week: 4
ECTS: 5
Lecturer: Prof. Dr. Simona Gentile-Lüdecke

Course description

The course aims to introduce students to the quantitative and qualitative research methods most frequently used by business scholars. Basic knowledge of these methodological approaches is critical to the comprehension of empirical research publications and to the design of own research projects (Master dissertation).

At the end of the semester students who have successfully participated in this course should be able to:

- demonstrate an understanding of the principles underlying the design, process and analysis of business research
- identify appropriate research methods for particular research questions and settings
- show an awareness and sensitivity to the ethical issues of research
- interpret the meaning of the most important statistical indicators featured in quantitative analysis
- describe the basic steps, strengths and weaknesses of different qualitative methods
- be able to present the results of a research in written report and presentation

The following topics will be object of analysis and discussion:

- Background information on research
- Ethics in business research
- Choosing the right research design
- The conceptual and theoretical framework
- Secondary data
- Collection of primary data
- Sampling, survey and interviews
- Analysis of quantitative and qualitative data
- Report writing and presentation

Assessment:
Midterm presentation (40%)
Written assignment (60%)

<< Back

241051 Current Issues in Global Culture

Semester: 1
Hrs/ week: 2
ECTS: 3
Lecturer: Prof. Dr. Louise Bielzer

Course description

The course aims to provide students with the theoretical foundations of aspects of the sociology of culture and comparative cultural analyses. Students who have successfully completed the submodule 6.1 are accordingly able to:

- differentiate and compare various theoretical concepts in cultural studies
- discuss current issues in cultural theory
- recognize processes of globalization of culture and critically question them and
- establish connections between cultural theory and various aspects of the of the cultural, sports and leisure industries

The course focuses on the following topics:

- Definition of culture/different cultural terms
- Cultural theories and models
- Globalization and culture
- Identity concepts
- Cultural-sociological aspects of current social development (e. g. value orientation and value change)
- Cultural migration processes
- Importance of culture in connection with increasing internationalization of culture, sport and leisure economy
- Practical examples from the fields of culture, sports and leisure economy

Assessment

Presentation

<< Back

241052 Selected Chapters in Global Culture

Semester: 2
Hrs/ week: 2
ECTS: 3
Lecturer: Prof. Dr. Louise Bielzer

Course description

Students who successfully completed the course, are able to:

- analyze and evaluate cultural theories and models with regard to their practical implications in the cultural, leisure and sports industries
- understand and distinguish models and concepts of intercultural management
- understand the importance of intercultural competences by analysis of practical examples from the culture, leisure and sports industry
- identify intercultural management challenges in the activity of in companies operating in the culture, leisure and sports industry and develop and discuss possible solutions.

The course focuses on the following topics:

- Theories and concepts of intercultural management
- Intercultural and cross-cultural management
- Dimensions and forms of intercultural management in culture-, leisure- and sport economy
- Current intercultural management requirements in culture-, leisure- and sport economy
- Working and discussing business cases from culture-, leisure- and sport economy

Assessment
Presentation

<< Back

241061 International Aspects of Culture and Leisure Management

Semester: 1
Hrs/ week: 1,5
ECTS: 2
Lecturer: Prof. Dr. Raphaela Henze

Course Description

Following topics are object of discussion and analysis:

- In-depth and integrated knowledge of key international and national cultural and leisure organisations
- Understanding of the complexity of international cultural and leisure events and organisations
- Understanding of the political implications and historical particularities of working in international contexts
- Discussing the theoretical discourses that form the basis for working in international contexts
- Developing management skills for working as a cultural and leisure manager in international and national contexts
- Ability to identify and work with different interfaces

Course content will focus on:

- International comparison of organisational structures
- International comparison of methods of financing
- International comparison of visitor loyalty versus community engagement
- Sustainable cultural policy concepts and mechanisms
- Knowledge of foreign cultural policies and the work of intermediary organisations
- Knowledge of the main discourses on activities in international and transcultural contexts

Assessment

Presentation

<< Back

241062 Selected Chapter in Culture and Leisure Management

Semester: 2
Hrs/ week: 1,5
ECTS: 2
Lecturer: Prof. Dr. Raphaela Henze

Course description

Students have in-depth knowledge of the of current cultural-political events on the basis of intensive confrontation with the underlying international discourses. They are in a position to implement the resulting implications in organizations operating in the culture and leisure sector.

Through the examination of international smart practices as well as in the independent realization of events, students train their problem-solving competence as well as critical reflection and research skills. Throughout the course current trends are addressed.

Following topics are object of discussion and analysis:

- Learning terminology in the culture and leisure sector and questioning it critically
- New forms of participation in non-homogeneous societies
- The changing role of the culture manager in a non-homogeneous society
- Identifying and addressing inequalities, discrimination in culture and leisure sector
- Current trends in the international culture and leisure management

Assessment
Presentation

<< Back

364181 PLC Laboratory

Semester: 4
Hrs/ week: 2
ECTS: 3
Lecturer: Prof. Dr.-Ing. Anke Ostertag

Course description

Students can apply their basic knowledge of PLC programming within the Codesys programming environment. They are familiar with the Raspberry Pi and Pixtend devices. They can combine the application of PLC programming with knowledge of the relevant areas of communication technology.

The course focuses on following topics:

- PLC programming with Codesys
- Fundamentals and modules
- Visualization
- Simulation
- Connecting Pixtend, Raspberry Pi via WiFi
- Application based on various practical examples

Assessment
Laboratory work with experiment

<< Back

364171 Control Engineering

Semester: 4
Hrs/ week: 4
ECTS: 5
Lecturer: Prof. Dr.-Ing. Mohamed Ibrahim

Course description

Students can describe the mode of operation of the closed control loop and analyze a dynamic system in a task-oriented manner. They can analyze the stability of the dynamic system in the S-plane and independently investigate and evaluate the behavior of the system in the time and frequency domain. You will be able to apply the knowledge you have acquired to specific problems.

The course focuses on following topics:

- Introduction to systems theory
- Basic concepts of control and control engineering
- Structural description of the control loop
- Analysis and synthesis of technical systems
- Introduction to mathematical models of continuous systems
- Introduction to the Laplace transformation for the investigation of control systems
- Transfer function and system behavior
- Construction of controlled systems with operational amplifiers and passive components
- Dynamic behavior of linear control systems
- Stationary behavior of control systems
- System stability and S-plan analysis
- Root locus method for system analysis
- Frequency analysis and Bode plo
- Definition and design of controller types

Assessment

Accompanying the course by written examination

<< Back

364202 Project Management

Semester: 4
Hrs/ week: 2
ECTS: 2
Lecturer: Prof. Markus Speidel

Course description

Students understand the relationships that lead to the success of a joint project when working in a team and are familiar with the methods and tools of project management. They also know some important basics from related disciplines, which are often decisive for the success of a project. Students have a broad spectrum of methods and tools in the field of project management and they can apply these to practical issues, including changing requirements and different content-related issues.

The course focuses on following topics:

- Problem-solving process, finding ideas and solutions
- Project foundation and project organization
- Team and team leadership in the project
- Structural planning, scheduling and capacity planning
- Risk management, project control and cost management
- Project completion
- Project contracts
- Project management and quality

Assessment

Course-accompanying combined examination with written exam as final examination

<< Back

364211 Air Conditioning Technology

Semester: 4
Hrs/ week: 2
ECTS: 2
Lecturer: Prof. Dr.-Ing. Ekkehard Laqua

Course description

The students have a broad and integrated knowledge in the field of air conditioning technology. In particular, they learn the basics of designing ventilation systems for air conditioning in buildings. The knowledge of air conditioning technology enables students to distinguish between partial and full air conditioning systems. This provides them with the prerequisite for the energy-efficient optimization of ventilation and air conditioning systems.

The course focuses on following topics:

- Introduction
- Physiology and comfort
- Determination of room loads
- Representation and calculation of ventilation processes
- Flow phenomena in air-supported air conditioning systems
- Potentials and limits of heat recovery in air conditioning systems
- Room air hygiene

Assessment
Across-course through written examination

<< Back

364212 Heating and Refrigeration Technology

Semester: 4
Hrs/ week: 2
ECTS: 3
Lecturer: Prof. Dr.-Ing. Ekkehard Laqua

Course description

Students have a broad and integrated specialist knowledge in the field of refrigeration and heating technology, in particular they learn the scientific principles of heating and refrigeration systems and their influence on comfort and energy consumption. Relevant regulations and standards enable students to assess the energy efficiency of buildings and their technology.

The course focuses on following topics:

- Determining the heating output and energy consumption of buildings
- Classification of heating systems System
- Components and their sensible use
- Dimensioning of heating systems
- Hydraulic balancing • Basic hydraulic circuits
- Safety equipment
- Overview of different methods of refrigeration
- Importance of mechanically and thermally driven machines
- Design and function of cold steam engines
- Design of cold steam engines
- Refrigeration and heat pump systems

Assessment
Across-course through written examination

<< Back

364072 Mechanics 2

Semester: 4
Hrs/ week: 2
ECTS: 3
Lecturer: Prof. Dr.-Ing. Ekkehard Laqua

Course description

Students have a broad and integrated specialist knowledge in selected areas of technical mechanics. In particular, they know how to calculate stresses in simple elastostatics problems, they have knowledge of the calculation of stresses and equivalent stresses and of plane kinematics.

The course focuses on following topics:
Elasto-Statics/ Strength of materials

- Tension and compression bars
- Stresses in straight bending of homogeneous beams
- Torsion of bars
- Dimensioning / strength verification of components

Kinematics

- One-dimensional movement
- Movement of a point in space

Assessment
Across-course through written examination

<< Back

364221 Heating, Ventilation and Air Conditioning Laboratory

Semester: 6

Hrs/ week: 4

ECTS: 5

Lecturer: Prof. Dr.-Ing. Ekkehard Laqua

Course description

By following the course students will acquire a broad and integrated cognitive expertise in the field of HVAC. The students will be able to deepen their cognitive skills through practical applications and will be able to assess the application of the respective technology.

The course will deal with following topics:

- Combined heat and power
- Gas appliance technology
- Solar thermal energy
- Controlled domestic ventilation
- Air condition unit
- Air distribution systems

Assessment
Laboratory work

<< Back

364191 Introduction to Business Administration

Semester: 1
Hrs/ week: 4
ECTS: 5
Lecturer: Tba.

Course description

Students will be able to define basic business management terms. They become familiar with the functional areas of business administration and their interaction. They will be able to discuss business management problems and master basic business management terminology.

The students have integrated specialist knowledge regarding the economic activities of companies. They can reproduce and interpret the basic concepts of general business administration.

Contents:

- Understanding Economic Systems and Business
- Competing in the Global Marketplace
- Forms of Business Ownership
- Designing Organizational Structures
- Managing Human Resources and Labor Relations
- Creating Products and Pricing Strategies to Meet Customers' Needs
- Distributing and Promoting Products and Services
- Using Technology to Manage Information
- Financial Information and Accounting

Assessment
Written exam

<< Back

364061 Mathematics 2

Semester: 2
Hrs/ week: 4
ECTS: 5
Lecturer: Prof. Dr.-Ing. Anke Ostertag or substitute lecturer

Course description

Students who have successfully participated in this module will know Taylor series and Fourier series. They will be able to reproduce functions of several variables as well as their integration and differentiation. They will also be able to reproduce the linear differential equations.

The students will be able to solve technical relevant problems using Taylor and Fourier series. They will apply the differentiation and integration of functions with several variables. They will be able to solve linear differential equations.

Contents:

- Taylor series, Fourier series
- Functions of several variables
- Partial differentiation
- Multiple integrals
- Differential equations

Assessment
Written exam

<< Back

364101 Liberalized Energy and Raw Materials Market

Semester: 2
Hrs/ week: 2
ECTS: 3
Lecturer: Prof. Dr. Christian Buske

Course description

Students acquire basic and in-depth knowledge of the various energy markets. They are familiar with the trading centers, the price-determining factors and the relevant players on the markets. Furthermore, students gain knowledge of the changes in business models due to the liberalization of grid-bound energy.

The course focuses on following topics:

- General conditions for grid-bound energies
- Pricing on the EEX (European Energy Exchange)
- Energy transportation and distribution
- Pricing at the end customer, taking into account special aspects
- Models and parameters of price forecasting
- Business models in the energy industry

Assessment
Across-course through written examination

<< Back

364081 Electrical Engineering 2

Semester: 2
Hrs/ week: 2
ECTS: 3
Lecturer: Dr. Alexander Pfannenstiel or substitute lecturer

Course description

The students learn about time-dependent processes of AC circuits. They can calculate operating variables of RLC circuits on sinusoidal voltages. The students know the basic circuits of AC circuits and can analyze and dimension the basic functions of RLC components. By learning the switching operations, they can calculate oscillating circuits. They have theoretical knowledge in the polyphase systems especially in the three-phase systems. The students can describe networks with variable sinusoidal periodic frequency. They can interpret and assign the variables they have learned accordingly.

Contents:

- Sinusoidal circuits and networks with periodic time-dependent quantities
- Theory of calculation of networks on sinusoidal voltage
- High and low pass filtering
- Resonant circuit
- Network calculation with variable frequency
- Basic circuits with diodes and OPV
- Multiphase systems

Participation in the Electrical Engineering 2 laboratory is strongly recommended.

Assessment
Written exam

<< Back

364082 Electrical Engineering Laboratory

Semester: 2
Hrs/ week: 2
ECTS: 2
Lecturer: Prof. Dr.-Ing. Mohamed Ibrahim or substitute lecturer

Course description

Laboratory experiments serve to deepen the knowledge gained in lectures and exercises and to convey theoretical teaching material. The students will work on specific tasks in groups or individually and analyze the results.

Students master the use of measuring devices/instruments and the basic skills required for setting up experiments. In addition, they can interpret the measurement results and check their accuracy. Students will be able to independently set up, commission and measure DC and AC circuits properties. They will be able to analyze and explain the results.

Contents:

- Handling measuring devices and electrical engineering instruments
- Setting up circuits with parallel and series resistors
- Use of voltage sources in the circuit
- Recording typical circuit properties
- Evaluation of measured variables from multimeters and oscilloscopes.

Experiments:

- Passive components on alternating current
- Oscilloscope in analogue and digital storage mode
- Switching processes on inductors and capacitance elements
- Measurement of the time constant of LC and RC elements
- Measurements on diode and OP basic circuits; recording characteristic values

Assessment

Examination performance through laboratory work

<< Back

364102 Public Supply Grids

Semester: 2

Hrs/ week: 2

ECTS: 3

Lecturer: Prof. Dr.-Ing. Ekkehard Laqua

Course description

Students know the origin of the different energy sources. They have a broad and integrated knowledge of the technical requirements and properties of supply networks. They are able to describe individual components of the distribution networks and combine what they have learned into an overall picture.

The course focuses on following topics:

- Raw materials
- Water management
- Electricity grids
- Natural gas grids
- Oil grids

Assessment
Across-course through written examination

<< Back

364201 Introduction to Accounting

Semester: 2
Hrs/ week: 2
ECTS: 3
Lecturer: Prof. Dr. Markus Speidel or substitute lecturer

Course description

Students will have in-depth general knowledge and specialized theoretical knowledge in the following areas:

- Fundamentals of Accounting
- Fundamentals of the annual financial statements
- Selected accounting and valuation rules

Students will have integrated and in-depth specialized theoretical knowledge regarding:

- The accounting of business transactions
- The application of selected accounting and valuation options depending on the respective accounting policy objectives of a company

Contents:

- Financial accounting as part of the accounting system
- Recording and retention obligations- Inventory, stocktaking, balance sheet
- Structure of an accounting record
- Chart of accounts and chart of accounts, posting to inventory and profit and loss accounts
- Accounting regulations and principles of proper bookkeeping and accounting
- Accounting for fixed and current assets, equity, provisions and liabilities
- Accrual of expenses and income over time • Content and structure of the profit and loss account

Assessment
Written exam

<< Back

364091 Applied Computer Science

Semester: 2
Hrs/ week: 4
ECTS: 5
Lecturer: tbd

Course description

Students who have successfully participated in this module will know the basics of software & software development, algorithms and programming languages. They will know what programs consist of and will also learn how algorithms are formulated and executed using sorting algorithms as an example.

The students will know the basic concepts of object-oriented programming using a common programming language. They will learn to use a software development environment for programming. They will learn how to design and implement small programs and their user interfaces, and can both explain the concept of debugging and use its methods themselves.

The students will know how algorithms are implemented in a program. They will recognize the need to develop software products in an engineering manner with project management methods and software processes. They will be able to name important tasks of the software development process. The students will know terms and methods of software engineering.

Contents:
Understand the fundamentals of software development:

- Basics software, algorithms, programming languages
- Terminology of software development and the software development process
- Basics of object-oriented programming
- Use of a software development environment
- Design and implementation of user interfaces
- Software usability
- Debugging
- Implementation of special algorithms (backtracking, recursion)
- Understand the need for software engineering

Assessment
Written exam

<< Back

364102 Decentralized Energy Systems and Smart Grids

Semester: 3

Hrs/ week: 2

ECTS: 3

Lecturer: Prof. Dr.-Ing. Mohamed Ibrahim

Course description

Students will learn about the various methods of decentralized energy generation. They will be able to assess these methods in terms of sustainability, reliability, controllability and economic efficiency. They will learn about the various methods of energy storage.

The course focuses on following topics:

- Introduction to decentralized energy conversion process
- Properties and operation of heating and cooling systems
- Heat pump technologies • Energy storage technologies
- Performance indicators of decentralized energy systems
- Micro and mini combined heat and power plants
- Smart meters and smart consumers
- Smart grid technology and grid flexibility

Assessment

Course-accompanying combined examination with written exam as final examination

<< Back

364161 Decentralized Energy Systems and Smart Grid Laboratory

Semester: 4
Hrs/ week: 4
ECTS: 5
Lecturer: Prof. Dr.-Ing. Mohamed Ibrahim

Course description

The aim of the laboratory experiments in energy technology is the practical illustration of basic knowledge as well as the presentation of selected practical aspects in connection with theoretically imparted specialist knowledge. Students are able to recognize and understand the theoretical knowledge required for the respective laboratory experiments from the lecture or self-study. They have relevant knowledge of measurement technology, in particular the various methods of error calculation, and know how results can be evaluated.

The course focuses on following topics:

- Behavior of photovoltaic systems under different operating conditions
- Charge-discharge characteristics of accumulators
- Operating behavior of fuel cells
- Wind turbine with double-fed asynchronous generators
- Design of photovoltaic systems- Decentralized energy supply systems

Assessment

Laboratory work

<< Back

364112 Communication Technology

Semester: 3

Hrs/ week: 2

ECTS: 2

Lecturer: Prof. Dr.-Ing. Anke Ostertag

Course description

Students have knowledge of standardization. They know different types of coding, compression and modulation processes. They will be able to reproduce data backup and encryption. They are familiar with bus access methods and wireless networks. They can combine the knowledge of the different areas into coherent communication systems.

The course focuses on following topics:

- Standardization
- Topology and data transmission
- Synchronization and multiplexing
- Modulation
- Coding • Compression
- Data backup
- Encryption
- Bus access methods
- Wireless/ wireless networks

Assessment
Across courses through written examination

<< Back

364111 Automation Systems

Semester: 3
Hrs/ week: 2
ECTS: 3
Lecturer: Prof. Dr.-Ing. Ekkehard Laqua

Course description

Students have a broad and integrated specialist knowledge in the field of automation systems, in particular they acquire basic knowledge of the entire process of implementing automation projects both in industry and in buildings. They know the interfaces to the players involved and understand the complexity of an automation project and learn how to use different automation computers.

The course focuses on following topics:

- Introduction and definition of automation technology
- Automation computer - Process control systems
- Actuators and sensors for machines and systems
- Machine automation with programmable logic controllers (PLC)
- Building automation
- Use of building automation
- Building automation buses
- State of the art and trends in automation technology

Assessment
Across courses through written examination

<< Back

364121 Electronics and Measurement Technology

Semester: 3

Hrs/ week: 4

ECTS: 5

Lecturer: Prof. Dr.-Ing. Ekkehard Laqua

Course description

Students have a broad and integrated specialist knowledge in the field of electrical measurement and sensor technology, in particular they learn analog and digital measurement methods of electrical quantities and the various sensor principles for converting physical quantities into electrical quantities. Students acquire a general overview of sensor production and sensor principles and are able to assess the principles with regard to their suitability for the measurement task at hand. They develop a critical understanding of the assessment of measurement results with regard to measurement deviation and uncertainty.

The course focuses on following topics:

- Introduction
- Characterization of measurement signals
- Measurement methods and setup
- Measurement deviation and measurement uncertainty
- Measurement of current and voltage • Measurement of ohmic, reactance and impedance
- Power and energy measurement
- Temperature measurement
- Displacement measurement
- Rotational speed and velocity measurement
- Strain measurement • Force-mass determination
- Pressure measurement
- Flow measurement
- Vibration measurement
- Moisture measurement

Assessment
Accompanying the course by written examination

<< Back

364131 Optimizing of Energy Supply

Semester: 3
Hrs/ week: 2
ECTS: 3
Lecturer: Prof. Dr.-Ing. Ekkehard Laqua

Course description

Students have a broad and integrated specialist knowledge in the field of energy optimization, in particular they learn about the potential for optimizing in energy generation structures and energy consumption structures in residential and non-residential buildings.

The course focuses on following topics:

- Energy efficiency Definitions, indicators, effects
- Increasing efficiency in conventional power plants
- Efficient use of energy in electrical applications
- Energy efficiency in buildings
- Energy efficiency in building services engineering
- Energy efficiency in industrial plants
- Industrial waste heat

Assessment
Across courses through written examination

<< Back

364132 Demand Side Management

Semester: 3
Hrs/ week: 2
ECTS: 2
Lecturer: Prof. Dr.-Ing. Ekkehard Laqua

Course description

Students have a broad and integrated specialist knowledge in the field of load management, in particular they learn to familiarize themselves with specific energy management tasks and to implement energy management in the operation of buildings and systems in technical and organizational terms. They know and master the application of basic organizational and technical methods of energy consumption recording, energy consumption evaluation and associated controlling instruments.

The course focuses on following topics:

- Energy costs and ways to reduce them
- Guidelines for operational energy management
- Selected examples • Tariff models
- Load management in electrical grids
- Energy management standard 50001
- Energy management and energy data acquisition

Assessment
Across courses through written examination

<< Back

364141Thermodynamics

Semester: 3
Hrs/ week: 2
ECTS: 2
Lecturer: Prof. Dr.-Ing. Anke Ostertag

Course description

Students know the most important fundamentals of thermodynamics. They can reproduce the 1st and 2nd law of thermodynamics. They know the thermodynamics of gases, vapors and cyclic processes. Students are able to calculate technically relevant thermodynamic problems. They are able to apply thermodynamics to the design and calculation of engines and power plants. This enables students to calculate, describe and analyze ideal and real cycle processes that frequently occur in engines, power plants and air conditioning technology.

The course focuses on following topics:

- Thermodynamic systems
- 1st and 2nd law of thermodynamics,
- Thermodynamics of gases
- Reversible and irreversible cyclic processes
- Vapors
- Humid air
- Applications in engines and power stations

Assessment
Course without examination, here: Examination at module level

<< Back

364142 Heat transfer/Fluid Dynamics

Semester: 3
Hrs/ week: 2
ECTS: 3
Lecturer: Prof. Dr.-Ing. Anke Ostertag

Course description

The students know the most important basics of heat transfer and fluid dynamics They are familiar with heat conduction, heat convection, heat transfer and radiation. They know different types of heat exchangers. They are familiar with calculation interpretation of hydrostatics and -dynamics as well as aerostatics and aerodynamics in technical applications. They are familiar with the limits of their calculation.

The course focuses on following topics:

- Fundamentals of Heat transfer Introduction
- Heat conduction • Convection
- Heat exchangers
- Thermal radiation Fundamentals of Fluid dynamics
- Hydrostatics
- Aerostatics
- Hydrodynamics
- Aerodynamics

Assessment
Course without examination, here: Examination at module level

<< Back

364151 Central Energy Systems

Semester: 3
Hrs/ week: 2
ECTS: 2
Lecturer: Dr. Rolf Hengerer

Course description

Students know the structure and function of central energy systems with their individual parts and components. They can reproduce the operating behavior and describe characteristic curves. Students can determine energy and mass flows, which are the starting point for dimensioning components. They are able to assess the efficiency of energy systems. They can develop measures to increase technical efficiency and are able to evaluate the cost-effectiveness of these measures.

The course focuses on following topics:

- Combustion calculation
- Structure and function of large fossil power plants
- Parts and components of large fossil power plants
- In-depth study: Turbomachinery
- Nuclear power plants
- Energy plants with combined heat and power generation

Assessment
Accompanying the course by written examination

<< Back

364011 Mathematics 1

Semester: 1
Hrs/ week: 6
ECTS: 8
Lecturer: Prof. Dr.-Ing. Anke Ostertag or substitute lecturer

Course description

Students train mathematical ways of thinking and working. They acquire knowledge of mathematical theorems and their possible applications.

Students master mathematical knowledge to efficiently solve problems in scientific and technical fields.

Contents:

- Vector Algebra
- Complex Numbers
- Matrices and Determinants
- Systems of Linear Equations
- Sequences, Series and Limits
- Functions
- Differential Calculus
- Integral Calculus

Assessment

Accompanying the course by written examination

<< Back

364021 Physics

Semester: 1
Hrs/ week: 4
ECTS: 5
Lecturer: tbd

Course description

Students are taught critical-quantitative, scientific thinking in various areas of physics.

They acquire a broad and integrated knowledge about:

- fundamental knowledge of physics in the fields of mechanics, optics, thermodynamics, atomic and nuclear physics
- physical modelling
- qualitative and quantitative problem-solving methods
- realisation of experimental working methods

Students who have successfully participated in this module can:

- set up and apply physical models
- solve application-related problems quantitatively
- design and carry out experiments

Contents:

- Classical mechanics (kinematics, dynamics, conservation laws, friction, aero- and hydrodynamics, oscillations and waves)
- Geometrical optics (reflection, refraction, imaging and optical instruments)

Assessment
Written exam

<< Back

364031 Electrical Engineering 1

Semester: 1
Hrs/ week: 4
ECTS: 5
Lecturer: Prof. Dr.-Ing. Mohamed Ibrahim or substitute lecturer

Course description

Students master the basics of passive and active circuit components e.g., resistance, voltage sources and current sources. They also learn the methods for analyzing electrical circuits with various wiring options. In addition, they know the basic forms for describing and analyzing electric and magnetic fields.

Contents:

- Basic concepts of electrical engineering
- Two poles and sources
- Direct current networks (parallel and series circuits)
- Methods of network analysis
- Electric field (structure and properties of capacitors)
- Introduction to the theory of the magnetic field structure
- Properties of the inductivities and transformers

Assessment
Written exam

<< Back

364041 Bioenergy, geothermal and solar thermal energy

Semester: 1
Hrs/ week: 2
ECTS: 2
Lecturer: Prof. Dr.-Ing. Ekkehard Laqua

Course description

After completing the module, students will have basic knowledge of individual application areas of renewable energy systems (solar thermal energy, bioenergy and geothermal energy). Students learn the most important tools for planning, designing and evaluating these energy systems. Students are proficient in dealing with the conversion processes of solar thermal energy, bioenergy and geothermal energy. Students have a very broad spectrum and practical skills in energy technology. They compare and analyze findings from the field of engineering sciences. Students have the ability to apply the knowledge they have acquired.

The course focuses on following topics:

- Classification of renewable energies
- Solar thermal energy - Solar thermal power generation
- Geothermal energy
- Biomass
- Biogas

Assessment
Across courses through written examination

<< Back

364012 Mechanics 1

Semester: 1
Hrs/ week: 2
ECTS: 2
Lecturer: Prof. Dr.-Ing. Ekkehard Laqua

Course description

Students who have successfully participated in this module have a broad and integrated knowledge of selected areas of engineering mechanics. In particular they can:

- calculate bearing reactions of plane systems (statically determined)
- identify focal points and determine section and stress magnitudes of plane beam structures.
- contrast the calculations and interpret them accordingly

The analytical methods for determining the bearing and internal forces of rigid bodies are taught. The students solve complex problems by means of computational methods rigid bodies and analyze their mechanical behavior. They assess the suitability of mechanical constructs for their static load.

Contents:

- Axioms of statics
- Equilibrium conditions
- Bearings
- Calculations of plane systems
- Plane trusses (bar trusses)
- Focus
- Stress variables

Assessment

Accompanying the course by written examination

<< Back

364071 Materials Science

Semester: 1
Hrs/ week: 2
ECTS: 2
Lecturer: Prof. Dr.-Ing. Anke Ostertag

Course description

Students have a broad and integrated specialist knowledge in selected areas of technical mechanics. In particular, they know how to calculate stresses in simple elastostatics problems, they have knowledge of the calculation of stresses and equivalent stresses and of plane kinematics.

Students will be able to apply stress calculation to complex practical problems in the field of elastostatics. They can calculate the stresses and comparative stresses of technical problems and thus assess the system and design it for given requirements.

Contents:

- Elasto-Statics/ Strength of materials
- Tension and compression bars
- Stresses in straight bending of homogeneous beams
- Torsion of bars- Dimensioning / strength verification of components Kinematics
- One-dimensional movement
- Movement of a point in space

The course Mechanics 2 (364072) should also be attended.

Assessment
Across courses through written examination

<< Back

364042 Photovoltaics, wind power

Semester: 1
Hrs/ week: 2
ECTS: 3
Lecturer: Prof. Dr.-Ing. Mohamed Ibrahim

Course description

After completing the course, students will have mastered the basic functions of photovoltaic and wind power systems. They acquire knowledge of the various system components. The students learn to implement aspects planning and installation of the systems. After this course, students will be able to evaluate such systems and calculate their energy yields. Students will acquire the most important basic knowledge of the regulation and control of photovoltaic and wind power systems.

The course focuses on following topics:

- Basic knowledge of photovoltaic systems and wind power plants
- Radiation supply and radiation calculation
- Operating principle and technologies of photovoltaic cells
- Electrical properties and equivalent circuit diagram of solar cells
- Operating conditions, maintenance and planning of PV systems
- Utilization of wind energy
- Function of the wind turbine for power generation
- Control, regulation and operational management of wind turbines

Assessment
Across courses through written examination

<< Back

364231 Environmental Economics, Management and Ethics

Semester: 6
Hrs/ week: 4
ECTS: 5
Lecturer: Prof. Dr.-Ing. Anke Ostertag

Course description

After completing this module, students will have mastered the concepts, methods and procedures for mathematical modeling of technical systems, with a focus on modeling energy systems. Students will describe the necessary procedures for identifying system parameters and energy component models. To deepen their understanding of the theoretical content, laboratory experiments will be integrated with modeling software. Students will create models and simulate them with real data. Students are able to construct a mathematical model in a task-oriented way and to analyze simulation results, as well as to describe the results independently. They can apply the acquired knowledge to specific problems. Students work on the tasks in small groups and participate interactively in the lecture. They discuss their findings with other students and are thus enabled to communicate engineering issues with their peers.

Assessment
Written exam

<< Back

364241 Modelling and Simulation of Energy Systems

Semester: 6
Hrs/ week: 2
ECTS: 2.5
Lecturer: Prof. Dr.-Ing. Mohammed Ibrahim

Course description

After completing this module, students will have mastered the concepts, methods and procedures for mathematical modeling of technical systems, with a focus on the modeling of energy systems. Students will learn the necessary methods for identifying system parameters and for numerically integrating differential equations, interpolation, curve fitting and the mathematical description of complex management concepts. Subsequently, the models are created from measurements taken on the system. Students can create and analyze an energy system model in a task-oriented way and describe how the model works.

Assessment
Written exam

<< Back

364242 Modelling and Simulation of Energy Systems Laboratory

Semester: 6
Hrs/ week: 2
ECTS: 2.5
Lecturer: Prof. Dr.-Ing. Mohammed Ibrahim

Course description

Students will set up the main components of the energy systems and energy management processes in the laboratory and simulate them under various operating scenarios. In particular, the modeling and simulation tool MATLAB-Simulink is used. After completing the module, students will have mastered the basics of analyzing and documenting energy management scenarios. The students are able to analyze and evaluate the generated simulation results of the energy management system. Students are able to discuss their own simulation results from technical and scientific content with lecturers and also with other fellow students and thus jointly gain a deeper understanding of the subject matter. Students develop their knowledge of the subject matter independently by setting up and solving experimental tasks and verifying the facts. They are able to collect, evaluate and interpret relevant results independently.

Assessment
Laboratory reports

<< Back

364251 Electric Power Systems

Semester: 6
Hrs/ week: 4
ECTS: 5
Lecturer: Prof. Dr.-Ing. Mohammed Ibrahim

Course description

The students have a broad and integrated knowledge including the scientific fundamentals and practical application in the field of electrical energy supply systems. They know the specifics of operating power supply networks and the necessary components of an electrical distribution network and can combine this into an overall view. They are able to apply the basic calculation methods to subject-specific problems. The module is designed to provide a basic knowledge of energy generation and distribution. Students acquire the ability to compare the use of selected supply technologies and to recommend an optimized electrical system. Students can identify issues and relationships using scientific methods and present the results clearly. The students support each other and guide others in solving tasks in the field of energy generation and distribution. They openly and critically discuss various approaches in learning groups during and outside of lectures in self-study units. Students are able to reflect on, evaluate and pursue their own learning and work goals in a self-directed manner. They see the consequences for the work process in their learning teams and implement them efficiently.

Assessment
Written exam

<< Back

364261 International Accounting Standards and Business Analysis

Semester: 6
Hrs/ week: 2
ECTS: 3
Lecturer: Not yet named

Course description

Knowledge of the main IFRS, financial statement analysis and the relationship between financial accounting and management accounting. Knowledge of financial statement analysis of English-language financial reports. In a practical example, the students discuss with the lecturer a system of key figures derived from the data of the annual financial statements. The students deepen their knowledge of balance sheet analysis by means of practical examples, which must be worked out independently, and learn to present the results in an appropriate manner for the target group.

Assessment

Written exam

<< Back

226166 International accounting and Business Analysis

Semester: 6
Hrs/ week: 2
ECTS: 2,5
Lecturer: Prof. Dr. Martin Tettenborn

Course description

By the end of the course students will be able to:

- Basic understanding of accounting of the firm, i. e. how the financial position of the firm is represented to different stakeholders depending on their various claims / objectives;
- understand the growing importance of global financial markets and its relation to financial reporting;
- understand the usefulness of a conceptual framework and the objective of financial reporting;
- understand basic accounting assumptions and measurement principles.

Each lecture will look at a different set of different accounting topics. An instructional unit involves lectures, class discussions, analyses of financial reports. The following are the main topics that will be dealt with:

- Introduction to Accounting
- Importance of global markets
- objective of financial reporting.
- Challenges facing financial reporting
- Conceptual Framework
- Measurement principles
- Revenue recognition
- Analyses of various financial reports

Assessment

Written examination (90 minutes)

<< Back

364262 Start- up Management

Semester: 6
Hrs/ week: 2
ECTS: 2
Lecturer: Not yet named

Course description

- Understanding of the fundamentals of start-up management.
- Understanding of the challenges and opportunities associated with founding and managing companies
- Ability to apply theoretical concepts to practical situations
- Ability to develop and implement a business idea, including the creation of a business plan and a convincing presentation
- Competence in using business tools and methods to analyze market opportunities and competitive strategies
- Development of problem-solving skills and entrepreneurial thinking
- Ability to work effectively in teams and communicate with each other during the simulation game and when developing concepts for social enterprises
- Ability to critically reflect on and discuss ethical and societal issues related to entrepreneurship.

Assessment
Written exam

<< Back

226177 Advanced Business Studies

Semester: 6
Hrs/ week: 4
ECTS: 5
Lecturer: Prof. Dr. Rainald Kasprik

Course description

Students work independently on a specific task: either they have to develop a model or a theoretical framework or they have to solve a practical operational problem or a case study on the basis of original texts from scientific and practical sources. In an oral presentation, students defend the written paper and train their communication skills as well as how to deal with public criticism.

The course aims at achieving following objectives:

Learning objectives
Processing of current topics on issues of strategic controlling, market research, strategy development or procurement and sales of technically complex goods in the investment goods market.

Qualification objectives
Independent development of a theoretical approach or independent solution of a practical operational problem on the basis of original texts from scientific and practical sources.

Assessment
Written report

<< Back

226176 Advanced Engineering Studies

Semester: 6
Hrs/ week: 4
ECTS: 5
Lecturer: Prof. Dr.-Ing. Ingo Kühne

Course description

Students work on internal / external tasks in the form of projects in the fields of the fields of information and communication technology or related fields. Students work on a project independently or in a team and show that they can work with both scientific methods as well as project management methods. They master the engineering description of a task. They are able to plan a project, to draw up a schedule and to draw up an agreement on objectives in terms of content and deadlines.

The course has following objectives:

Learning objectives

- Self-organization of a working group of students for an interdisciplinary project
- Joint planning of goals and deadlines
- Organization according to project management methods
- Assumption of subtasks by the members of the working group
- Regular meetings with actual and target comparisons in the project progress
- Planning and execution of an event to present the results and/or presentation of results in the form of written documentation.

Qualification objectives
Development, implementation and evaluation of an engineering problem in the form of a completed project.
Learning project management methods in practice

Assessment
Laboratory work

<< Back

310754 Methods of product development

Semester: 4
Hours per week: 2
ECTS: 2
Lecturer: Prof. Dr.-Ing. Martin Wäldele

Course description

- Processes in Product Development
- Process Models
- Use of methods in the phases of product development
- Business economic framework conditions of the development process

Assessment
Written exam (60 min)

<< Back

212101 Innovation Lab

Semester: 4
Hours per week: 2
ECTS: 3
Lecturer: Prof. Dr.-Ing. Martin Wäldele

Course description

- Analysis of the problem
- Definition of goals and milestones
- Definition of work packages
- Development of individual results
- Discussion and evaluation of the results
- Presentation of results and report creation

Assessment

Innovation Lab (30 min)

<< Back

212191 Project Lab

Semester: 7
Hours per week: 6
ECTS: 8
Lecturer: Prof. Dr.-Ing. Martin Wäldele

Course description

•The contents of the project lab are dependent on the specific task and usually include a project report or final presentation.

Assessment
Lab

<< Back

331332 Magnetic measurement technology

Semester: 2
Hours per week: 2
ECTS: 2
Lecturer: Prof. Dr.-Ing. Jürgen Ulm

Course description

The students learn about:

- the systematics and methods of non-destructive magnetic measurement technology,
- Measurement technology of non-destructive magnetic measurement technology,
- Measurement technology for the design of a permanent magnet,
- Measurements of magnetic polymer materials,
- Measurement technology of patented measurement methods.

Assessment

Written exam (40 min)

<< Back

331311 Theory of electromagnetic fields with applications

Semester: 1
Hours per week: 4
ECTS: 4
Lecturer: Prof. Dr.-Ing. Jürgen Ulm

Course description

- Students become familiar with vector analysis as a universal tool for the research and development engineer
- learn about electrostatic and electromagnetic fields, their properties and applications,
- learn to calculate electrostatic and electromagnetic fields,
- learn to calculate wave propagations,
- learn the structure of our natural science and the transferability of scientific laws to other scientific disciplines.

Assessment

Written exam (120 min)

<< Back

331312 Electro-magneto-mechanical energy converters

Semester: 1
Hours per week: 2
ECTS: 2
Lecturer: Prof. Dr.-Ing. Jürgen Ulm

Course description

The introduction to the theory of magnetic circuits is followed by familiarization with simulation software for simulating magnetic actuators. This approach allows the connection between theoretical knowledge and the design process of energy converters.

Students understand the function and structure of electro-magneto-mechanical energy converters and are able to simulate and design electro-magneto-mechanical converters.

Students have knowledge of the design, simulation and operation of energy converters accompanied by practical examples.

Assessment

Written exam (120 min)

<< Back

225122 English for industrial engineers

Semester: 3
Hrs/ week: 4
ECTS: 4
Lecturer: Melanie Gish

Course description

By following the course students will be able to understand the core statements of more complex texts and are in a position to comment on them, to their own position and, if necessary, to propose and present solutions. The corresponding technical and business-related vocabulary will be expanded and deepened accordingly.

The course content includes following themes:

- Create and edit standard business correspondence documents (e.g., inquiries, making appointments)
- Developing and practicing typical oral communication situations (getting to know each other, small talk, telephone calls, etc.)
- Describing organizational structures
- Describing economic developments using charts and graphs
- Linguistic focus: Letter styles, technical and business language, technical terms and idiomatic expressions
- Intercultural communication and its meaning; regional aspects

Assessment

Written exam and presentation

<< Back

226127 Laboratory Automation and PLC Systems

Semester: 4
Hrs/ week: 2
ECTS: 2,5
Lecturer: Prof. Dr.-Ing. Anke Ostertag

Course description

Students can apply their basic knowledge of PLC programming within the Codesys programming environment. They are familiar with the Raspberry Pi and Pixtend devices. They can combine the application of PLC programming with knowledge of the relevant areas of communication technology.

The course focuses on following topics:
- PLC programming with Codesys
- Fundamentals and modules
- Visualization
- Simulation
- Connecting Pixtend, Raspberry Pi via WiFi
- Application based on various practical examples

Assessment
Laboratory work with expermient

<< Back

226112 Laboratory Manufacturing Techniques

Semester: 4
Hrs/ week: 2
ECTS: 2,5
Lecturer: Prof. Dr.-Ing. Martin Wäldele

Course description

Students will be able to:

- classify manufacturing processes and evaluate their technical relevance.
- select and combine suitable processes based on design and material requirements.
- develop essential technical skills by applying theoretical concepts to real-world challenges.
- gain hands-on experience in industrially significant manufacturing processes and quality assurance techniques.

Learning objectives:

- Laboratory LV 1 – Sintering Technologies in Metallurgy
- Laboratory LV 2 – Machining Processes
- Laboratory LV 3 – Measurement Technology
- Laboratory LV 4 – Adhesive Bonding in Assembly Processes
- Laboratory LV 5 – Molding Processes & Additive Manufacturing in Engineering Practice

Assessment
Laboratory work

<< Back

226196 Integrative Project Laboratory

Semester: 7
Hrs/ week: 4
ECTS: 7
Lecturer: Prof. Dr. Gertraud Peinel

Course description

Students are able to plan a project independently and develop a schedule and an agreement on objectives in terms of content and deadlines.

The course content includes following topics:

1. Implementation of a project by “inventing” a technical-practical product idea
2. Self-organization of the project team
3. Execution of an interdisciplinary project (task planning, technical and functional specification, joint target and schedule planning, and more)
4. Organization and scheduling according to project management methods
5. Regular project meetings with comparison of current and target project state in the progress of the project
6. Elaboration of potential customers or client needs
7. Developing the economic framework for a market launch of the resulting product

Important: Mandatory introductory event during the first week of lectures

Assessment

Laboratory work and presentation

<< Back

226128 Materials Laboratory

Semester: 4
Hrs/ week: 2
ECTS: 2,5
Lecturer: Prof. Dr.-Ing. Martin Wäldele

Course description

Students will be able to:

- understand various classes of materials and explore their structures, properties, and characteristics
- select and adapt the right materials for specific engineering applications
- acquire practical skills in material characterization and analysis using diverse testing methods
- engage in laboratory work using techniques and methods relevant to industrial applications

Learning objectives:

- Laboratory LV 1 – Introduction to Metallography
- Laboratory LV 2 – Tensile Testing of Materials
- Laboratory LV 3 – Strengthening Processes for Metals
- Laboratory LV 4 – Chemistry and Physics of Macromolecules (Polymers)
- Laboratory LV 5 – Effects of Magnetism

Assessment

Laboratory work

<< Back

225265 Seminar and Case Studies: Current Aspects of Strategic Management and Quantitative Marketing Management

Semester: 7
Hrs/ week: 3
ECTS: 6
Lecturer: Prof. Dr. Rainald Kasprik

Course description

Students work independently on a specific task: either they have to develop a model or a theoretical framework or they have to solve a practical operational problem or a case study on the basis of original texts from scientific and practical sources. In an oral presentation, students defend the written paper and train their communication skills as well as how to deal with public criticism.

The course aims at achieving following objectives:

Learning objectives
Processing of current topics on issues of strategic controlling, market research and strategy development

Qualification objectives
Independent development of a theoretical approach or independent solution of a practical operational problem on the basis of original texts from scientific and practical sources.

Assessment
Written report

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293551 Innovation Management

Semester	winter
Hrs/ week	2
ECTS	2.5
Lecturer:	Prof. Dr. Martin Wäldele

Course description

This course aims to introduce the fundamental principles of innovation. Participants will gain insights into the key drivers of innovation and the significance of business model analysis and generation. Additionally, the course will cover the foundations of human-centered innovation and the importance of understanding market needs.

Moreover, it will explore intellectual property (IP) management and strategies, highlighting their role in fostering an innovation culture within organizations.

After the course, the students should be able to:

- understand the fundamentals of innovation: Grasp the basic principles and concepts of innovation, enabling them to apply these ideas in various contexts.
- identify key drivers of innovation: Recognize and analyze the primary factors that drive innovation within industries and organizations.
- conduct business model analysis: Evaluate and generate effective business models, understanding their critical role in facilitating innovation and growth.
- implement human-centered Innovation: Apply principles of human-centered design to create solutions that meet real market needs and enhance user experience.
- assess market needs: Conduct market research to identify customer requirements and trends, ensuring that innovations align with market demands.
- manage intellectual property: Develop strategies for IP management, understanding its importance in protecting innovations and maintaining competitive advantage.
- foster an innovation culture: Cultivate a culture of innovation within organizations, using strategies that encourage creativity, collaboration, and risk-taking.

Students

- work in a team-oriented manner and achieve good results in the group.
- can present and represent the results of the group's work and lead interdisciplinary discussions
- deepen the questions of the lecture independently.
- organize their own work processes effectively.
- are characterized by the ability to work on a task with perseverance

Assessment

Written exam

<< Back

293552 Sustainability and Ethics

Semester	winter
Hrs / week	2
ECTS	2,5
Lecturer	Prof. Dr. Anke Ostertag

Course Description

The students will

- be familiar with the basics of environmental pollution and circular systems
- be able to assess the interrelationships between environmental impacts, environmental pollution and the impact of mankind
- know the principles of sustainability combined with the basics of environmental economics and environmental management
- be familiar with ethical values in the area of sustainability
- be able to apply and reflect on the environmental impacts of the relevant sectors.
- evaluate complex environmental impacts in monetary terms and reflect on their effects
- analyze and structure chemical and physical environmental impacts and combine them in an environmental management system.
- Be able to apply, analyze and compare comprehensive life cycle assessments using LCA tools like SimaPro
- Be able to read and to know the limit of published life cycle assessments in the context of various stakeholders

Assessment

Written exam

<< Back

293561 Product and Engineering Design

Semester 2
Hrs/week
ECTS
Lecturer Prof. Dr. Martin Wäldele

Course description

The students

- know the various methods and procedures for product development.
- are familiar with the implementation of a continuous development process in companies and formulate the framework conditions for international cooperation.
- gain in-depth knowledge of project management for national and international projects.
- systematically apply methods in product development, covering stages like problem definition, concept generation, and refinement.
- explore the entire product development process, from initial concepts to final implementation, ensuring alignment with market needs.
- focus on developing innovative concepts that meet defined requirements and utilize Quality Function Deployment (QFD) to analyze and prioritize customer needs.
- gain proficiency in various product development tools, including value analysis, target costing, and FMEA.
- to consider global market conditions and constraints when developing product concepts.

Assessment

Written exam

<< Back

293571 Embedded and Edge Systems

Semester:	winter
Hrs/week	2
ECTS	2,5
Lecturer	Prof. Dr. Ing. Ralf Gessler

Course description

The students

- understand embedded systems and their boundary conditions and areas of application, using synergies with circuit technology (hardware-software co-design)
- can develop and explain applications for embedded systems in the field of 'short-range wireless networks' (SRWN)
- are proficient in processor architectures, in particular digital signal processors (DSP) and FPGAs
- are proficient in 'comparative design' and hybrid architectures with microprocessors and FPGAs (hardware-software codesign)
- understand design methods at system level
- are able to evaluate GPP and FPGAs using parameters.
- are able to discuss a GPP/FPGA solution.
- apply the acquired knowledge to specific problems.
- can familiarize themselves independently with complex embedded systems.
- are familiar with important microprocessor and FPGA platforms.

Assessment

Written exam

<< Back

293572 Industrial Software Engineering

Semester: winter
Hrs/week 2
ECTS 2,5
Lecturer Prof. Dr. Ing. Ralf Gessler / Prof. Dr. Ing. Stolz

Course description

The students

- know the basics, terms and key aspects of modern software development
- know the main phases of the software life cycle concept from requirements analysis to software maintenance
- understand how to manage software projects
- can explain and apply common process models and methods
- can differentiate between analysis, design and implementation
- understand software architecture and modelling, software quality, software verification and software maintenance
- are able to manage software projects over the entire software life cycle
- can determine and allocate tools for the software development phases
- can create requirements analyses and project plans for software projects
- understand software architecture and modelling, software quality, software verification and software maintenance
- can apply the acquired knowledge to specific problems
- can present reports
- can familiarize themselves independently with complex software topics

Assessment

Written exam

<< Back

293581 Artificial Intelligence in Technical Systems

Semester:	summer
Hrs/week	2
ECTS	2,5
Lecturer	Frederik Wystup

Course Description

The students

- are familiar with core AI concepts, including machine learning, neural networks, and data-driven decision-making
- understand and implement various AI and machine learning algorithms for real-world applications
- know how to integrate AI technologies with existing technical systems and IoT devices for enhanced functionality
- understand the ethical implications of AI technologies, including biases and societal impacts, leading to responsible AI use
- are aware of current trends and advancements in AI technologies
- are able to develop, train, and validate AI models tailored to specific technical challenges
- are able to use problem-solving skills for engineering problems with AI solutions

Assessment

Written exam

<< Back

293582 Industrial Data Analytics

Semester:	2
Hrs/week	2
ECTS	2,5
Lecturer	Dipl. Ing. Christopher Müller

Course Description

The students

- understand the role of data analyses in industrial processes
- can master tools and techniques for analyzing large industrial data sets

gain an understanding of modern approaches in the data-driven industry such as predictive maintenance, process optimization and IoT

- are able to apply methods of data preparation, analysis and interpretation
- are able to implement analytical models in production environments

Assessment

Written exam

<< Back

293591 Development of Power Electronics

Semester: winter
Hrs/week 2
ECTS 2.5
Lecturer Michael Lindenberger / Jakob Meyer

Course Description

The students

- are familiar with the latest trends and advancements in power electronics, including new materials and technologies
- understand of thermal management techniques to ensure the reliable operation of power electronic devices under varying environmental conditions
- design and optimize various power electronic topologies for different applications, considering efficiency, cost, and reliability.
- implement advanced control strategies for power converters, enabling precise regulation and improved system performance.
- use simulation tools and software to model power electronic circuits.
- solve hands-on projects that require troubleshooting and innovative solutions

Assessment

Written exam

<< Back

293592 Electric, Magnetic, and Mechanic Energy Converters

Semester:	winter
Hrs/week	2
ECTS	2.5
Lecturer	Prof. Dr.-Ing. Jürgen Ulm

Course Description

The students

- understand the function and structure of electro-magneto-mechanical energy converters
- are able to simulate and design electro-magneto-mechanical converters
- have knowledge of the design, simulation and operation of energy converters accompanied by practical examples
- acquire knowledge with the help of modelling electromagnetic-mechanical converters

Assessment

Written exam

<< Back

293601 Computer Vision

Semester: summer
Hrs/week 2
ECTS 2.5
Lecturer Prof. Dr.-Ing. Marcus Stolz

Course Description

The students

- know the process of image processing projects.
- understand the technical aspects of image acquisition (lighting, cameras, lens systems)
- know typical image processing algorithms and can differentiate between them
- analyze given requirements and outline a procedure
- select and implement suitable image processing operations
- solve specific problems using Matlab

Assessment

Written exam

<< Back

293602 Assembly and Handling Systems

Semester:	summer
Hrs/week	2
ECTS	2.5
Lecturer	Prof. Dr.-Ing. Marcus Stolz

Course Description

The students

- categorize automation systems in typical classifications
- know the procedure for planning automated systems for product processing and packaging
- can design basic procedures for handling different workpieces and develop handling processes for given products (assembly plans)
- optimize process reliability or costs by adapting the handling process
- are able to select application-related production measurement methods
    - are familiar with digital planning tools
- design assembly processes
- optimize products with regard to their automation capability.
- calculate the economic efficiency of a production system or
- select the most favourable variant

Assessment

Written exam

<< Back

293631 Entrepreneurship in R&D

Semester: 1
Hrs/week 2
ECTS 2.5
Lecturer Prof. Dr.-Ing. Marcus Stolz / various external

Course Description

The students

- learn strategies and methods used in the industry to transform innovative ideas into marketable products or services
- develop of an entrepreneurial mindset that includes risk-taking, creativity, and problem-solving skills
- gain insights into the importance of networking and building relationships in the industry
- recognize real-world market trends and customer needs
- understand how to lead teams in innovative projects and manage diverse groups effectively
- use experience from successful R&D professionals to improve their own skills
- apply methods, strategies and the entrepreneurial mindset in their professional work
- communicate with stakeholders in order to get required resources for R&D projects
- analyze company situations, market trends and research findings to an informed decision-making process

Assessment

Presentation accompanying the course

<< Back

293632 Research Project

Semester: 1
Hrs/week 6
ECTS 7.5
Lecturer Prof. Dr.-Ing. Marcus Stolz / various external

Course Description

Group (2-4 students) research project under supervision and guidance of a professor. The project may be performed at a company, research lab or organization other than the university.

The students
- apply their knowledge to real-world problems
- focus on individual research interests
- formulate research questions
- do literature study
- learn how to present their findings
- apply the methods of project management
- plan a research endeavor
- draw up a schedule and an agreement on objectives in terms of content and deadlines
- do independent research work in assigned topics

Assessment

Laboratory work accompanying the course

<< Back

293641 Leadership in R&D

Semester: 2
Hrs/week 2
ECTS 2.5
Lecturer Prof. Dr.-Ing. Marcus Stolz / various external

Course Description

The students

- know and recognize different leadership styles
- learning how to manage and lead through change, including how to implement new processes or technologies within R&D teams
- know how to create an environment that encourages creativity and innovation among team members
- apply different leadership styles to inspire and motivate teams
- think strategically about R&D initiatives, aligning them with organizational goals and market demands
- achieve effective decision-making processes, including how to evaluate risks and opportunities
- convey ideas clearly and effectively to diverse audiences
- build and maintain professional relationships with stakeholders, including cross-functional teams and external partners

Assessment

Presentation accompanying the course

<< Back

293642 Development Project

Semester: 2
Hrs/week 6
ECTS 7.5
Lecturer Prof. Dr.-Ing. Martin Wäldele

Course Description

Group (2-4 students) development project under supervision and guidance of a professor. The project may be performed at a company, research lab or organization other than the university.

The students
- apply their knowledge to real-world problems
- focus on individual interests
- define requirements for the system
- do literature study
- select technologies and plan the system's structure
- implement and test the system
- apply the methods of project management.
- plan a development endeavor
- draw up a schedule and an agreement on objectives in terms of content and deadlines
- do independent development work in assigned topics
- explore new technologies and tools

Assessment

Laboratory work accompanying the course

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93562 Intercultural Communication

Semester	summer
Hrs / week	2
ECTS	2,5
Lecturer	Prof. Dr. Simona Gentile-Lüdecke

Course description

After following this course, students should be able to:

- Understand the role of culture in the organization and review the major aspects of culture
- Look at how culture influences management practices
- Raise awareness of how culture guides the way managers look at problems as well as the solutions they find
- Analyze the leadership across cultures and multicultural teams
- Learn how to develop intercultural competences

The following topics will be object of discussion and analysis:

- The meaning of culture
- Different dimensions of culture
- The international company
- Culture and human resource management
- Intercultural communication
- Managing intercultural conflicts
- Managing intercultural teams
- Intercultural leadership

Assessment
Written assignment (30%)
Presentation (70%)

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