Enclosure C

Module Handbook

Master of Science
Intercultural Leadership and Technology

Contents

1.1 Technology Management

Module title:	*Innovation and Technology Management*
Level of module, if applicable:	
Abbreviation, if applicable:	
Subheading, if applicable:	
Lectures, if applicable:	*Technology Management* *Innovation Culture and Management*
Semester / Duration of modules:	*1st semester / 1 semester*
Responsible for module:	*Prof. Dr. Lutz Göcke*
Lecturer:	*Prof. Dr. Lutz Göcke*
Language:	*English*
Assigned to curriculum of:	***Technology Management:*** *Mandatory: Intercultural Leadership and Technology* ***Innovation Culture and Management:*** *Mandatory: Intercultural Leadership and Technology*
Form of teaching:	***Technology Management*** *Online lectures + lectures on campus* ***Innovation Culture and Management*** *Online lectures + lectures on campus*
Workload:	***Technology Management*** *82 hours of self-studies + 8 hours of on-campus studies* ***Innovation Culture and Management*** *82 hours of self-studies + 8 hours of on-campus studies*
Credit points:	*6 ECTS*
Prerequisites according to Examination Regulations:	
Recommended prerequisites:	
Intended study achievements:	***Technology Management:*** *Students* • *understand the processes of both technological and industrial development as well as industry disruption.* • *are able to apply their theoretical knowledge to analyze the impacts of technologies on existing industries.* • *understand the measures companies use to administrate and get access to technologies in order to gain competitive advantages.* ***Innovation Culture and Management:***

	Students • *understand innovation as a source of competitive advantages.* • *understand the role of innovation cultures and dynamic abilities in innovation management.* • *know and understand different innovation strategies and processes, and forms of organizing innovations.* • *understand the importance and the different measures of successful innovation.*
Contents:	***Technology Management:*** • *Definition of technology and innovation* • *Technology as a source of competitive advantages* • *Life cycles of technologies, products, companies and industries* • *Theories of technological development and industrial evolution and retention (e.g. dominant design, adoption/diffusion, evolutionary economics, structuring)* • *Types of innovations/technologies (e.g. architectural, disruptive, radical)* • *Analysis of technology-based changes at the industrial, corporate and resource level* • *Management of technological innovation and change (e.g. scanning, acquisition, licensing, patents, networks)* • *Specific dynamics of digital technologies (e.g. distributed development, Open Source)* ***Innovation Culture and Management:*** • *Definition of invention, innovation and entrepreneurial initiative* • *Types of innovation (product/process/business model, radical/incremental, disruptive/sustaining)* • *Innovation as a source of market- and resource-based competitive advantages* • *Specific challenges for innovation management (e.g. legitimation problem, resource allocation problem, measuring problem)* • *Dimensions of an innovative and entrepreneurial culture* • *Innovation strategies (e.g. content, point in time, launch)* • *Innovation processes (e.g. Stage-Gate-Innovation, agile software development, lean start-up, open vs. closed innovation)* • *Organization of innovation and entrepreneurial initiative (e.g. innovation labs, corporate incubators, accelerators for venture capital)* • *Measuring innovation success* • *Dynamic skills*
Academic achievements / examinations / prerequisites for achieving ECTS:	*Theoretical / practical assignment (module examination)*
Type of media:	*Online video recordings, online questions, compilation of slides*

Literature:	***Technology Management*** • *Burgelmann/Christensen/Wheelwright (2008), Strategic Management of Technology and Innovation* • *Utterback (1996), Mastering the Dynamics of Innovation* • *Tushman/Anderson (1997), Managing Strategic Innovation and Change* • *Christensen (1997), Innovators Dilemma* • *McAffee/Brynjolfsson (2018), Machine, Platform, Crowd: Harnessing Our Digital Future* ***Innovation Culture and Management:*** • *Goffin/Mitchell (2016), Innovation Management: Effective strategy and implementation* • *Schilling (2019), Strategic Management of Technological Innovation* • *Ries (2017), The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses* • *Kuratko/Morris/Covin (2011), Corporate Innovation and Entrepreneurship* • *Christensen (1997), Innovators Dilemma* • *Hausschildt/Salomo/Schultz/Kock (2016), Innovationsmanagement* • *Schein (2016), Organizational Culture and Leadership*

1.2 Strategic Management

Module title:	*Strategic Management*
Level of module, if applicable:	
Abbreviation, if applicable:	
Subheading, if applicable:	
Lectures, if applicable:	*International Strategic Management* *Business Model Management*
Semester / Duration of modules:	*1st semester / 1 semester*
Responsible for module:	*Dr. Karsten Jänsch*
Lecturer:	*Dr. Karsten Jänsch* *Dr. Isabella Grahsl*
Language:	*English*
Assigned to curriculum of:	***International Strategic Management:*** *Mandatory: Intercultural Leadership and Technology* ***Business Model Management:*** *Mandatory: Intercultural Leadership and Technology*
Form of teaching:	***International Strategic Management*** *Online lectures + lectures on campus* ***Business Model Management*** *Online lectures + lectures on campus*
Workload:	***International Strategic Management*** *82 hours of self-studies + 8 hours of on-campus studies* ***Business Model Management*** *82 hours of self-studies + 8 hours of on-campus studies*
Credit points:	*6 ECTS*
Prerequisites according to Examination Regulations:	
Recommended prerequisites:	***Business Model Management*** • Fundamentals of management theory (e.g. course "Introduction to Strategic Management“ at Bachelor-level) and/or • Job experience in a department related to strategies, in a start-up or consulting firm / in-house consulting
Intended study achievements:	***International Strategic Management:*** *Upon successful completion of this module, students are able to* • *understand the bases of international companies.* • *understand and analyze different concepts of international companies.* • *understand the organization forms of international*

	companies and put them into practice. • *understand, analyze and apply strategies for internationalization in their work environment.* • *understand the role of digitalization and how to apply it.* ***Business Model Management*** • *Students get an overview of the history and the framework conditions ("internet bubble burst") of the initial impetus of scientific research on business models (BMs), are familiar with central definitions and understand the relevance of the topic for corporate (leadership) practice.* • *Students gain first experiences in identifying a target customer segment based on personas (specific customer archetypes) and in quantifying the market potential behind this segment.* • *Upon completion of the module, students will have delved into real-world business models of the mobility market and will be able to describe them using central criteria as well as to draw comparisons between them.* • *Graduates of this module will have tools at hand to identify relevant success criteria of a market and to systematically analyze strengths and weaknesses of BMs, competitors and adaptation needs.* • *Students are able to develop and prove target-group-specific product and service offers based on the identification of personas and pains and gains.* • *Using the findings of the value proposition canvas, students can derive complete business models and present them in a compact format and also implement these methods in their corporate practice.* • *Finally, students are encouraged to use the business model canvas to connect it to the bigger context of market- and resource-oriented analysis approaches and use it as the basis for discussion and explanation of relative competitive advantages and for finding logical connections.* • *Thanks to intensive group work before and on the day on campus itself, and due to in-depth interactions and discussions, students improve their planning and organization skills and their ability to cooperate and collaborate in order to achieve a common goal.*
Contents:	***International Strategic Management:*** • *Internationalization in the course of history* • *Different kinds of internationalization* • *Concepts of international companies* • *Organization of international companies* • *Corporate internationalization strategies* • *Internationalization and globalization* • *Impact of digitalization on international companies* ***Business Model Management***

	• *Introduction to business model research: history, definitions, different research focuses and practical relevance of business model research* • *Analysis of existing business models (with focus on traditional and new business models and the mobility market) regarding yet to be defined criteria that consider success factors of market segments* • *Personas as key element for developing customer-centered product and service offers in due consideration of the value proposition canvas* • *Approaches to target market definition* • *Students gain practical experience in size evaluation of relevant market segments* • *Definition and comparison of business models based on the business model canvas, and understanding of the "power" of this tool regarding the market- and resource-based perspective on competitive advantages* • *Identification of trigger points for adjusting (so-called "pivoting“) business models*
Academic achievements / examinations / prerequisites for achieving ECTS:	***International Strategic Management:*** *Theoretical / practical assignment (part-module examination)* ***Business Model Management:*** *Theoretical / practical assignment (part-module examination)*
Type of media:	*Online video recordings, online questions*
Literature:	***International Strategic Management:*** • *Kutschker, Michael; Schmid, Stefan Internationales Management, München: Oldenbourg, 2012* • *Morschett, Dirk; Schramm-Klein, Hanna; Zentes, Joachim Strategic international management : text and cases, Wiesbaden: Springer Gabler, 2015* ***Business Model Management:*** • *Business Model Generation, Alexander Osterwalder and Yves Pigneur, 2009* • *The lean startup: how today's entrepreneurs use continuous innovation to create radically successful businesses, Ries, Eric (2014)* • *Resource Based View according to Contemporary Strategy Analysis, Robert M. Grant, 8th Edition, 2012* • *Porter, The Five Competitive Forces That Shape Strategy, Harvard business Review, January 2008* • *- Prahalad, Hamel: The Core Competence of the Corporation; HBR; Issue May-June 1990*

1.3 Organizational Development and Leadership

Module title:	*Organizational Development and Leadership*
Level of module, if applicable:	
Abbreviation, if applicable:	
Subheading, if applicable:	
Lectures, if applicable:	*Change Management: Dynamic in Organizations* *Leadership and Leading the Change*
Semester / Duration of modules:	*1st semester / 1 semester*
Responsible for module:	*Dr. Michael Lindemann*
Lecturer:	*Dr. Michael Lindemann*
Language:	*English*
Assigned to curriculum of:	***Change Management: Dynamic in Organizations:*** *Mandatory: Intercultural Leadership and Technology* ***Leadership and Leading the Change:*** *Mandatory: Intercultural Leadership and Technology*
Form of teaching:	***Change Management: Dynamic in Organizations*** *Online lectures + lectures on campus* ***Leadership and Leading the Change*** *Online lectures + lectures on campus*
Workload:	***Change Management: Dynamic in Organizations*** *82 hours of self-studies + 8 hours of on-campus studies* ***Leadership and Leading the Change*** *82 hours of self-studies + 8 hours of on-campus studies*
Credit points:	*6 ECTS*
Prerequisites according to Examination Regulations:	
Recommended prerequisites:	*Initial practice experiences in organization development, transformation, leadership*
Intended study achievements:	***Change Management: Dynamic in Organizations:*** *Upon successful completion of this module, students are able to* • *recognize and distinguish different forms of organizational change,* • *describe the course of organizational change,* • *present methods to manage organizational change* *and to apply the aforementioned skills in case studies.* ***Leadership and Leading the Change:***

	After successful completion of the module, students are able to • *distinguish leadership styles,* • *describe leadership tasks and tools,* • *present methods for change management* *and to apply the aforementioned skills in case studies.*
Contents:	***Change Management: Dynamic in Organizations:*** 1. *Definition and characterization of change in the organizational context* a. *Definition, causes and goals of change* b. *Types and layers of change* c. *Success factors and problems of change* 2. *Phases of change* a. *Phase model of change at individual level* b. *Phase models of change at organizational level* 3. *Change Management* a. *Definition and types* b. *Individuum-centered methods* c. *Group-centered methods* ***Leadership and Leading the Change:*** 1. *Leadership* a. *Leadership theories* b. *Self-management and leadership of others* c. *Leadership tasks and methods* 2. *Management of organizational change processes*
Academic achievements / examinations / prerequisites for achieving ECTS:	*Theoretical / practical assignment (module examination)*
Type of media:	*Online video recordings, online questions, compilation of slides*
Literature:	• *Anderson, Robert J. and Adams, William A.: Mastering Leadership: An Integrated Framework for Breakthrough Performance and Extraordinary Business Results (2015)* • *Appelo, Jurgen: Management 3.0: Leading Agile Developers, Developing Agile Leaders (2010)* • *Cameron, Esther and Green, Mike: Making Sense of Change Management: A Complete Guide to the Models, Tools and Techniques of Organizational Change (2015)* • *Cohen, William A.: Drucker on Leadership: New Lessons from the Father of Modern Management (2009)* • *Kotter, John P.: Leading Change (2012)* • *Laloux, Frederic: Reinventing Organizations: A Guide to Creating Organizations Inspired by the Next Stage in Human Consciousness (2014)* • *Lewrick, Michael et.al.: The Design Thinking Playbook: Mindful Digital Transformation of Teams, Products, Services, Businesses and Ecosystems (2018)* • *Malik, Fredmund, Scherer Jutta: Managing Performing*

	Living: Effective Management for a New World (2015) • *Medinilla, Ángel: Agile Management: Leadership in an Agile Environment (2012)* • *Pinnow, Daniel F.: Leadership - What Really Matters: A Handbook on Systemic Leadership (2011)* • *Scarlett, Hilary: Neuroscience for Organizational Change: An Evidence-based Practical Guide to Managing Change (2019)* • *Sinek, Simon: Start with Why: How Great Leaders Inspire Everyone to Take Action (2011)*

1.4 Transfer Assessment 1

Module title:	*Transfer Assessment 1*
Level of module, if applicable:	
Abbreviation, if applicable:	
Subheading, if applicable:	
Lectures, if applicable:	
Semester / Duration of modules:	*1st semester / 1 semester*
Responsible for module:	*Prof. Dr. Wolfgang Pfau*
Lecturer:	*Prof. Dr. Wolfgang Pfau*
Language:	*English*
Assigned to curriculum of:	***Transfer Assessment 1:*** *Mandatory: Intercultural Leadership and Technology*
Form of teaching:	*Theory-practice-reflection + online-questionnaire*
Workload:	*148 hours of self-studies + 2 hours of on-campus studies*
Credit points:	*6 ECTS*
Prerequisites according to Examination Regulations:	
Recommended prerequisites:	
Intended study achievements:	*Upon successful completion of the assessment, students are able to* • *self-evaluate their competences at the beginning of the Master program;* • *locate the contents of the program within their individual working environment;* • *form a conceptual basis for evaluating the relevance of the program in their working environment.*
Contents:	• *Evaluation of the technically relevant competences present at the beginning of the program* • *Potential applications of the scientific findings of the program to the individual work practice of the students.*
Academic achievements / examinations / prerequisites for achieving ECTS:	*Theoretical / practical assignment (proof of performance)*
Type of media:	*Online-questionnaire*
Literature:	-

1.5 Real-Life Project Seminar

Module title:	*Real-Life Project Seminar*
Level of module, if applicable:	
Abbreviation, if applicable:	
Subheading, if applicable:	
Lectures, if applicable:	*Real-Life Project Seminar*
Semester / Duration of modules:	*2nd semester / 1 semester*
Responsible for module:	*Prof. Dr. Wolfgang Pfau*
Lecturer:	*Prof. Dr. Wolfgang Pfau*
Language:	*English*
Assigned to curriculum of:	***Real-Life Project Seminar:*** *Mandatory: Intercultural Leadership and Technology*
Form of teaching:	*Online lectures + lectures on campus*
Workload:	*172 hours of self-studies + 8 hours of on-campus studies*
Credit points:	*6 ECTS*
Prerequisites according to Examination Regulations:	
Recommended prerequisites:	
Intended study achievements:	*After successful completion of this module, students are able to* • *use appropriate methods to work scientifically.* • *apply their economic and engineering knowledge in order to solve distinct practical problems.* • *work independently.*
Contents:	*The seminar aims to deepen students' knowledge in the chosen economic and engineering subjects. Students are to discuss economic or engineering questions and apply their newly acquired knowledge.*
Academic achievements / examinations / prerequisites for achieving ECTS:	*Theoretical / practical assignment (module examination)*
Type of media:	*Depending on the individual seminar topic.*
Literature:	*Depending on the individual seminar topic.*

1.6 Business Simulation Going Global

Module title:	*Business Simulation Going Global*
Level of module, if applicable:	
Abbreviation, if applicable:	
Subheading, if applicable:	
Lectures, if applicable:	*Business Simulation Going Global*
Semester / Duration of modules:	*2nd semester / 1 semester*
Responsible for module:	*Prof. Dr. Wolfgang Pfau*
Lecturer:	*Prof. Dr. Wolfgang Pfau*
Language:	*English*
Assigned to curriculum of:	***Business Simulation Going Global:*** *Mandatory: Intercultural Leadership and Technology*
Form of teaching:	*Online lectures + lectures on campus*
Workload:	*172 hours of self-studies + 8 hours of on-campus studies*
Credit points:	*6 ECTS*
Prerequisites according to Examination Regulations:	
Recommended prerequisites:	
Intended study achievements:	*Upon successful completion of this module, students are able to* • *coordinate multicultural teams.* • *perform in a virtual working environment.* • *develop and implement internationalization and adaptation strategies.* • *assess and classify chances and risks of economically different markets.* • *act and react in a competitive environment.* • *give their entrepreneurial actions a long-term perspective.* • *understand the volatility of markets around the world.* • *shape and implement goal-oriented global and regional strategies.* • *make decisions in uncertain environments.*
Contents:	*”Going Global“ is a business simulation mocking a global competitive environment.* *The participants manage their own multinational company which spreads over six different economic regions which offer different market conditions. Students evaluate the strengths and weaknesses of their company to stay competitive and successful*

	in the markets.
Academic achievements / examinations / prerequisites for achieving ECTS:	*Seminar assignment (proof of performance)*
Type of media:	*Online business simulation*
Literature:	*Participant's handbook*

1.7 International Project Management live

Module title:	*International Project Management live*
Level of module, if applicable:	
Abbreviation, if applicable:	
Subheading, if applicable:	
Lectures, if applicable:	*International Project Management live*
Semester / Duration of modules:	*2nd semester / 1 semester*
Responsible for module:	*Mr. Hans-Jürgen Weisser*
Lecturer:	*Mr. Hans-Jürgen Weisser*
Language:	*English*
Assigned to curriculum of:	***International Project Management live:*** *Mandatory: Intercultural Leadership and Technology*
Form of teaching:	*Online lectures + lectures on campus*
Workload:	*164 hours of self-studies + 16 hours of on-campus studies*
Credit points:	*6 ECTS*
Prerequisites according to Examination Regulations:	
Recommended prerequisites:	
Intended study achievements:	*Upon successful completion of this module, students are able to* • *apply fundamental knowledge of team management and of how to chair meetings, negotiate and manage conflicts.* • *deal with difficult situations arising during the planning and implementation of projects.* • *find solutions for problems arising within project teams or with other parties involved in the project.* • *apply the project management processes described in the Project Management Body of Knowledge (PMBOK® Guide).* • *plan project resources and use project management tools.* • *make decisions with the team and react appropriately even in stressful situations.*
Contents:	• *Project initiation and organization* • *Definition of the extent of a project and concept development* • *Planning of activities and resources* • *Risk analysis, monitoring and controlling*

	• *Cost estimation, budgeting and cost control* • *Quality planning and control* • *Performance monitoring and change management* • *Training and team building, communication* • *Project closure, learnings from the project*
Academic achievements / examinations / prerequisites for achieving ECTS:	*Seminar assignment (proof of performance)*
Type of media:	*Simulation software, online video recordings, online questions*
Literature:	• *Project Management Institute: A Guide to the Project Management Body of Knowledge (Pmbok Guide)*

1.8 Theory-Practice-Reflection

Module title:	*Theory-Practice-Reflection*
Level of module, if applicable:	
Abbreviation, if applicable:	
Subheading, if applicable:	
Lectures, if applicable:	
Semester / Duration of modules:	*2nd semester / 1 semester*
Responsible for module:	*Prof. Dr. Wolfgang Pfau*
Lecturer:	*Prof. Dr. Wolfgang Pfau*
Language:	*English*
Assigned to curriculum of:	***Theory-Practice-Reflection:*** *Mandatory: Intercultural Leadership and Technology*
Form of teaching:	*Pre-structured theory-practice-reflection*
Workload:	*178 hours of self-studies + 2 hours of on-campus studies*
Credit points:	*6 ECTS*
Prerequisites according to Examination Regulations:	
Recommended prerequisites:	
Intended study achievements:	*Upon successful completion of the theory-practice-reflection, students are able to* • *realize and describe the connections between the daily professional practice and the theoretical contents of the Master program, and to reflect upon them.* • *connect contents of individual modules or part-modules with fields from the professional practice.* • *scrutinize the contents of the Master program regarding the aptitude in the professional practice and document this process.*
Contents:	• *Collection and demonstration of general synergies of theory and practice.* • *Connect (three) certain modules with the areas relevant to the professional practice.* • *Scrutinizing one module regarding the professional relevance.*
Academic achievements / examinations / prerequisites for achieving ECTS:	*Theoretical / practical assignment (proof of performance)*
Type of media:	*Online-questionnaire*
Literature:	-

1.9 International Marketing and Sales

Module title:	*International Marketing and Sales*
Level of module, if applicable:	
Abbreviation, if applicable:	
Subheading, if applicable:	
Lectures, if applicable:	*International Marketing* *International Sales*
Semester / Duration of modules:	*3rd semester / 1 semester*
Responsible for module:	*Prof. Dr. Winfried Steiner*
Lecturer:	*Prof. Dr. Thomas Niemand* *Prof. Dr. Winfried Steiner*
Language:	*English*
Assigned to curriculum of:	***International Marketing:*** *Mandatory: Intercultural Leadership and Technology* ***International Sales:*** *Mandatory: Intercultural Leadership and Technology*
Form of teaching:	***International Marketing*** *Online lectures + lectures on campus* ***International Sales*** *Online lectures + lectures on campus*
Workload:	***International Marketing*** *82 hours of self-studies + 8 hours of on-campus studies* ***International Sales*** *82 hours of self-studies + 8 hours of on-campus studies*
Credit points:	*6 ECTS*
Prerequisites according to Examination Regulations:	
Recommended prerequisites:	
Intended study achievements:	***International Marketing:*** *After successful completion of this module, students* • *have a fundamental understanding of modern marketing, understand its layers and can differentiate international marketing from different and related marketing phenomena.* • *understand the problem of standardization compared to differentiation.* • *have developed the ability to distinguish strategic and tactic instruments and to apply these in international*

	marketing in the context of standardization and differentiation. • *can relate cultural aspects and concepts to the question of standardization vs. differentiation and know selected channel and funnel marketing strategies in international marketing.* . ***International Sales:*** *After successful completion of this module, students* • *understand the fundamental goals and instruments of sales management. Further, they know how to derive specific implications for sales planning from specific methods and different analysis possibilities (e.g. sales response models, expert interviews or preference analyses).* • *possess the analytical abilities to create profound sales forecasts regarding the instruments of product policy, pricing, communication and sales policies using well-established model approaches.* • *know the essential empirical findings on how marketing activities affect product sales.*
Contents:	***International Marketing:*** • *Fundamentals and layers of marketing* • *Questions of standardization vs. differentiation in global and international marketing* • *Implementation of strategic and tactic instruments* • *Cultural aspects and concepts and their relevance in marketing* • *Strategies of channel and funnel marketing in international marketing* ***International Sales:*** • *Fundamentals of sales management* • *Descriptive modeling approaches (Sales Response Function, Conjoint Analysis, expert interviews)* • *Sales management for new product planning* • *Sales management tools for product management, pricing, communication and distribution* • *Empirical findings on the effects of Marketing Mix Activities and product sales*
Academic achievements / examinations / prerequisites for achieving ECTS:	***International Marketing:*** *Theoretical / practical assignment (part-module examination)* ***International Sales:*** *Theoretical / practical assignment (part-module examination)*
Type of media:	*Online video recordings, online questions*

Literature:	***International Marketing:*** • *Cateora, P. R., Gilly, M. C., Graham, J. L., and Money, R. B. (2016). International marketing (17th ed.). New York, NY: McGraw-Hill Education.* • *Keegan, W.J., Green, M.C. (2015): Global Marketing (8th ed.). Harlow: Pearson.* • *Usunier, J.-C., and Lee, J. A. (2013). Marketing across cultures (6th ed.). Harlow: Pearson.* • *+ selected articles* ***International Sales:*** • *Choudhury, R.G. (2019): Sales and Distribution Management for Organizational Growth, IGI Global* • *Johnston, M.W.; Marshall, G.W. (2013): Sales Force Management, 11th ed., Routledge* • *Lilien, G.L. (2018): Advisor 1: A Descriptive Model of Advertising Budgeting for Industrial Products, Forgotten Books* • *Lilien; Gary L.; Rangaswamy; Arvind; De Bruyn A. (2017): Principles of Marketing Engineering and Analytics, State College, PA 16803* • *Orme, B. (2013): Getting Started with Conjoint Analysis.* • *Simon, H., Fassnacht, M. (2018): Price Management: Strategy, Analysis, Decision, Implementation, Springer* • *van Heerde, H.J., Neslin, S.A. (2008): Sales Promotion Models, in: Handbook of Marketing Decision Models, International Series in Operational Research and Management Science, New York* • *+ selected articles*

1.10 Big Data Management and Analytics

Module title:	*Big Data Management and Analytics*
Level of module, if applicable:	
Abbreviation, if applicable:	
Subheading, if applicable:	
Lectures, if applicable:	*Big Data Management* *Big Data Analytics*
Semester / Duration of modules:	*3rd semester / 1 semester*
Responsible for module:	*Prof. Dr. Sven Hartmann*
Lecturer:	*Prof. Dr. Sven Hartmann*
Language:	*English*
Assigned to curriculum of:	***Big Data Management:*** *Mandatory: Intercultural Leadership and Technology* ***Big Data Analytics:*** *Mandatory: Intercultural Leadership and Technology*
Form of teaching:	***Big Data Management*** *Online lectures + lectures on campus* ***Big Data Analytics*** *Online lectures + lectures on campus*
Workload:	***Big Data Management*** *82 hours of self-studies + 8 hours of on-campus studies* ***Big Data Analytics*** *82 hours of self-studies + 8 hours of on-campus studies*
Credit points:	*6 ECTS*
Prerequisites according to Examination Regulations:	
Recommended prerequisites:	
Intended study achievements:	*Upon successful completion of this module, students understand the challenges of management and of the analysis of vast amounts of data and data streams in modern data-intensive applications and master IT-based solution approaches.*
Contents:	*A choice of the following topics will be covered:* • *Characteristics, challenges and applications of Big Data* • *NoSQL- and NewSQL-Databases* • *Cloud and Multi-Tenant Databases* • *Data Processing with Hadoop, MapReduce and Spark* • *Management and mining of data streams*

	• *Frequent Item Sets* • *Preprocessing of data* • *High-dimensional data* • *Graph databases and analysis of graph data* • *Social networks, recommender systems*
Academic achievements / examinations / prerequisites for achieving ECTS:	*Exam or oral exam (module examination)*
Type of media:	*Online video recordings, online questions*
Literature:	• *Abiteboul et al. (2011): Web Data Management, Cambridge University Pres* • *Leskovec, Rajaraman, Ullman (2020): Mining of Massive Datasets Frampton: Complete Guide to Open Source Big Data Stack, Apress* • *Emrouznejad, Charles (2018): Big Data for the Greater Good, Springer* • *Kipf u.a (2019).: Scalable Analytics on Fast Data, ACM ToDS*

1.11 German and European Leadership and Business Culture

Module title:	*German and European Leadership and Business Culture*
Level of module, if applicable:	
Abbreviation, if applicable:	
Subheading, if applicable:	
Lectures, if applicable:	*German and European Business Culture* *Leadership in German and European Companies*
Semester / Duration of modules:	*3rd semester / 1 semester*
Responsible for module:	*Dr. Dirk Tröndle*
Lecturer:	*Dr. Dirk Tröndle*
Language:	*English*
Assigned to curriculum of:	***German and European Business Culture:*** *Mandatory: Intercultural Leadership and Technology* ***Leadership in German and European Companies:*** *Mandatory: Intercultural Leadership and Technology*
Form of teaching:	***German and European Business Culture*** *Online lectures + lectures on campus* ***Leadership in German and European Companies*** *Online lectures + lectures on campus*
Workload:	***German and European Business Culture*** *82 hours of self-studies + 8 hours of on-campus studies* ***Leadership in German and European Companies*** *82 hours of self-studies + 8 hours of on-campus studies*
Credit points:	*6 ECTS*
Prerequisites according to Examination Regulations:	
Recommended prerequisites:	
Intended study achievements:	***German and European Business Culture*** *Upon successful completion, students* • *understand the German culture and the culture of other European countries* • *are able to recognize how the cultures of these countries have changed in the course of history.* • *comprehend and can deal with the effects national cultures have on companies, industries and the culture of professionalism.* • *are able to identify and implement successful corporate activities within the respective cultural environment.*

	Leadership in German and European Companies *Upon successful completion, students* • *can recognize cultural impacts and their consequences on corporate leadership in German and other European companies.* • *understand the impact of cultural differences at all managerial levels and are able to adapt managerial actions accordingly.*
Contents:	1. *Global trends of geopolitics and its effects on cultural differences in Germany and Europe* 2. *Current markets and future markets (potential) for German and European companies* 3. *Concepts and theories of intercultural management in Germany and Europe* 4. *Leadership and culture: the GLOBE project* 5. *Culture-independent universal strategies for action* 6. *Integrating global and European tendencies of unification* 7. *Differentiating culture-dependent strategies for action* 8. *Human Resource Management in German and European companies*
Academic achievements / examinations / prerequisites for achieving ECTS:	*Theoretical / practical assignment (proof of performance)*
Type of media:	*Online video recordings, online questions*
Literature:	• *H. Dunning (1993): Multinational Enterprises and the Global Economy. 2. Auflage. Wokingham u. a.* • *House, RJ.; Hanges PJ.; Javidan, M.; Dorfman, PW. and Gupta, V. (2004). Culture, Leadership, and Organizations. The GLOBE Study of 62 Societies. Sage Publications, California* • *Bartlett, G., and Ghoshal, S. (1989). Managing Across Borders. London: Century.* • *Clegg, S., Ibarra-Colado, E., and Bueno-Rodriguez, L. (Eds.). (1999). Global management– universal theories and local realities. London: Sage.* • *Hofstede, G. (1980). Culture's consequences. London: Sage.* • *Ohmae, K. (1990). The borderless world: power and strategy in the interlinked economy. New York: Free Press.* • *Pedro Macedo Leao (2011). Germany - Keys To Understanding German Business Culture.*

1.12 Transfer Assessment 2

Module title:	*Transfer Assessment 2*
Level of module, if applicable:	
Abbreviation, if applicable:	
Subheading, if applicable:	
Lectures, if applicable:	
Semester / Duration of modules:	*3rd semester / 1 semester*
Responsible for module:	*Prof. Dr. Wolfgang Pfau*
Lecturer:	*Prof. Dr. Wolfgang Pfau*
Language:	*English*
Assigned to curriculum of:	***Transfer Assessment 2:*** *Mandatory: Intercultural Leadership and Technology*
Form of teaching:	*Theory-practice-reflection + online-questionnaire*
Workload:	*178 hours of self-studies + 2 hours of on-campus studies*
Credit points:	*6 ECTS*
Prerequisites according to Examination Regulations:	
Recommended prerequisites:	
Intended study achievements:	*Upon successful completion of the assessment, students are able to* • *self-evaluate and compare their competences from the beginning of the program with the competences developed during the course of the program.* • *locate the contents of the program within their individual working environment.* • *form a conceptual basis for evaluating the relevance of the program in their working environment.*
Contents:	• *Evaluation and demonstration of the technically relevant competences present at the beginning and the end of the program.* • *Ability to apply the scientific findings of the program to the students' individual work practice.*
Academic achievements / examinations / prerequisites for achieving ECTS:	*Theoretical / practical assignment (proof of performance)*
Type of media:	*Online-questionnaire + oral examination*

Literature:	-

1.13 Leadership and Intercultural Competence in Russia

Module title:	*Leadership and Intercultural Competence in Russia*
Level of module, if applicable:	
Abbreviation, if applicable:	
Subheading, if applicable:	
Lectures, if applicable:	*Leadership in Russian Companies* *Russian Business Culture*
Semester / Duration of modules:	*2nd semester / 1 semester*
Responsible for module:	*Dr. Radik Valliulin*
Lecturer:	*Dr. Radik Valliulin*
Language:	*English*
Assigned to curriculum of:	***Leadership in Russian Companies:*** *Mandatory elective: Intercultural Leadership and Technology* ***Russian Business Culture:*** *Mandatory elective: Intercultural Leadership and Technology*
Form of teaching:	***Leadership in Russian Companies*** *Online lectures + lectures on campus* ***Russian Business Culture*** *Online lectures + lectures on campus*
Workload:	***Leadership in Russian Companies*** *82 hours of self-studies + 8 hours of on-campus studies* ***Russian Business Culture*** *82 hours of self-studies + 8 hours of on-campus studies*
Credit points:	*6 ECTS*
Prerequisites according to Examination Regulations:	
Recommended prerequisites:	
Intended study achievements:	*Upon successful completion, students* • *are able to implement the imparted fundamentals of international management taking the example of Russia in their professional practice.* • *develop knowledge of economic, political, intercultural and legal framework conditions of business in Russia.* • *understand the most important aspects of successful cooperation with Russian companies.*

	• *can successfully negotiate with Russian business partners.*

Contents:	• *Russia: Interesting facts*
	• *Russia compared internationally*
	• *Russia as sales market*
	• *Russia as procurement market*
	• *Moscow vs. Russia*
	• *Working in Russia*
	• *Russian start-up scene*
	• *Human Resources in Russia*
	• *Foreign employers and employees in Russia*
	• *Communication*
	• *Digitalization in Russia*
	• *Intercultural aspects: comparison between countries / classification of Russia according to Hofstede's cultural dimensions*
	  ○ *Cultural dimension Power Distance*
	  ○ *Cultural dimension Individualism / Collectivism*
	  ○ *Cultural dimension Masculinity / Femininity*
	  ○ *Cultural dimension Uncertainty Avoidance*
	  ○ *Cultural dimension Long-term Orientation / Short-term Orientation*
	• *Comparison of the international competences of Germany and Russia*
	• *Bureaucracy and corruption in Russia*
	• *Negotiations with Russian partners*
	• *Leading a Russian team or a company in Russia*
	• *Critical success factors in Russia*

Academic achievements / examinations / prerequisites for achieving ECTS:	*Theoretical / practical assignment (proof of performance)*
Type of media:	*Online video recordings, online questions, compilation of slides*
Literature:	• *Block, F.: Erfolgreich als Deutscher mit Russen verhandeln: Interkulturelle Handlungskompetenzen in Theorie und Praxis. 2016, Monsenstein und Vannerdat* • *Eckstein, K.A.: Geschäftserfolg in Russland: Business-Tipps vom Russland-Kenner Nummer 1. 2007, Orell Fuessli/ Schweiz* • *Frank, S.; Wedde, R.: Investmentguide Russland: Personal, Recht, Steuern und Kommunikation in der Praxis. 2009 Schäffer Poeschel* • *Hofstede, G.: Cultures and Organizations: Software of the Mind, 3. Auflage. 2010* • *Krause, J.: Regulierung von Investitionsprojekten in Russland: Normativ-rechtliche Anforderungen im Anlagenbau. Springer Gabler; 2016* • *Kuskova, E.; Budey, O.: Business-Guide Russland:*

	Erfolg und Rechtssicherheit bei Markteinstieg und Geschäftsaufbau, 2013, 3. Auflage, Reguvis Fachmedien • *Lütthans, A.; Zlotina, I.: Russenversteher: Wie aus interkulturellen Konfliktfeldern Wettbewerbsvorteile werden. 2012, NWB Verlag* • *o.V.: German Mittelstand in Russland: Ein Leitfaden zum Geschäftserfolg. 2014, OWC-Verlag für Außenwirtschaft* • *Rothlauf, J.: Interkulturelles Management: Mit Beispielen aus Vietnam, China, Japan, Russland und den Golfstaaten De Gruyter Oldenbourg, 2012, 4. Auflage* • *Schmitt, M.: Strategische Projekte zum Markteintritt nach Russland: Markteintrittsformen, -Strategien Und Standortauswahl (Internationale und Interkulturelle Projekte erfolgreich umsetzen). 2014, Diplomica Verlag* • *Tischendorf, F.: Investorenleitfaden: Lokalisierung und Produktionsaufbau in Russland. 2019, Deutscher Fachverlag GmbH,* • *Valiullin, R.; Valiullina E.: Managerwissen kompakt: Russland. 2005, Hanser* • *Recherchen aus den russischen Zeitschriften und Zeitungen wie Vedomosti, Expert, RBK*

1.14 Leadership and Intercultural Competence in China

Module title:	*Leadership and Intercultural Competence in China*
Level of module, if applicable:	
Abbreviation, if applicable:	
Subheading, if applicable:	
Lectures, if applicable:	*Leadership in Chinese Companies* *Chinese Business Culture*
Semester / Duration of modules:	*2nd semester / 1 semester*
Responsible for module:	*N.N.*
Lecturer:	*N.N.*
Language:	*English*
Assigned to curriculum of:	***Leadership in Chinese Companies:*** *Mandatory elective: Intercultural Leadership and Technology* ***Chinese Business Culture:*** *Mandatory elective: Intercultural Leadership and Technology*
Form of teaching:	***Leadership in Chinese Companies*** *Online lectures + lectures on campus* ***Chinese Business Culture*** *Online lectures + lectures on campus*
Workload:	***Leadership in Chinese Companies*** *82 hours of self-studies + 8 hours of on-campus studies* ***Chinese Business Culture*** *82 hours of self-studies + 8 hours of on-campus studies*
Credit points:	*6 ECTS*
Prerequisites according to Examination Regulations:	
Recommended prerequisites:	
Intended study achievements:	***Chinese Business Culture*** *Upon successful completion, students* • *understand the Chinese culture.* • *are able to recognize how this culture has changed in the course of history.* • *comprehend and can deal with the effects this culture has on companies, industries and the culture of professionalism.* • *are able to identify and implement successful corporate activities within the respective cultural environment.* ***Leadership in Chinese Companies***

	Upon successful completion, students • *can recognize cultural impacts and their consequences on corporate leadership in Chinese companies.* • *understand the impact of cultural differences on all managerial levels and are able to adapt managerial actions accordingly.*

Contents:	• *Intercultural aspects: comparison between countries / classification of Russia according to Hofstede's cultural dimensions*
	  ○ *Cultural dimension Power Distance*
	  ○ *Cultural dimension Individualism / Collectivism*
	  ○ *Cultural dimension Masculinity / Femininity*
	  ○ *Cultural dimension Uncertainty Avoidance*
	  ○ *Cultural dimension Long-term Orientation / Short-term Orientation*
	• *Comparison of the international competences of Germany and China*
	• *Bureaucracy and corruption in China*
	• *Negotiations with Chinese partners*
	• *Leading a Chinese team or a company in China*
	• *Critical success factors in China*

Academic achievements / examinations / prerequisites for achieving ECTS:	*Theoretical / practical assignment (proof of performance)*
Type of media:	*Online video recordings, online questions*
Literature:	

1.15 Cyber Physical Systems and Cybersecurity

Module title:	*Cyber-Physical Systems and Cybersecurity*
Level of module, if applicable:	
Abbreviation, if applicable:	
Subheading, if applicable:	
Lectures, if applicable:	*Cyber-Physical Systems* *Cybersecurity in Digital Transformation*
Semester / Duration of modules:	*1st semester / 1 semester*
Responsible for module:	*Prof. Dr.-Ing. Dietmar Möller*
Lecturer:	*Prof. Dr.-Ing. Dietmar Möller*
Language:	*English*
Assigned to curriculum of:	***Cyber-Physical Systems:*** *Mandatory elective: Intercultural Leadership and Technology* ***Cybersecurity in Digital Transformation:*** *Mandatory elective: Intercultural Leadership and Technology*
Form of teaching:	***Cyber-Physical Systems*** *Online lectures + lectures on campus* ***Cybersecurity in Digital Transformation*** *Online lectures + lectures on campus*
Workload:	***Cyber-Physical Systems*** *82 hours of self-studies + 8 hours of on-campus studies* ***Cybersecurity in Digital Transformation*** *82 hours of self-studies + 8 hours of on-campus studies*
Credit points:	*6 ECTS*
Prerequisites according to Examination Regulations:	
Recommended prerequisites:	*Knowledge of programming languages, system theory*
Intended study achievements:	***Cyber-Physical Systems*** *Students are to acquire relevant knowledge in a vital topic of today's digital transformation. Thus, they develop knowledge essential for a deeper understanding of cyber-physical systems to achieve independent problem-solving for industrial applications. This enables students to use cyber-physical systems for industrial purposes and to proactively conduct the necessary knowledge transfer from theory to professional practice by conceptual actions. This leads to appropriate and innovative solutions.*

	Cybersecurity in Digital Transformation *Students are to acquire relevant knowledge in a vital topic of today's digital transformation. Thus, they develop knowledge essential for a deeper understanding of cybersecurity to achieve independent problem-solving skills.* *This enables students to react to ubiquitous cyber-physical threats with adequate approaches for industrial purposes as well as to proactively transfer knowledge from theory to professional practice by conceptual actions. This leads to appropriate and innovative solutions.*
Contents:	***Cyber-Physical Systems*** *LO1: Introduction to systems* *LO2: Introduction to embedded systems* *LO3: Introduction to cyber-physical systems* *LO4: Introduction to the Internet of Things* *LO5: Introduction to Ubiquitous Computing* *LO6: CPS in Industry 4.0* ***Cybersecurity in Digital Transformation*** *LO1: Introduction to digital transformation* *LO2: Introduction to cybersecurity* *LO3: Introduction to threat modeling* *LO4: Identification and defeat of attackers* *LO5: Machine learning and deep learning* *LO6: Threat modeling and scenarios, and cybersecurity*
Academic achievements / examinations / prerequisites for achieving ECTS:	*Theoretical / practical assignment (module examination)*
Type of media:	*Online video recordings, online questions, compilation of slides*
Literature:	• *D.P.F.Möller Guide to Computing Fundamentals in Cyber-Physical Systems – Concepts, Design Methods, and Applications, Springer Publ. 2016.* • *D.P.F.Möller und R.E.Haas Guide to Automotive Connectivity and Cybersecurity – Trends, Technologies, Innovations, and Applications" Springer Publ., 2019*

1.16 Internet of Things and Intelligent Manufacturing

Module title:	*Industrial Internet of Things and Intelligent Manufacturing*
Level of module, if applicable:	

Abbreviation, if applicable:	
Subheading, if applicable:	
Lectures, if applicable:	*Internet of Things and Industrial Internet of Things* *Intelligent Manufacturing – Industry 4.0*
Semester / Duration of modules:	*3rd semester / 1 semester*
Responsible for module:	*Prof. Dr. Eng. Dietmar Möller*
Lecturer:	*Prof. Dr. Eng. Dietmar Möller*
Language:	*English*
Assigned to curriculum of:	***Internet of Things and Industrial Internet of Things:*** *Mandatory elective: Intercultural Leadership and Technology* ***Intelligent Manufacturing – Industry 4.0:*** *Mandatory elective: Intercultural Leadership and Technology*
Form of teaching:	***Internet of Things and Industrial Internet of Things*** *Online lectures + lectures on campus* ***Intelligent Manufacturing – Industry 4.0*** *Online lectures + lectures on campus*
Workload:	***Internet of Things and Industrial Internet of Things*** *82 hours of self-studies + 8 hours of on-campus studies* ***Intelligent Manufacturing – Industry 4.0*** *82 hours of self-studies + 8 hours of on-campus studies*
Credit points:	*6 ECTS*
Prerequisites according to Examination Regulations:	
Recommended prerequisites:	*Knowledge of programming languages, Industrial Internet of Things, cybersecurity*
Intended study achievements:	***Internet of Things and Industrial Internet of Things*** *Students acquire relevant knowledge in a vital topic of today's digital transformation. Thus, they develop knowledge essential for a deeper understanding of cyber-physical systems to achieve independent problem-solving competence. This enables students to use the Internet of Things and the industrial Internet of Things in industrial applications. Moreover, they can proactively transfer knowledge from theory to professional practice by conceptual actions. This leads to appropriate and innovative solutions.* ***Intelligent Manufacturing – Industry 4.0*** *The students acquire relevant knowledge in a vital topic of the digital transformation of today's industry. Thus, they develop knowledge essential for a deeper understanding of intelligent manufacturing / Industry 4.0 to achieve independent problem-solving competence. Hence, students comprehend traditional methods of production as well as modern methodological processes like agile manufacturing and additive manufacturing. In the context of industrial applications, new approaches to*

	intelligent manufacturing using artificial intelligence, the industrial Internet of Things, Big Data and analytics, Cloud Computing are taught among others. The proactively conducted knowledge transfer from theory to professional practice by conceptual actions leads to appropriate and innovative solutions.
Contents:	***Internet of Things and Industrial Internet of Things*** *LO1: Introduction to the Internet of Things* *LO2: Introduction to the technology and applications of radio frequency identification* *LO3: Introduction to wireless network technology* *LO4; Power supply technology* *LO5: Internet of Things in logistics* *LO6: Industrial Internet of Things in intelligent manufacturing - Industry 4.0* ***Intelligent Manufacturing – Industry 4.0*** *LO1: Introduction to manufacturing* *LO2: Introduction to agile manufacturing* *LO3: Introduction to additive manufacturing* *LO4: Introduction to simulation and the digital twin* *LO5: Methods of intelligent manufacturing and circular economy* *LO6: Intelligent factory and industry 4.0*
Academic achievements / examinations / prerequisites for achieving ECTS:	*Theoretical / practical assignment (module examination)*
Type of media:	*Online video recordings, online questions*
Literature:	• *D.P.F.Möller Guide to Computing Fundamentals in Cyber-Physical Systems – Concepts, Design Methods, and Applications, Springer Publ. 2016.* • *D.P.F.Möller Cybersecurity in Digital Transformation. To appear Springer Publ. 2020* • *D.P.F.Möller "Guide to Computing Fundamentals in Intelligent Manufacturing/Industry 4.0 -: Trends, Technologies, Innovations, and Applications", to appear Springer Publ., 2021*

1.17 Circular Economy and Recycling Technologies

Module title:	*Circular Economy and Recycling Technologies*
Level of module, if applicable:	
Abbreviation, if applicable:	
Subheading, if applicable:	
Lectures, if applicable:	*Introduction, General Challenges and Framing Conditions for a Circular Economy and Recycling Systems* *Recycling Technologies for Waste Streams of High Resource Relevance or of Large Generated Amounts*

Semester / Duration of modules:	*3rd semester / 1 semester*
Responsible for module:	*Prof. Dr. Daniel Goldmann*
Lecturer:	*Prof. Dr. Daniel Goldmann*
Language:	*English*
Assigned to curriculum of:	***Introduction, General Challenges and Framing Conditions for a Circular Economy and Recycling Systems:*** *Mandatory elective: Intercultural Leadership and Technology* ***Recycling Technologies for Waste Streams of High Resource Relevance or of Large Generated Amounts:*** *Mandatory elective: Intercultural Leadership and Technology*
Form of teaching:	***Introduction, General Challenges and Framing Conditions for a Circular Economy and Recycling Systems*** *Online lectures + lectures on campus* ***Recycling Technologies for Waste Streams of High Resource Relevance or of Large Generated Amounts*** *Online lectures + lectures on campus*
Workload:	***Introduction, General Challenges and Framing Conditions for a Circular Economy and Recycling Systems*** *82 hours of self-studies + 8 hours of on-campus studies* ***Recycling Technologies for Waste Streams of High Resource Relevance or of Large Generated Amounts*** *82 hours of self-studies + 8 hours of on-campus studies*
Credit points:	*6 ECTS*
Prerequisites according to Examination Regulations:	
Recommended prerequisites:	
Intended study achievements:	*Upon successful completion of the module, students* • *understand the social and economic challenges arising from resource depletion, increasing waste volumes, and chances and framework conditions of the circular economy.* • *know the fundamentals of general legal requirements in the waste industry and of economic and ecological control mechanisms and evaluation tools.* • *comprehend the multi-stage chains of processing and recycling in waste management, recycling product extraction and utilization.* • *are up to date on the current market structures and potentials for recovery of valuable recycling products from waste streams of high resource relevance or of large amounts.* • *are able to construct recovery systems and technologies to extract recycled materials from waste streams in due consideration of technical, economic, ecologic and legal aspects.*

	• *will have acquired mainly technical and methodological competence but also system competence.* • *are able to conceptualize and build networks that bring together all relevant stakeholders to solve complex problems, and to form interdisciplinary teams by using modern communication methods.* • *understand challenges, framework conditions and methods. Thus, they are able to tackle distinct complex challenges within their own surroundings and put their plans into practice by including other stakeholders.*
Contents:	***Introduction, General Challenges and Framing Conditions for a Circular Economy and Recycling Systems*** • *Waste as a source of raw materials but also of pollution, and the development of the circular economy* • *Political development, legal structures in waste management* *Introduction to recycling technology* • *Collection systems and pre-processing* • *General processing, shredding and classification of waste* • *Waste sorting* • *General valorization, valorization of metals* • *Valorization of paper, plastic and glass* *Recycling of production waste* • *Important waste streams (generals)* • *Mining accidents* • *Metallurgical slags and process residues* • *Residues from component and product manufacturing* *Recycling of consumer waste* ***Recycling Technologies for Waste Streams of High Resource Relevance or of Large Generated Amounts*** *Important waste streams and their impact on resources, environment, and their treatment* • *End-of-life vehicle (ELV) recycling chain* • *Recycling of e-waste* • *Recycling of empty batteries* *Recycling of consumer waste* *Important waste streams, their volume and their treatment* • *Treatment and valorization of biodegradable waste* • *Energy content of wastes and valorization* • *Recycling of demolition waste and mineral residues* • *Landfills and landfill demolition*
Academic achievements / examinations / prerequisites for achieving ECTS:	*Theoretical / practical assignment (module examination)*
Type of media:	*Online video recordings, online questions*

Literature:	• *Worell, E. and Reuter, M.A.: Handbook of Recycling, Elsevier 2014*

1.18 Primary and Sustainable Extraction of Resources

Module title:	*Primary and Sustainable Extraction of Resources*
Level of module, if applicable:	
Abbreviation, if applicable:	
Subheading, if applicable:	
Lectures, if applicable:	*Primary Extraction of Resources* *Sustainable Mining*
Semester / Duration of modules:	*1st semester / 1 semester*
Responsible for module:	*Prof. Dr. Oliver Langefeld*
Lecturer:	*Prof. Dr. Oliver Langefeld*
Language:	*English*
Assigned to curriculum of:	***Primary Extraction of Resources:*** *Mandatory elective: Intercultural Leadership and Technology* ***Sustainable Mining:*** *Mandatory elective: Intercultural Leadership and Technology*
Form of teaching:	***Primary Extraction of Resources*** *Online lectures + lectures on campus* ***Sustainable Mining*** *Online lectures + lectures on campus*
Workload:	***Primary Extraction of Resources*** *82 hours of self-studies + 8 hours of on-campus studies* ***Sustainable Mining*** *82 hours of self-studies + 8 hours of on-campus studies*
Credit points:	*6 ECTS*
Prerequisites according to Examination Regulations:	
Recommended prerequisites:	
Intended study achievements:	*After successful completion of the module, students* • *are able to explain and evaluate technical, social and economic challenges related to the extraction of primary raw materials.* • *are able to distinguish and evaluate mining methods and excavation techniques.* • *understand backfilling techniques and the related tasks and know how to evaluate them.* • *can explain underground waste disposal sites and the related tasks.* • *can integrate the complex tasks of mining and discuss*

	sustainable and responsible mining activities. • *are familiar with post-mining tasks and can assess the risks.* • *are able to interpret the challenges of future mining and have solutions at hand.*

Contents:	***Primary Extraction of Resources:***
	• *Introduction to mining*
	• *Extraction processes*
	• *Road engineering*
	• *Backfill and final disposal underground*
	• *Further use of underground space*
	Sustainable Mining:
	• *Concept of blue mining*
	• *Further use of mines as energy converters*
	• *Post-mining*
	  ○ *Planning*
	  ○ *Tasks*
	  ○ *Responsibility*
	• *Challenges of future mining activities*
	• *License for operations*

Academic achievements / examinations / prerequisites for achieving ECTS:	*Theoretical / practical assignment (module examination)*
Type of media:	*Online video recordings, online questions*
Literature:	• *Gertsch, R.E., Bullock, R.L. (1998): Techniques in Underground Mining* • *Hartmann, H.L. (ed.) (1992): SME - Mining Engineering Handbook* • *Junker, M. et al. (2006): Gebirgsbeherrschung von Flözstrecken Reuther, E.-U. (1989): Lehrbuch der Bergbaukunde • Roschlau, H. (2001): Sprengen* • *Hustrulid, W.A., Bullock, R.L. (2001): Underground Mining Methods - Engineering Fundamentals and International Case Studies*

1.19 Master Thesis and Colloquium

Module title:	*Master Thesis and Colloquium*
Level of module, if applicable:	
Abbreviation, if applicable:	
Subheading, if applicable:	
Lectures, if applicable:	
Semester / Duration of modules:	*4th semester / 1 semester*
Responsible for module:	*Prof. Dr. Wolfgang Pfau*
Lecturer:	*Respective supervisor*
Language:	*English*
Assigned to curriculum of:	***Master Thesis and Colloquium:*** *Mandatory: Intercultural Leadership and Technology*
Form of teaching:	*Master thesis and colloquium*
Workload:	***Master thesis:*** *870 hours* ***Colloquium:*** *60 hours*
Credit points:	*30 ECTS*
Prerequisites according to Examination Regulations:	
Recommended prerequisites:	
Intended study achievements:	*Upon successful completion of this module, students are able to* • *classify a specific task in the respective specialist fields* • *investigate the state of research mostly autonomously and bring it together in an individual consistent paper* • *based on the conducted research, complete the task systematically and autonomously by applying scientific methods* • *edit the findings of the work in a well-structured scientific thesis, present it and defend it in a discussion*
Contents:	• *Autonomous completion of the given task* • *Writing a scientific treatise* • *Presentation and thesis defense*
Academic achievements / examinations / prerequisites for achieving ECTS:	*Master thesis and colloquium*
Type of media:	*Depending on the chosen topic*
Literature:	*Topic-specific literature and additional resources, especially according to the student's own research*