Technische Hochschule Ingolstadt

Modulhandbuch

Course Description

Individuelle Wahlpflichtmodule

Elective Modules

Master-Studiengänge */ Master's Programs*

Fakultät Wirtschaftsingenieurwesen

Faculty of Engineering and Management

SS 2026

Stand: 13.02.2026

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1 Angebot Wahlpflichtmodule / Electives for Master Programs

Stand 04.02.2026

Electives for Master Program "Wirtschaftsingenieurwesen"

Angebote aus der Fakultät WI	Dozent*in	SWS	Sprache	Prüfungsform	freie Plätze
Digital Procurement & Data Science	Hecht/Huber	4	deutsch	StA	5
Leadership und soziale Verantwortung	Martens	4, Block	deutsch	SA mit Koll	10
Nachhaltiges Value Management	Hecht/Jattke/Ziegeltrum (LB)	4, Block	deutsch	schrP	5
Engineering Processes in Automotive Industry	Meyer/Neumann (LB)	4	englisch	schrP	5
Strategic Foresight and Trend Analyses	Schwarz	4	englisch	mdlP	5
Technology Design and Evaluation	Schönmann/Schropp	4	englisch	schrP	5
International negotiation training	Hecht/Schneider Y.	4	englisch	mdlP	35
Strategy and Growth in Automotive Sector	Rengarajan (LB)	4, Block	englisch	Proj	35
Corporate Transformation	Kalmbach (LB)	4	englisch	StA	35
Strategic Information Dynamics in Global Operations and Supply Chains	Dr. Bhardwaj (LB)	4, Block	englisch	SA mit Koll	35
Advanced Video Marketing (Hinweis: Anmeldung direkt bei der Dozentin)	Huber, S.	4, Block	deutsch/englisch	Proj	10
Smart Factory in discrete production	Dr. Huber, W. (LB)	4	englisch	mdlP	35
Angebote aus anderen Fakultäten					
Energy Management and Energy Efficency	LB	4	englisch	schrP	2
Environmetal Law, Policies and Institutions	LB	4	englisch	mdlP	2
Integrated Safety and Assistance Systems	Botsch	4	englisch	schrP	5
Strategic Brand Development & Go to Market Management	Weiss	4	englisch	Proj	5
Entrepreneuerial Finance & Growth Management	Jagdhuber/Marques	4, Block	englisch	mdlP	5

Electives for Master Program „Digitaler Einkauf und Nachhaltiges Supply Chain Management"

Angebote aus der Fakultät WI	Dozent*in	SWS	Sprache	Prüfungsform	freie Plätze
Fallstudie Internet of Things	Großmann	4	deutsch	Proj	5
Software Engineering	Bock/Kastner	4	deutsch	SA	5
Internationales Projekt (Kalifornien) Hinweis: Voranmeldung im WS 25/26	Schwandner	4, Block	deutsch/englisch	Proj	10
Engineering Processes in Automotive Industry	Meyer/Neumann (LB)	4	englisch	schrP	5
Business Analytics & Artificial Intelligence	Bock/Ali	4	englisch	schrP	5
Strategic Foresight and Trend Analyses	Schwarz	4	englisch	mdlP	5
Technology Design and Evaluation	Schönmann/Schropp	4	englisch	schrP	5
Strategy and Growth in Automotive Sector	Rengarajan (LB)	4, Block	englisch	Proj	35
Corporate Transformation	Kalmbach (LB)	4	englisch	StA	35
Advanced Video Marketing (Hinweis: Anmeldung direkt bei der Dozentin)	Huber, S.	4, Block	deutsch/englisch	Proj	10
Strategic Information Dynamics in Global Operations and Supply Chains	Dr. Bhardwaj (LB)	4, Block	englisch	SA mit Koll	35
Angebote aus anderen Fakultäten					
Environmetal Law, Policies and Institutions	LB	4	englisch	mdlP	2

Electives for Master Program „Engineering and Management"

Angebote aus der Fakultät WI	Dozent*in	SWS	Sprache	Prüfungsform	freie Plätze
Production and Logistic Networks	Jattke	4	englisch	mdlP	5
Design Culture Theory and Methods	Rothbucher	4	englisch	SA	5
Design Leadership Methods	Rothbucher	4	englisch	StA	5
Strategic Foresight and Trend Analyses	Schwarz	4	englisch	mdlP	5
Technology Design and Evaluation	Schönmann/Schropp	4	englisch	schrP	5
International negotiation training	Hecht/Schneider Y.	4	englisch	mdlP	35
Strategy and Growth in Automotive Sector	Rengarajan (LB)	4, Block	englisch	Proj	35
Corporate Transformation	Kalmbach (LB)	4	englisch	StA	35
Strategic Information Dynamics in Global Operations and Supply Chains	Dr. Bhardwaj (LB)	4, Block	englisch	SA mit Koll	35
Development of a decentralised energy supply concept for rural areas	Funk/Wrobel	4, Block	englisch	Proj	10
Advanced Video Marketing (Hinweis: Anmeldung direkt bei der Dozentin)	Huber, S.	4, Block	deutsch/englisch	Proj	10
Smart Factory in discrete production	Dr. Huber, W. (LB)	4	englisch	mdlP	35
Angebote aus anderen Fakultäten					
Strategic Brand Development & Go to Market Management	Weiss	4	englisch	Proj	5

Electives for Master Program „Automotive Production Engineering"

Angebote aus der Fakultät WI	Dozent*in	SWS	Sprache	Prüfungsform	freie Plätze
Business Analytics & Artificial Intelligence	Bock/Ali	4	englisch	schrP	5
Software Engineering	Bock/Kastner	4	englisch	StA	5
Future Business Modelling	Wrobel	4	englisch	schrP	5
International negotiation training	Hecht/Schneider Y.	4	englisch	mdlP	35
Strategy and Growth in Automotive Sector	Rengarajan (LB)	4, Block	englisch	Proj	35
Corporate Transformation	Kalmbach (LB)	4	englisch	StA	35
Strategic Information Dynamics in Global Operations and Supply Chains	Dr. Bhardwaj (LB)	4, Block	englisch	SA mit Koll	35
Development of a decentralised energy supply concept for rural areas	Funk/Wrobel	4, Block	englisch	Proj	10
Advanced Video Marketing (Hinweis: Anmeldung direkt bei der Dozentin)	Huber, S.	4, Block	deutsch/englisch	Proj	10
Smart Factory in discrete production	Dr. Huber, W. (LB)	4	englisch	mdlP	35
Angebote aus anderen Fakultäten					
Energy Management and Energy Efficency	LB	4	englisch	schrP	2
Data Engineering and Analytics	LB	4	englisch	Proj	2
Hardware and Software Prototyping	Riener/Alvarez	4	englisch	Proj	5
Environmetal Law, Policies and Institutions	LB	4	englisch	mdlP	2
Integrated Safety and Assistance Systems	Botsch	4	englisch	schrP	5
Social Impact, Sustainability and Compliance	Loza Adaui, Cristian Rolando	4	englisch	Proj	5
Global Business and Economics 1	Gallier	4	englisch	schrP	5
Global Business and Economics 2	Rauscher	4	englisch	schrP	5

Electives for Master Program „Global Foresight and Technology Management"

Angebote aus der Fakultät WI					
Leadership und soziale Verantwortung	Martens	4, Block	deutsch	SA mit Koll	10
Engineering Processes in Automotive Industry	Meyer/Neumann (LB)	4	englisch	schrP	5
Design Culture Theory and Methods	Rothbucher	4	englisch	SA	5
Design Leadership Methods	Rothbucher	4	englisch	StA	5
Business Analytics & Artificial Intelligence	Bock/Ali	4	englisch	schrP	5
Software Engineering	Bock/Kastner	4	englisch	StA	5
International negotiation training	Hecht/Schneider Y.	4	englisch	mdlP	35
Strategy and Growth in Automotive Sector	Rengarajan (LB)	4, Block	englisch	Proj	35
Strategic Information Dynamics in Global Operations and Supply Chains	Dr. Bhardwaj (LB)	4, Block	englisch	SA mit Koll	35
Development of a decentralised energy supply concept for rural areas	Funk/Wrobel	4, Block	englisch	Proj	10
Advanced Video Marketing (Hinweis: Anmeldung direkt bei der Dozentin)	Huber, S.	4, Block	deutsch/englisch	Proj	10
Smart Factory in discrete production	Dr. Huber, W. (LB)	4	englisch	mdlP	35
Angebote aus anderen Fakultäten					
Energy Management and Energy Efficency	LB	4	englisch	schrP	2
Data Engineering and Analytics	LB	4	englisch	Proj	2
Environmetal Law, Policies and Institutions	LB	4	englisch	mdlP	2
Social Impact, Sustainability and Compliance	Loza Adaui, Cristian Rolando	4	englisch	Proj	5
Global Business and Economics 1	Gallier	4	englisch	schrP	5
Global Business and Economics 2	Rauscher	4	englisch	schrP	5
Strategic Brand Development & Go to Market Management	Weiss	4	englisch	Proj	5
Entrepreneuerial Finance & Growth Management	Jagdhuber/Marques	4, Block	englisch	mdlP	5
Technology-Commercialization & IP Management	Kleyn	4, Block	englisch	SA mit Koll	5

Electives for Master Program „Design Leadership"

Angebote aus der Fakultät WI	Dozent*in	SWS	Sprache	Prüfungsform	freie Plätze
Business Analytics & Artificial Intelligence	Bock/Ali	4	englisch	schrP	5
Entrepreneurship & Innovation Management	Albrecht	4	englisch	Proj	5
Strategic Foresight and Trend Analyses	Schwarz	4	englisch	mdlP	5
Future Business Modelling	Wrobel	4	englisch	schrP	5
International negotiation training	Hecht/Schneider Y.	4	englisch	mdlP	35
Strategy and Growth in Automotive Sector	Rengarajan (LB)	4, Block	englisch	Proj	35
Corporate Transformation	Kalmbach (LB)	4	englisch	StA	35
Strategic Information Dynamics in Global Operations and Supply Chains	Dr. Bhardwaj (LB)	4, Block	englisch	SA mit Koll	35
Advanced Video Marketing (Hinweis: Anmeldung direkt bei der Dozentin)	Huber, S.	4, Block	deutsch/englisch	Proj	10
Smart Factory in discrete production	Dr. Huber, W. (LB)	4	englisch	mdlP	35
Angebote aus anderen Fakultäten					
Strategic Brand Development & Go to Market Management	Weiss	4	englisch	Proj	5
Technology-Commercialization & IP Management	Kleyn	4, Block	englisch	SA mit Koll	5

2 Modulbeschreibungen / Course Descriptions

Fallstudie Internet of Things

Modulkürzel:	FallstudieIntThings_M-WI	**Art des Moduls:**	Wahlpflichtfach
Zuordnung zum Curriculum:	**Studiengang, -abkürzung, SPO-Nr.**		
	M-DENS		

Modulverantwortliche(r):	Großmann, Daniel	
Dozent(in):	Großmann, Daniel	
Sprache:	Deutsch	
Leistungspunkte / SWS:	5 ECTS / 4 SWS	
Arbeitsaufwand:	Kontaktstunden:	47 h
	Selbststudium:	78 h
	Gesamtaufwand:	125 h
Lehrveranstaltungen des Moduls:	Fallstudie Internet of Things	
Lehrformen des Moduls:	SU/Ü-Seminaristischer Unterricht/Übung	

Studien- / Prüfungsleistungen:

LN - Projektbericht und mündlicher Präsentation 15 min.

Weitere Erläuterungen:

Keine

Empfohlene Voraussetzungen:

Keine

Angestrebte Lernergebnisse:

Die Studierenden:

- können die besonderen Eigenschaften des Internet of Things (IoT) und von IoT-Systemen erläutern.
- können die gesellschaftliche und wirtschaftliche Bedeutung des IoT einzuschätzen.
- kennen die wichtigsten Standards für die Kommunikation zwischen IoT-Geräten.
- kennen Techniken zur Speicherung und Verarbeitung von Daten in IoT-Systemen.
- kennen Architekturen und Technologien zur Strukturierung von IoT-Systemen und können diese auf eine eigene Fallstudie anwenden.
- kennen die Herausforderungen des Datenschutzes und der Datensicherheit in IoT-Systemen.

Inhalt:

- Grundlagen des Internet of Things
- Anwendungsbereiche
- Gesellschaftliche und wirtschaftliche Bedeutung
- Kommunikationsstandards und -technologien
- Datenspeicherung und -verarbeitung
- Design und Entwicklung

Literatur:

Wird zu Beginn der Vorlesung bekannt gegeben

Weitere Anmerkungen/Sonstiges:
Keine Anmerkungen.

Corporate Transformation

Modulkürzel:	WMod_CorpTrans_M-EGM	**Art des Moduls:**	Wahlpflichtfach
Zuordnung zum Curriculum:	**Studiengang, -abkürzung, SPO-Nr.**		
	M-WI, M-DENS, M-EGM, M-APE, M-DL		

Modulverantwortliche(r):	Kalmbach, Ralf	
Dozent(in):	Kalmbach, Ralf	
Sprache:	English	
Leistungspunkte / SWS:	5 ECTS / 4 SWS	
Arbeitsaufwand:	Kontaktstunden:	47 h
	Selbststudium:	78 h
	Gesamtaufwand:	125 h
Lehrveranstaltungen des Moduls:	Corporate Transformation	
Lehrformen des Moduls:	SU/Ü-Lecture with practical exercises	

Studien- / Prüfungsleistungen:

Student research project with presentation

Weitere Erläuterungen:

None

Empfohlene Voraussetzungen:

None

Angestrebte Lernergebnisse:

This module will provide a comprehensive understanding of the key elements and success factors as well as the design and management of a corporate transformation program.

After attending the course, the students:

- will be able to understand the need and magnitude of change, the approach and design as well as the management of a corporate transformation program.
- will have knowledge about success factors and roadblocks in such programs and develop understanding of how to overcome the classical pitfalls.
- will touch reality by walking through case studies of successful and failed transformations.

Inhalt:

- Purpose: Refreshing the organization´s reason for being
- Full Potential Plan: Diagnosis of current performance and strategic position to identify the most important disruptive factors and important value levers to win today and in the future
- Leadership: Building a high performing, aligned, committed leadership team, and assign top talent to the critical roles that will drive the most value
- Program Design: Setting up an operating model that allows to rum and change the business at the same time
- Results Delivery: Rapidly delivering value by innovating, testing, and scaling solutions
- Orchestration: Building capabilities, boosting accountability, and managing change to realize rapid sustainable results

- Communication and Culture: Communication and behaviour is key to “onboard” all relevant stakeholder and capture / energize the key people to support the transformation and creating a winning team / culture

Literatur:

- DALPIAZ, E., DI STEFANO, G., 2018. A universe of stories: Mobilizing narrative practices during transformative change. In: *Strategic Management*. (39 (3)), S.664-696.
- BLENKO, Marcia W., Michael C. MANKINS und Paul ROGERS, 2010. *Decide & Deliver: 5 Steps to Breakthrough Performance in your Organization*. Harvard: Harvard Business Press.
- MANKINS, Michael und Patrick LITRE, 2024. *Middle Managers Should Drive Your Business Transformation*.
- HITT, M. A., HAYNES, K. T., SERPA, R., 2010. Strategic leadership for the 21st Century. In: *Business Horizons*. (53(5)), S.437–444.
- KARTAWIJAYA, T., 2022. HBR Case Study: Organizational Change. In: *Harvard Business Review*.
- KOTTER, J., 2012. Leading Change. In: *Harvard Business Review Press*.
- CHIDI, Ameke, 2021. *Purpose-Driven Transformation: The Corporate Leader´s Guide to Value Creation and Growth*.
- LOPARO, K., 2014. *The Executive Guide to Corporate Restructuring*.
- FURR, N., 2018. Leading Transformation: How to Change Your Company´s Future. In: *Harvard Business Review Press*.

Weitere Anmerkungen/Sonstiges:

No remarks.

Digital Procurement & Data Science			
Modulkürzel:	DiPro&DaSc_M-DES	**Art des Moduls:**	Wahlpflichtfach
Zuordnung zum Curriculum:	**Studiengang, -abkürzung, SPO-Nr.**		
	M-WI,		

Modulverantwortliche(r):	Hecht, Dirk	
Dozent(in):	Hecht, Dirk; Huber, Sina	
Sprache:	Deutsch	
Leistungspunkte / SWS:	5 ECTS / 4 SWS	
Arbeitsaufwand:	Kontaktstunden:	47 h
	Selbststudium:	78 h
	Gesamtaufwand:	125 h
Lehrveranstaltungen des Moduls:	Digital Procurement & Data Science	
Lehrformen des Moduls:	SU/Ü-Seminaristischer Unterricht/Übung	

Studien- / Prüfungsleistungen:

StA - Studienarbeit, schriftliche Ausarbeitung 8 - 15 Seiten, Präsentation 15 - 20 Seiten

Weitere Erläuterungen:

Keine

Empfohlene Voraussetzungen:

Keine

Angestrebte Lernergebnisse:

Die Studierenden sind in der Lage:

- verschiedene IT-Tools entlang des Produktentstehungsprozesses (PEP) komplexer Produkte zielgerichtet anzuwenden.
- IT-Methoden zur Optimierung von Prozessen in der modernen Beschaffung einzusetzen.
- globale Beschaffungsdaten mit Hilfe moderner Projekt-Datenmanagementsoftware (z. B. PDM) zu analysieren und relevante Erkenntnisse abzuleiten.
- spezialisierte Softwarelösungen für Vergabevorbereitung, Änderungsmanagement und Bestellabwicklung anzuwenden sowie entsprechende Beschaffungsprozesse zu modellieren
- eine grundlegende Blockchain-Anwendung zur Unterstützung globaler Supply Chain-Prozesse zu konzipieren.
- mit Python ein einfaches neuronales Netz zur Anwendung im modernen Beschaffungsmanagement zu entwickeln.

Inhalt:

- Software entlang des PEP aus Beschaffungssicht
- Zugrundeliegende Theorien und praktische Anwendung der vorgestellten Software
- Python Programmierung
- Neuronale Netze
- Blockchain und Digital Twin

- IT Methoden, moderne Projekt-Datenmanagementsoftware (PDM)
- Digitale Beschaffungsprozesse
- Grundzüge des Data Science

Literatur:

- APPELFELLER, Wieland, FELDMANN, Carsten, 2023. *Die digitale Transformation des Unternehmens: Systematischer Leitfaden mit zehn Elementen zur Strukturierung und Reifegradmessung* [online]. Berlin, Heidelberg: Springer Berlin Heidelberg PDF E-Book. ISBN 978-3-662-65413-2. Verfügbar unter: https://doi.org/10.1007/978-3-662-65413-2.
- NIEBLER, Paul, LINDNER, Dominic, 2022. *Datenbasiert entscheiden: Data Analytics in der Unternehmenspraxis* [online]. Wiesbaden: Springer Fachmedien Wiesbaden PDF e-Book. ISBN 978-3-658-39460-8. Verfügbar unter: https://doi.org/10.1007/978-3-658-39460-8.
- SCHUPP, Florian, WÖHNER, Heiko, 2018. *Digitalisierung im Einkauf* [online]. Wiesbaden: Springer Fachmedien Wiesbaden PDF E-Book. ISBN 978-3-658-16909-1. Verfügbar unter: https://doi.org/10.1007/978-3-658-16909-1.
- HECHT, Dirk, 2022. *Modernes Beschaffungsmanagement in Lehre und Praxis*. Stuttgart: Verlag W. Kohlhammer. ISBN 978-3-17-039953-2, 3-17-039953-5

Weitere Anmerkungen/Sonstiges:

Keine Anmerkungen.

Energy Management and Energy Efficiency			
Modulkürzel:	WMod_EnManaEnEff_M-RES	**Art des Moduls:**	Wahlpflichtfach
Zuordnung zum Curriculum:	**Studiengang, -abkürzung, SPO-Nr.**		
	M-WI, M-APE, M-GFTM,		

Modulverantwortliche(r):	Khalili, Khadijeh	
Dozent(in):	Khalili, Khadijeh	
Sprache:	English	
Leistungspunkte / SWS:	5 ECTS / 4 SWS	
Arbeitsaufwand:	Kontaktstunden:	47 h
	Selbststudium:	78 h
	Gesamtaufwand:	125 h
Lehrveranstaltungen des Moduls:	Energy Management and Energy Efficiency	
Lehrformen des Moduls:	SU/Ü-Lecture with practical exercises	

Studien- / Prüfungsleistungen:

LN - written exam, 90 minutes

Further information:

None

Empfohlene Voraussetzungen:

None

Angestrebte Lernergebnisse:

The students

- understand the design rules of a photovoltaic system and will be able to layout specific systems.
- are familiar with supply versus demand simulations of photovoltaic system in industrial environments and understand methods to increase self-consumption of produced energy.
- understand the different contributions of the electricity bill and know methods to reduce costs.
- can analyse and understand electric load profiles and extract exposed loads.
- understand energy management systems and know how to manage exposed loads.
- are familiar with the cross-sectional technologies in industrial companies, can identify potential of savings and take measures to reduce energy consumption.

Inhalt:

- Photovoltaic: design rules for solid photovoltaic system layout (connection module to inverter). Overall planning of photovoltaic systems. Simulation of provided energy.
- Electric load profile: analysing electric load profiles and identification of exposed loads.
- Supply versus demand simulation of photovoltaic systems in industrial environments. Methods of supply and demand displacements.
- Contributions to energy costs of industrial companies and methods to reduce the cost level.
- Energy management systems in industrial companies (DIN EN ISO 50001 and DIN EN 16247).
- Methods to identify, measure and manage energy consumption of exposed loads.

- Methods to analyse general cross-sectional technologies (compressed air, ventilation, cooling, process heating, lighting, heat recovery).
- Methods to identify and reduce the energy consumption of cross-sectional technologies (electricity and other energy sources).

Literatur:

- BILGE, Ali Nezihi, 2015. *Energy systems and management* [online]. Cham: Springer International Publishing PDF e-Book. ISBN 978-3-319-16024-5, 978-3-319-16023-8. Verfügbar unter: https://doi.org/10.1007/978-3-319-16024-5.
- THORPE, David, 2014. *Energy management in industry: the Earthscan Expert Guide*. London: Routledge, Taylor & Francis Group. ISBN 978-1-134-64941-9, 1-134-64941-X

Weitere Anmerkungen/Sonstiges:

Course selection varies depending on availability and demand. The actual selection for each semester can be found in the timetable. Courses may be canceled at the beginning of the semester. Participation is limited in some cases.

Engineering Processes in Automotive Industry			
Modulkürzel:	EngineeProcAuto_M-APE	**Art des Moduls:**	Wahlpflichtfach
Zuordnung zum Curriculum:	**Studiengang, -abkürzung, SPO-Nr.**		
	M-WI, M-DENS, M-GFTM		

Modulverantwortliche(r):	Meyer, Roland	
Dozent(in):	Neumann, Alexander; Triveni, Prashant	
Sprache:	English	
Leistungspunkte / SWS:	5 ECTS / 4 SWS	
Arbeitsaufwand:	Kontaktstunden:	47 h
	Selbststudium:	79 h
	Gesamtaufwand:	126 h
Lehrveranstaltungen des Moduls:	Engineering Processes in Automotive Industry	
Lehrformen des Moduls:	SU/Ü-Lecture with integrated exercises	

Studien- / Prüfungsleistungen:

schrP90 - written exam, 90 minutes

Further information:

None

Empfohlene Voraussetzungen:

None

Angestrebte Lernergebnisse:

The students are able to

- know the strong networked and parallel processes in the product and process development of automobiles.
- recognise, assess and include in the work interactions between production and product.
- know the significance and working methods of Simultaneous Engineering (SE) including the involvement of suppliers in product design and product and process quality to meet the requirements of production.
- handle tools of project and process management and know the working methods and processes (e.g. for networking, decision-making, escalation, etc.) in large automotive and supplier companies.
- know the significance of prototype, pilot production and release processes and here applied tools.
- know about the significance of lean development methods and cost management.

Inhalt:

- Product and process development in the automotive industry
- Automotive project- and process-management and proper methods
- Requirements and quality management tools
- Pre-series process
- Cost management
- Lean development
- Aspice

Literatur:

- STAMATIS, Diomidis H., 2001. *Advanced quality planning: a commonsense guide to AQP and APQP*. New York, NY: Productivity Press. ISBN 1-56327-258-X
- COOPER, Robert G., 2017. *Winning at new products: creating value through innovation*. New York, NY: Basic Books. ISBN 0-465-09332-9, 978-0-465-09332-8
- WOMACK, James P., Daniel T. JONES und Daniel ROOS, 2007. *The machine that changed the world: [how lean production revolutionized the global car wars]*. London [u.a.]: Simon & Schuster. ISBN 978-1-84737-055-6, 1-8473-7055-1
- WOMACK, James P. und Daniel T. JONES, 2003. *Lean thinking: banish waste and create wealth in your corporation*. London [u.a.]: Simon & Schuster. ISBN 978-0-7432-3164-0
- ROTHER, Mike und John SHOOK, 2009. *Learning to see: value-stream mapping to create value and eliminate muda*. Version 1. Auflage. Cambridge, Mass.: Lean Enterprise Inst.. ISBN 978-0-9667843-0-5, 0-9667843-0-8
- MORGAN, James M. und Jeffrey K. LIKER, 2006. *The Toyota product development system: integrating people, process, and technology*. New York, NY: Productivity Press. ISBN 1-56327-282-2, 978-1-563-27282-0
- REINERTSEN, Donald G., 2009. *The principles of product development flow: second generation lean product development*. Redondo Beach, Calif: Celeritas. ISBN 978-1-935401-00-1, 1-935401-00-9
- CHANG, Kuang-Hua, 2013. *Product manufacturing and cost estimating using CAD/CAE*. Amsterdam [u.a.]: Elsevier. ISBN 978-0-12-401745-0
- MITAL, Anil, 2014. *Product development: a structured approach to consumer product development, design, and manufacture*. Amsterdam [u.a.]: Elsevier. ISBN 978-0-12-799945-6

Weitere Anmerkungen/Sonstiges:

Bonus system:

In the course, tasks can be set that lead to bonus points for the examination performance for each qualitatively completed task. The maximum crediting of bonus points takes place according to the APO.

Entrepreneurial Finance & Growth Management			
Modulkürzel:	ECV_EF&GM	**Art des Moduls:**	Wahlpflichtfach
Zuordnung zum Curriculum:	**Studiengang, -abkürzung, SPO-Nr.**		
	M-WI, M-GFTM		

Modulverantwortliche(r):	Marques, Thiago	
Dozent(in):	Jagdhuber, Andreas; Marques, Thiago	
Sprache:	English	
Leistungspunkte / SWS:	5 ECTS / 4 SWS	
Arbeitsaufwand:	Kontaktstunden:	47 h
	Selbststudium:	79 h
	Gesamtaufwand:	126 h
Lehrveranstaltungen des Moduls:	Entrepreneurial Finance & Growth Management	
Lehrformen des Moduls:	SU/Ü-Lecture with practical exercises	

Studien- / Prüfungsleistungen:

LN - oral exam, 15 minutes

Further information:

None

Empfohlene Voraussetzungen:

None

Angestrebte Lernergebnisse:

On completing the module part Entrepreneurial Finance, the students will have achieved the following learning outcomes based on scientific methods:

- Students have in-depth theoretical and practical knowledge of entrepreneurial finance particularly start-up financing. Students understand the entrepreneurial process and the sources of financing which are relevant in different development stages of emerging ventures.
- Students know conventional and innovative financing instruments and can assess their advantages and disadvantages for new ventures and start-ups. They are familiar with start-up financing through support programs, networks, business angels, various forms of venture capital and crowdfunding, as well as loans and can classify and practically apply them. Students have a comprehensive understanding of the chances and risks resulting from different means of capital and fund raising.
- In addition, students can understand the business model of private equity and venture capital firms including their special refinancing and investment process. Finally, students have the skill to apply and analyse valuation methods which are suitable for entrepreneurial companies.
- Students can apply different entrepreneurial financing instruments. They can prepare, resolve, and critically appraise alternatives for decisions regarding the sources and use of financing instruments considering risk and return aspects for new ventures. They can evaluate their impact and can translate their proposed solutions into business practice.
- Students develop, analyse and critically appraise alternative courses of action through group work, case studies and discussion sessions. They benefit from debating and reasoning skills, can work in a team and can present and defend results in front of an audience.

- Students can contribute theoretically sound and practicable ideas for entrepreneurial financing problems and decision-making process, and to critically discuss them. They are aware of the financial and capital consequences of their decisions and are able to incorporate them into their own value system.

On completing the module Growth Management, the students will have achieved the following learning outcomes based on scientific methods:

- Students have a strong methodological and theoretical knowledge regarding the process of scaling exponentially the growth of a startup business, understanding the different applications regarding early stage, traction or mass market moment for new ventures.
- Students apply the Objective and Key Results methodology under a Business Plan or Strategic Planning context, using the method to understand the venture stage and to project the growth through a structured and pragmatic approach. In addition, the students use the overall business perspective to adapt the strategy to a tactical point of view, deriving KPIs for teams and squads, aiming for a result-based management system.
- Students apply modern marketing and sales techniques to support the growth of the business, integrating the strategic perspective with a client base scale process. Outbound and Inbound strategies can be applied, using the main acquisition channels for B2C and B2B markets. Digital x Traditional marketing and sales perspective can be used, creating an omnichannel approach for business growth.
- Finally, students understand different approaches for different market scenarios, using budgeting for capex and opex and measuring financial results for pivoting to new strategies.

All objectives will be fulfilled through a project-based lecture, using group work, case studies and field practice to create a solid understanding of the growth management of an innovative and/ or emerging venture. All the theory and tools presented will be applied in real cases, reinforcing the constructed knowledge during the classes.

Inhalt:

Entrepreneurial Finance:

- Sources and forms of financing and evaluation of start-ups from seed financing to exit, e.g. through buy-back, IPO and sale of the company or transition.
- Knowledge of the business model of private equity firms and refinancing: fundraising, investor relations and the return of funds.
- Knowledge of the investment process: sourcing, screening, contracting, venture management and exiting.
- Special forms of entrepreneurial activity (especially digital entrepreneurship, corporate and social entrepreneurship and family entrepreneurship)
- Digital startup financing and valuation, Crowdfunding, -investing as financing instruments

Growth Management:

- Startup and innovation performance management
- Objective and Key Results methodology and Key Performance Indicators approach
- Marketing techniques applied for growth and hypergrowth scenarios
- Inbound and Outbound Sales processes, pipeline management and tactical and strategic sales performance
- Marketing and Sales integration, Omnichannel perspective and technological tendencies for growth management
- Customer Success management
- Budgeting, opex and capex, scenarios, financial performance indicators and pivoting strategies

Literatur:

- STAROSSOM, Heike. *Corporate Finance Teil 2. Finanzierung in den Lebensphasen einer Unternehmung* [online]. Verfügbar unter: https://doi.org/10.1007/978-3-8349-4101-5
- NIVEN, Paul R. und Ben LAMORTE, 2016. *Objectives and key results: driving focus, alignment, and engagement with OKRs*. Hoboken, New Jersey: Wiley. ISBN 978-1-119-25558-1, 978-1-119-25566-6

- ROSS, Aaron und Marylou TYLER, 2020. *Predictable revenue: turn your business into a sales machine with the $ 100 million best practices of Salesforce.com*. West Hollywood, CA: Pebblestorm. ISBN 978-0-9843802-4-4
- STAROSSOM, Heike. Corporate Finance Teil 2. Finanzierung in den Lebensphasen einer Unternehmung [online]. Verfügbar unter: https://doi.org/10.1007/978-3-8349-4101-5
- LYNN, Theo und andere, 2019. *Disrupting finance: Fintech and strategy in the 21st century*. Cham: Palgrave Macmillan. ISBN 978-3-030-02329-4, 3-030-02329-X
- WILSON, Jay D., 2017. *Creating Strategic Value Through Financial Technology*. Somerset: John Wiley & Sons, Incorporated. ISBN 978-1-119-24387-8
- VOLKMANN, Christine K., Kim Oliver TOKARSKI und Marc GRÜNHAGEN, 2010. *Entrepreneurship in a European perspective: concepts for the creation and growth of new ventures*. Wiesbaden: Gabler. ISBN 978-3-8349-2067-6
- TIMMONS, Jeffry A. und Stephen SPINELLI, 2016. *New venture creation: entrepreneurship for the 21st century*. 10. Auflage. New York: McGraw-Hill. ISBN 978-0-07-786248-0
- GOMPERS, Paul A. und William A. SAHLMAN, 2002. *Entrepreneurial finance: a case book*. New York: Wiley. ISBN 0-471-45283-1
- SMITH, Richard L. und Janet Kiholm SMITH, 2004. *Entrepreneurial finance*. New York, NY: Wiley. ISBN 0-471-45221-1, 0-471-23072-3
- AMIS, David und Howard H. STEVENSON, 2001. *Winning angels: the seven fundamentals of early-stage investing; [sourcing, evaluating, valuing, structuring, negotiating, supporting, harvesting; featuring interviews with more than 50 well-known angels including the angels behind]*. London; Munich [u.a.]: Pearson Education. ISBN 0-273-64916-7
- ELLIS, Sean und Morgan BROWN, 2017. *Hacking growth: how today's fastest-growing companies drive breakout success*. New York: Currency. ISBN 978-0-451-49721-5
- KINGSNORTH, Simon, 2019. *Digital marketing strategy: an integrated approach to online marketing*. London ; New York ; New Delhi: Kogan Page. ISBN 978-0-7494-8422-4, 978-0-7494-9808-5
- KOTLER, Philip, Hermawan KARTAJAYA und Iwan SETIAWAN, 2021. *Marketing 5.0: technology for humanity*. Hoboken, New Jersey: Wiley. ISBN 978-1-119-66851-0
- CROLL, Alistair und Benjamin YOSKOVITZ, 2013. *Lean analytics: use data to build a better startup faster*. Beijing [u.a.]: O'Reilly. ISBN 978-1-449-33567-0, 1-449-33567-5
- OSTERWALDER, Alexander und Yves PIGNEUR, 2010. *Business model generation: a handbook for visionaries, game changers, and challengers*. Hoboken, NJ: Wiley. ISBN 978-0-470-87641-1, 0-470-87641-7

Weitere Anmerkungen/Sonstiges:

The course is held on-site. However, under special circumstances, it may also take place virtually.

Environmental Law, Policies and Institutions

Modulkürzel:	SMT_Environmental_Law_Policies_FW	**Art des Moduls:**	Wahlpflichtfach
Zuordnung zum Curriculum:	**Studiengang, -abkürzung, SPO-Nr.**		
	M-WI, M-DENS, M-APE, M-GFTM		

Modulverantwortliche(r):	NN	
Dozent(in):	NN	
Sprache:	English	
Leistungspunkte / SWS:	5 ECTS / 4 SWS	
Arbeitsaufwand:	Kontaktstunden:	47 h
	Selbststudium:	79 h
	Gesamtaufwand:	126 h
Lehrveranstaltungen des Moduls:	Environmental Law, Policies and Institutions	
Lehrformen des Moduls:	SU/Ü-Lecture with integrated exercises	

Studien- / Prüfungsleistungen:

LN - oral exam, 15 minutes

Further information:

There will be an oral exam of 15 minutes offered in the exam period.

Empfohlene Voraussetzungen:

None

Angestrebte Lernergebnisse:

By the end of this course, students will be able to

- critically analyse national, European, and international environmental laws and policies, and interpret their implications for real-world environmental governance and decision-making contexts.
- apply environmental legal rules, policy instruments, and regulatory mechanisms to concrete case studies involving environmental protection, climate change, biodiversity, or resource management.
- assess the roles, mandates, and interactions of key environmental institutions (e.g. public authorities, courts, international organisations, NGOs, private actors) in policy design, implementation, and enforcement.
- integrate legal analysis with policy objectives and relevant environmental science knowledge to develop coherent, interdisciplinary solutions to complex environmental challenges.
- formulate legally sound and policy-relevant recommendations for organisations, public authorities, or stakeholders, considering feasibility, compliance, sustainability, and governance constraints.
- communicate complex environmental law and policy issues clearly and persuasively in written and oral formats, demonstrating the ability to argue positions grounded in legal reasoning and policy analysis.

Inhalt:

- Introduction to Environmental Governance
- International Environmental Law
- European Union Environmental Policy

- Framework laws and sectoral laws (air, water, waste) in national legislation
- Environmental Institutions and Governance Structures
- Multi-level governance
- Environmental Impact Assessment (EIA) and Strategic Environmental Assessment (SEA)
- Climate Change Policy and Law
- Biodiversity and Conservation Law
- Pollution Control and Waste Management Regulations
- Environmental Justice and Human Rights
- Compliance, Enforcement, and Litigation
- Digitalization and Environmental Monitoring.

Literatur:

- BREARS, Robert C., LINDLEY, Jade, 2025. *The Palgrave Handbook of Environmental Policy and Law* [online]. Cham: Springer Nature Switzerland PDF e-Book. ISBN 978-3-031-55387-5.

Weitere Anmerkungen/Sonstiges:

No remarks.

Integrated Safety and Assistance Systems

Modulkürzel:	IAE_ISAS	**Art des Moduls:**	Wahlpflichtfach
Zuordnung zum Curriculum:	**Studiengang, -abkürzung, SPO-Nr.**		
	M-WI, M-APE		

Modulverantwortliche(r):	Botsch, Michael	
Dozent(in):	Botsch, Michael; Dirndorfer, Tobias	
Sprache:	English	
Leistungspunkte / SWS:	5 ECTS / 4 SWS	
Arbeitsaufwand:	Kontaktstunden:	47 h
	Selbststudium:	78 h
	Gesamtaufwand:	125 h
Lehrveranstaltungen des Moduls:	Integrated Safety and Assistance Systems	
Lehrformen des Moduls:	SU/Ü-Lecture with integrated exercises	

Studien- / Prüfungsleistungen:

schrP90 - written exam, 90 minutes

Further information:

None

Empfohlene Voraussetzungen:

None

Angestrebte Lernergebnisse:

After successfully completing the master's thesis, students are able to

- to explain basic vehicle components that are required for driver assistance systems and for vehicle integrated safety functions.
- to analyse and evaluate state of the art driver assistance systems.
- to describe testing procedures that are used for vehicle active safety functions.
- to explain mathematically the concepts for motion planning that are used in algorithms for driver assistance systems and integrated safety functions.
- to implement basic trajectory planning algorithms in Matlab.

Inhalt:

- Introduction to IS & DAS
- Examples of driver assistance and integrated vehicle safety systems: parking systems, adaptive cruise control, autonomous emergency braking
- Position and orientation: pose, representing pose in 2-D and in 3-D
- Time and motion generation of trajectories, rate of change and inverse problem
- Vehicle motion models: decoupled X- and Y-dynamics, constant velocity model, constant steering angle and velocity model, constant turn rate and acceleration model, one-track model, two-track model
- Navigation and localization

Literatur:
• KELLY, Alonzo, 2013. *Mobile robotics: mathematics, models, and methods*. New York, NY: Cambrige Univ. Press. ISBN 978-1-107-03115-9 • HEISSING, Bernd, 2011. *Chassis handbook: fundamentals, driving dynamics, components, mechatronics, perspectives* [online]. Wiesbaden: Vieweg+Teubner PDF e-Book. ISBN 978-3-8348-9789-3. Verfügbar unter: https://doi.org/10.1007/978-3-8348-9789-3. • WINNER, Hermann, HAKULI, Stephan, LOTZ, Felix, SINGER, Christina, 2019-. *Handbook of Driver Assistance Systems: Basic Information, Components and Systems for Active Safety and Comfort* [online]. Cham: Springer International Publishing PDF e-Book. ISBN 978-3-319-09840-1. Verfügbar unter: https://doi.org/10.1007/978-3-319-09840-1. • BOTSCH, Michael, UTSCHICK, Wolfgang, 2020. *Fahrzeugsicherheit und automatisiertes Fahren: Methoden der Signalverarbeitung und des maschinellen Lernens* [online]. PDF e-Book. ISBN 978-3-446-46804-7.
Weitere Anmerkungen/Sonstiges:
No remarks.

International Negotiation Training

Modulkürzel:	WMod_InternNegoTrai_M-APE	**Art des Moduls:**	Wahlpflichtfach
Zuordnung zum Curriculum:	**Studiengang, -abkürzung, SPO-Nr.**		
	M-WI, M-EGM,M-APE, M-GFTM, M-DL		

Modulverantwortliche(r):	Schneider, Yvonne	
Dozent(in):	Hecht, Dirk; Schneider, Yvonne	
Sprache:	English	
Leistungspunkte / SWS:	5 ECTS / 4 SWS	
Arbeitsaufwand:	Kontaktstunden:	47 h
	Selbststudium:	78 h
	Gesamtaufwand:	125 h
Lehrveranstaltungen des Moduls:	International negotiation training	
Lehrformen des Moduls:	SU/Ü-Lecture with integrated exercises	

Studien- / Prüfungsleistungen:

LN - oral exam, 15 minutes

Further information:

None

Empfohlene Voraussetzungen:

None

Angestrebte Lernergebnisse:

Students will

- understand the sensitivities of different cultures regarding the importance of negotiations in the purchasing environment.
- learn about common scientific approaches to successful negotiation management (Harvard, Schranner).
- learn different methods of negotiation techniques.
- practice various negotiation situations in challenging environments (technology dependency, market monopolist, oligopolies, corporations).
- can implement learned theories in negotiation strategies and deepen them in practical exercises.

Inhalt:

Structured into the topics culture - methods - technology

- Methods and theories of negotiation (e.g. Harvard method)
- International negotiation cultures
- Negotiation strategies/techniques with monopolists
- Communication techniques, moderation methods
- Crisis management, mediation
- Technical aspects/support for rational negotiation management (e.g. video, on-site negotiation)
- Practical exercises (sales talks, etc.)

Literatur:
• DE BONO, Edward, 2009. *Think Before It's Too Late*. • KARSAKLIAN, Eliane, 2014. *The Intelligent International Negotiator*. • FISHER, Roger und William URY, 2007. *Getting to yes: negotiating an agreement without giving in*. London [u.a.]: Random House. ISBN 1-8441-3146-7, 0-09-924842-5 • SCHRANNER, Matthias, 2019. *Teure Fehler: die 7 größten Fehler in schwierigen Verhandlungen*. Berlin: Econ. ISBN 978-3-430-20075-2 HEUSSEN, Benno, Gerhard PISCHEL und Jan CURSCHMANN, 2021. *Handbuch Vertragsverhandlung und Vertragsmanagement: Planung, Verhandlung, Design und Durchführung von Verträgen*. Köln: ottoschmidt. ISBN 978-3-504-06307-8, 3-504-06307-6 • RICHTER, Thorsten S., 2013. *Vertragsrecht: die Grundlagen des Wirtschaftsrechts*. München: Verlag Franz Vahlen. ISBN 978-3-8006-4673-9, 978-3-8006-4674-6 • ITZHAK, Gilboa, 2011. *Making Better Decisions*.
Weitere Anmerkungen/Sonstiges:
No remarks.

Leadership & Soziale Verantwortung

Modulkürzel:	LeaShip&SoVerant_M-DES	**Art des Moduls:**	Wahlpflichtfach
Zuordnung zum Curriculum:	**Studiengang, -abkürzung, SPO-Nr.**		
	M-WI, M-GFTM		

Modulverantwortliche(r):	Martens, Bernd	
Dozent(in):	Martens, Bernd	
Sprache:	Deutsch	
Leistungspunkte / SWS:	5 ECTS / 4 SWS	
Arbeitsaufwand:	Kontaktstunden:	47 h
	Selbststudium:	78 h
	Gesamtaufwand:	125 h
Lehrveranstaltungen des Moduls:	Leadership & Soziale Verantwortung	
Lehrformen des Moduls:	SU/Ü-Seminaristischer Unterricht/Übung	

Studien- / Prüfungsleistungen:

SA+Koll. - schriftliche Ausarbeitung 8-15 Seiten; Präsentation 15-20 Folien, mündliche Prüfung 15 Min.

Weitere Erläuterungen:

Keine

Empfohlene Voraussetzungen:

Keine

Angestrebte Lernergebnisse:

Die Studierenden

- verstehen und vertiefen das Kompetenzspektrum zur Bewältigung von Leadership-Aufgaben.
- besitzen grundlegende führungsbezogene und unternehmerische Kompetenzen, um in ihrer aktuellen bzw. zukünftigen Führungsposition professionell agieren zu können.
- fokussieren auf ein zielgerichtetes, wertorientiertes und reflektierendes Führungsverhalten.
- verstehen die soziale Verantwortung eines Unternehmens und insbesondere der Einkaufsorganisation im Sinne des Corporate Social Responsibility (CSR).
- lernen relevante Orientierungsrahmen zu branchenübergreifenden Normen kennen und sind in der Lage, Standards und Leitlinien von CSR zielgerichtet einzusetzen.

Inhalt:

- Konzept des Leaderships incl. „Personal Leadership" „Lateral Leadership" und „Task-Oriented Leadership"
- Theorien und Hintergründe zum Thema „Mitarbeiterzentrierte Leadership“
- Leadership im Einkaufskontext
- Leistungsorientierung, Messbarkeit und Work Life Balance
- Talentmanagement im Einkauf und Karriereentwicklung
- Wichtige Führungsinstrumente im täglichen Umgang mit Mitarbeitern
- Das CSR-Verständnis der Europäischen Kommission

- Verantwortung von Unternehmen für ihre Auswirkungen auf die Gesellschaft
- CSR in der Transport- und Logistikbranche Im Rahmen der globalen Herausforderungen
- Lieferkettengesetz, Umsetzung und die Auswirkungen für Großkonzerne und KMU

Literatur:

- BAUS, Lars, 2015. *Selbstmanagement: Die Arbeit ist ein ewiger Fluss: Gelassener arbeiten und besser leben* [online]. Wiesbaden: Springer Fachmedien Wiesbaden PDF e-Book. ISBN 978-3-658-09593-2, 978-3-658-09592-5. Verfügbar unter: https://doi.org/10.1007/978-3-658-09593-2.
- ECKERT, Marcus und Torsten TARNOWSKI, 2017. *Stress- und Emotionsregulation: Trainingsmanual zum Programm Stark im Stress: mit E-Book inside und Arbeitsmaterial*. Weinheim: Beltz. ISBN 978-3-621-28451-6
- FURTNER, Marco, BALDEGGER, Urs, 2016. *Self-Leadership und Führung: Theorien, Modelle und praktische Umsetzung* [online]. Wiesbaden: Springer Fachmedien Wiesbaden PDF e-Book. ISBN 978-3-658-13045-9, 978-3-658-13044-2. Verfügbar unter: https://doi.org/10.1007/978-3-658-13045-9.
- DECKERT, Carsten, 2021. *CSR und Logistik: Spannungsfelder Green Logistics und City-Logistik* [online]. Berlin: Springer Gabler PDF e-Book. ISBN 978-3-662-63570-4. Verfügbar unter: https://doi.org/10.1007/978-3-662-63570-4.
- HEIDBRINK, Ludger und Brigitte BIERMANN, 2015. *Corporate Social Responsibility in der Logistikbranche: Anforderungen an eine nachhaltige Unternehmensführung*. Berlin: Schmidt, Erich. ISBN 978-3-503-14488-4, 3-503-14488-9
- FIFKA, Matthias S., 2021. *CSR- und Nachhaltigkeitsmanagement* [online]. Baden-Baden: Nomos PDF e-Book. ISBN 978-3-7489-0834-0. Verfügbar unter: https://doi.org/10.5771/9783748908340.
- ROHDE, Thomas. *CSR und Nachhaltigkeitsmanagement. Definitionen, Ansätze und organisatorische Umsetzung im Unternehmen* [online]. Berlin: Institute for Sustainability [Zugriff am:]. Verfügbar unter: http://www.4sustainability.de/fileadmin/redakteur/bilder/Publikationen/Loew_Rohde_2013_CSR-und-Nachhaltigkeitsmanagement.pdf
- SCHNEIDER, Andreas, SCHMIDPETER, René, 2015. *Corporate Social Responsibility: Verantwortungsvolle Unternehmensführung in Theorie und Praxis* [online]. Berlin, Heidelberg: Springer Berlin Heidelberg PDF e-Book. ISBN 978-3-662-43483-3, 978-3-662-43482-6. Verfügbar unter: https://doi.org/10.1007/978-3-662-43483-3.
- KERKHOFF, Gerd und Stephan PENNING, 2010. *Der strategische Faktor Personal im Einkauf: warum manche Einkaufsorganisationen erfolgreich sind - andere aber nicht*. Weinheim: Wiley-VCH-Verl.. ISBN 978-3-527-50478-7

Weitere Anmerkungen/Sonstiges:

Fr 20.03.2026: 09.00 - 17.00 Prof. Dr. Bernd Martens G303

Fr 17.04.2026: 09.00 - 17.00 Prof. Dr. Bernd Martens G303

Fr 24.04.2026: 09.00 - 17.00 Prof. Dr. Bernd Martens G303

Fr 26.06.2026: 09.00 - 17.00 Prof. Dr. Bernd Martens G303

Smart Factory in Descrete Production			
Modulkürzel:	WMod_SmaFacProd	**Art des Moduls:**	Wahlpflichtfach
Zuordnung zum Curriculum:	**Studiengang, -abkürzung, SPO-Nr.**		
	M-WI, M-EGM, M-APE, M-GFTM, M-DL		

Modulverantwortliche(r):	Huber, Walter	
Dozent(in):	Huber, Walter	
Sprache:	English	
Leistungspunkte / SWS:	5 ECTS / 4 SWS	
Arbeitsaufwand:	Kontaktstunden:	47 h
	Selbststudium:	78 h
	Gesamtaufwand:	125 h
Lehrveranstaltungen des Moduls:	Smart Factory in descrete production	
Lehrformen des Moduls:	SU/Ü-Lecture with integrated exercises	

Studien- / Prüfungsleistungen:

LN - oral exam, 15 minutes
Further information:
None

Empfohlene Voraussetzungen:

None

Angestrebte Lernergebnisse:

After attending the course sudents will be able to:

- generate basic understanding of relevant Business Processes.
- develop an understanding in Smart Factory technologies.
- get insights in the challenges of digital transformation.
- see how a transformation process to reach out a Smart Factory.
- understand the challenges of Leadership in the digital area.

Inhalt:

- Big Picture of Smart Factory
- Backend-Systeme (ERP, MES)
- CPS like Sensors, AGVs, Robotik (incl. humanoide Robots)
- Paperless Production (Shift planning, Qualifications)
- Simulation (Value stream, virtuell commissioning)
- OT-Security
- KI-based Production systems
- Relevants of Standards
- Digital Twin
- Organisational aspects

- Digital Leadership and Transformation
- Change Management

Literatur:

- HUBER, Walter, 2018. *Industrie 4.0 kompakt - Wie Technologien unsere Wirtschaft und unsere Unternehmen verändern: Transformation und Veränderung des gesamten Unternehmens*. Wiesbaden: Springer Vieweg. ISBN 978-3-658-20798-4, 3-658-20798-1
- HUBER, Walter, 2016. *Industrie 4.0 in der Automobilproduktion: ein Praxisbuch*. Wiesbaden: Springer Fachmedien Wiesbaden GmbH. ISBN 978-3-658-12731-2, 3-658-12731-7
- BEBERSDORF, Peter, HUCHZERMEIER, Arnd, 2021. *Variabler Takt: mit dem VarioTakt Varianz beherrschen bei grenzenloser Produktindividualisierung* [online]. Berlin: Springer Gabler PDF e-Book. ISBN 978-3-662-63931-3. Verfügbar unter: https://doi.org/10.1007/978-3-662-63931-3.
- BRAUCKMANN, Otto, 2015. *Smart Production: Wertschöpfung durch Geschäftsmodelle*. Berlin: Springer Vieweg. ISBN 978-3-662-45301-8, 978-3-662-45301-8
- SCHULZ, Thomas, 2019. *Cybersicherheit: für vernetzte Anwendungen in der Industrie 4.0*. ISBN 978-3834334244
- ZIEMKE, André, Thomas STÖCKEL und Lars THOMSON, 2016. *Produktion 4.0: Neue Wege für die Automobilindustrie*. ISBN 13-978-3981636055
- FRIESIKE, Sascha und Johanna SPRONDEL, 2022. *Träge Transformation. Welche Denkfehler den digitalen Wandel blockieren.*. ISBN 13-978-3150141885
- Ohne Autor. *Industrie 4.0 Interoperabilität durch OPC UA mit Companion Specifications Mehrwerte für Stakeholder des Maschinen- und Anlagenbaus* [online]. [Zugriff am:]. Verfügbar unter: https://www.vdma.eu/documents/34570/77803117/VDMA_Leitfaden_Mehrwerte_DE.pdf
- Ohne Autor. *Catena X Sonderheft automotiveIT & Automobil Produktion* [online]. , 2025 [Zugriff am:]. Verfügbar unter: https://de.scribd.com/document/869420247/Catena-x-Sonderheft-Automotiveit-Automobil-Produktion-2025-1
- HERWIG, Tobias. *Fabrik der Zukunft - Inspirationen für die Produktion und Logistik von morgen! (Podcast)* [online]. , 2025 [Zugriff am:]. Verfügbar unter: https://podcast.fabrikderzukunft.com/
- KOARK, Anne , RAMIN, Philipp . *DigiKompetenz Podcast - Der Podcast zur digitalen Kompetenzentwicklung* [online]. , 2025 [Zugriff am:]. Verfügbar unter: https://www.i40.de/digikompetenzpodcast

Weitere Anmerkungen/Sonstiges:

No remarks.

Strategic Brand Development & Go-to-Market Management			
Modulkürzel:	ECV_SBD&GtMM	**Art des Moduls:**	Wahlpflichtfach
Zuordnung zum Curriculum:	**Studiengang, -abkürzung, SPO-Nr.**		
	M-WI, M-EGM, M-GFTM, M-DL		

Modulverantwortliche(r):	Seckinger, Christoph	
Dozent(in):	Seckinger, Christoph; Weiss, Patrick	
Sprache:	English	
Leistungspunkte / SWS:	5 ECTS / 4 SWS	
Arbeitsaufwand:	Kontaktstunden:	47 h
	Selbststudium:	79 h
	Gesamtaufwand:	126 h
Lehrveranstaltungen des Moduls:	Strategic Brand Development & Go-to-Market Management	
Lehrformen des Moduls:	SU/Ü-Lecture with practical exercises	

Studien- / Prüfungsleistungen:

Proj - Project work with oral presentation (15 min) and written elaboration (5 - 25 pages)

Further information:

None

Empfohlene Voraussetzungen:

None

Angestrebte Lernergebnisse:

Subject competence

- Students understand strategic principles of brand development and their application in startup, corporate venture building, and early-stage investment contexts.
- They are familiar with key models of brand identity (e.g., Kapferer's Brand Identity Prism) and can apply them to develop coherent brand systems.
- They can analyse markets, define a positioning, and translate strategic insights into actionable brand and marketing concepts, using generative AI-Tools for market research (synthetic personas) or efficient asset creation.
- Students can connect brand-building decisions to measurable business outcomes.

Methodological competence

- Students can conduct structured market and customer analyses to derive relevant brand insights.
- They can plan, develop, and test brand concepts through iterative project work; or evaluate existing brand concepts in e.g. investment scenarios.
- They can design and evaluate marketing activities using frameworks such as the Bullseye approach.

Personal / Self-competence

- Students strengthen their creative and analytical problem-solving skills through iterative brand development.
- They develop the ability to manage complex strategic and creative processes independently.

- They reflect on their personal role as brand creators and decision-makers in dynamic market environments.

Social competence

- Students collaborate effectively in interdisciplinary teams combining business and technical expertise.
- They provide constructive feedback and integrate diverse perspectives during team and peer-review sessions.

Inhalt:

The module follows a structured brand-building process consisting of five interconnected stages (5D Method):

1. **Discover**: Re-asses prior work, analysing the existing startup idea's market and customer insight using secondary and primary research data; identification of core customer jobs and pain points for further usage in the brand development. Students without an existing business model idea will use this timeframe for initial set-up.
2. **Define**: Segmentation, targeting, and positioning in the context of new ventures; developing a clear brand route and audience understanding.
3. **Develop**: Creation of the brand identity (e.g., using Kapferer's Brand Identity Prism) and definition of major building blocks such as naming, brand character, and tone of voice.
4. **Design**: Translation of identity into visual assets; production of brand guidelines and Figma design templates.
5. **Deploy**: Planning and execution of a Go-to-Market strategy using the Weinberg & Mares' Bullseye framework; testing and evaluation of early marketing traction ideas.

Presentation: Final brand presentation and reflection on learnings.

Literatur:

- WHEELER, Alina und Rob MEYERSON, 2024. *Designing Brand Identity: A Comprehensive Guide to the World of Brands and Branding*. Newark: John Wiley & Sons, Incorporated. ISBN 978-1-119-98482-5
- KAPFERER, Jean-Noël, 2012. *The new strategic brand management: advanced insights and strategic thinking*. London; Philadelphia, Pa; New Delhi: Kogan Page. ISBN 978-0-749-46516-2
- WEINBERG, Gabriel und Justin MARES, 2015. *Traction: how any startup can achieve explosive customer growth*. New York, New York: Portfolio/Penguin. ISBN 978-1-59184-836-3, 1-59184-836-9
- Rachitsky, L. (Ongoing). Lenny's Newsletter / Podcast. A leading resource on startup growth, product management, and go-to-market strategies.

Weitere Anmerkungen/Sonstiges:

Exam: Project work to be performed during the semester, including the development of brand concept for a new venture, creation of a two-page brand guideline, preparation of a Figma template, and the planning and execution of one to three short marketing activities. Written documentation (approx. 10-15 pages) and presentation (15 minutes).

Additional remarks: A voluntary bonus system is offered: Within the course, selected topics may be taken up by students for individual preparation and presentation. Each qualitatively completed presentation earns bonus points amounting to a maximum of 10% of the total achievable exam points. The creditability and maximum allocation of bonus points follow the regulations of the APO.

The course is held on-site. However, under special circumstances, it may also take place virtually.

Course selection varies depending on availability and demand. The actual selection for each semester can be found in the timetable. Courses may be canceled at the beginning of the semester. Participation is limited in some cases.

Strategic Information Dynamics in Global Operations and Supply Chains			
Modulkürzel:	WMod_Strat InfDynam	**Art des Moduls:**	Wahlpflichtfach
Zuordnung zum Curriculum:	**Studiengang, -abkürzung, SPO-Nr.**		
	M-WI, M-DENS, M-EGM, M-APE, M-GFTM, M-DL		

Modulverantwortliche(r):	Bhardwaj, Debarshee	
Dozent(in):	Bhardwaj, Debarshee	
Sprache:	English	
Leistungspunkte / SWS:	5 ECTS / 4 SWS	
Arbeitsaufwand:	Kontaktstunden:	47 h
	Selbststudium:	78 h
	Gesamtaufwand:	125 h
Lehrveranstaltungen des Moduls:	Strategic Information Dynamics in Global Operations and Supply Chains	
Lehrformen des Moduls:	SU/Ü-Lecture with practical exercises	

Studien- / Prüfungsleistungen:

SA+Koll - written elaboration 8-15 pages, presentation 15-20 slides; oral exam 15 Min.

Further information:

Short technical report with oral presentation.

Empfohlene Voraussetzungen:

None

Angestrebte Lernergebnisse:

Students will be able to

- understand key principles of global operations and supply chain management.
- analyse information flows and data in supply chain decision-making.
- identify and solve coordination and integration problems in global supply chains.
- apply analytical tools to case data and develop evidence-based solutions.
- present findings and collaborate effectively in case-based group work.

Inhalt:

The course integrates foundational lectures with intensive case-based group work. It consists of three main components:

1. Introductory lecture/s:

- Fundamentals of logistics, global operations, and supply chain management
- Information and data processing in supply chain decision-making
- Information quality, uncertainty, and demand/supply planning
- Information systems for SCM (MRP, ERP, EDI, RFID, analytics, dashboards)
- Global supply chain structures, risk, disruptions, and emerging technologies (AI, IoT, blockchain)

2. Case-Based Sessions:

Students work in groups on company-specific cases that reflect real challenges in:

- Coordination and integration problems (e.g., bullwhip effect, sourcing complexity)
- Global production and network design
- Supplier selection, outsourcing/offshoring, and procurement
- Logistics, distribution, and cross-border operations
- Information flow design, data analysis, forecasting, and planning
- Lean, agile, and responsive supply chain philosophies
- Each case includes structured data analysis tasks and guiding questions.

Working with structured datasets and guiding questions, students analyze operational problems and apply relevant supply chain frameworks. The course concludes with a comprehensive integrative case in which teams synthesize their learning and present their analysis and recommendations.

Literatur:

- SKJOTT-LARSEN, Tage, 2007. *Managing the global supply chain*. Copenhagen: Copenhagen Business School. ISBN 978-87-630-0171-7

Weitere Anmerkungen/Sonstiges:

- Fr 10.04.2026 & Sa 11.04.2026 (09:00 – 18:05) - two sessions in person, compulsory attendance
- Tue 28.04.2026 (14:55 – 18:05) virtual session
- Tue 05.05.2026 (14:55 – 18:05) virtual session
- Tue 12.05.2026 (14:55 – 18:05) virtual session
- Fr 29.05.2026 & Sa 30.05.2026 (09:00 – 18:05) - two sessions in person, compulsory attendance

Strategy and Growth in Automotive Sector			
Modulkürzel:	WMod_StrGroAutSc_M-GFT	**Art des Moduls:**	Wahlpflichtfach
Zuordnung zum Curriculum:	**Studiengang, -abkürzung, SPO-Nr.**		
	M-WI, M-DENS, M-EGM, M-APE, M-GFTM, M-DL		

Modulverantwortliche(r):	Rengarajan, Srinath	
Dozent(in):	Rengarajan, Srinath	
Sprache:	English	
Leistungspunkte / SWS:	5 ECTS / 4 SWS	
Arbeitsaufwand:	Kontaktstunden:	47 h
	Selbststudium:	78 h
	Gesamtaufwand:	125 h
Lehrveranstaltungen des Moduls:	Strategy and Growth in Automotive Sector	
Lehrformen des Moduls:	SU/Ü-Lecture with integrated exercises	

Studien- / Prüfungsleistungen:

LN - project work

Further information:

None

Empfohlene Voraussetzungen:

None

Angestrebte Lernergebnisse:

After attending the course, the students will be able to

- understand trends of strategy management and application of strategy tools and frameworks in the automotive sector based on multiple real-world case examples.
- gain an overview of megatrends and technological developments in the global automotive sector, including new business models incorporating ecosystem and platform approaches.
- develop an international perspective on the activities and strategies of established automotive companies, including the intricacies in market entry and growth strategies.
- analyse the product and mobility solutions portfolios and corporate strategies of global automakers from a positioning and competition perspective.

Inhalt:

- Strategy management: Introduction, Corporate & Competitive Strategy, Strategy Tripod, M&A and Alliances, Strategy Tools/Frameworks and their applications
- Automotive trends: Megatrends, Connected, Autonomous, Electric, Shared
- International management: Global growth, Market entry, CSA/FSA, Reshoring. business strategies for emerging markets
- Dealing with uncertainty: decision intelligence framework
- Business ecosystems, marketplaces and platforms, as-a-Service models

Literatur:
• MINTZBERG, Henry, Bruce W. AHLSTRAND und Joseph LAMPEL, 2005. *Strategy safari: a guided tour through the wilds of strategic management*. New York: Free Press. ISBN 978-0-7432-7057-1, 0-7432-7057-6 • NIEUWENHUIS, Paul und Peter WELLS, 2015. *The global automotive industry*. Chichester, UK: Wiley. ISBN 978-1-118-80239-7 • TRAUB-MERZ, Rudolf, 2017. *The Automotive Sector in Emerging Economies: Industrial Policies, Market Dynamics and Trade Unions. Trends & Perspectives in Brazil, China, India, Mexico and Russia*. Berlin: Friedrich-Ebert-Stiftung. ISBN 978-3-95861-597-7 • ACEA, *The Automobile Industry Pocket Guide 2024/2025 [online]* [online]. , 2024. [Zugriff am:]. Verfügbar unter: https://www.acea.auto/publication/the-automobile-industry-pocket-guide-2024-2025/
Weitere Anmerkungen/Sonstiges:
The lecture takes place in block from 9 a.m. to 6 p.m. on the following dates: March, 21st and 28th April 11th and 18th May 30th June 13th and 27th

Internationales Projekt (Kalifornien)

Modulkürzel:	InternProj_M-WI	**Art des Moduls:**	Wahlpflichtfach
Zuordnung zum Curriculum:	**Studiengang, -abkürzung, SPO-Nr.**		
	M-DENS		

Modulverantwortliche(r):	Schwandner, Gerd	
Dozent(in):	Schwandner, Gerd	
Sprache:	Deutsch/Englisch	
Leistungspunkte / SWS:	5 ECTS / 4 SWS	
Arbeitsaufwand:	Kontaktstunden:	46 h
	Selbststudium:	79 h
	Gesamtaufwand:	125 h
Lehrveranstaltungen des Moduls:	Internationales Projekt	
Lehrformen des Moduls:	S-Seminar	

Studien- / Prüfungsleistungen:

Proj - Projektarbeit mit mdl. Präsentation (15 min) und schriftlicher Ausarbeitung (5 - 25 Seiten)

Weitere Erläuterungen:

Keine

Empfohlene Voraussetzungen:

Keine

Angestrebte Lernergebnisse:

Die Studierenden können selbstständig ein abgegrenztes Thema aus dem internationalen Kontext nach wissenschaftlichen Anforderungen bearbeiten und Lösungsvorschläge präsentieren.

Students can independently work on a delimited topic from the international context according to scientific requirements and present proposed solutions.

Inhalt:

Die Inhalte werden jeweils an das entsprechende Land adaptiert und mit aktuellen Aspekten der Internationalität bzw. Globalisierung abgerundet.

The contents are adapted to the respective country and rounded off with current aspects of internationality or globalization.

Literatur:

- DANIELS, John D., Lee H. RADEBAUGH und Daniel P. SULLIVAN, 2013. *International Business: Environments and Operations*. 14. Auflage. Harlow: Pearson.
- HOLLENSEN, Svend, 2014. *Global Marketing*. Harlow: Pearson.

Weitere Anmerkungen/Sonstiges:

Blockseminar / Compact seminar. Eine Woche vor Ort (Kalifornien) / One week on site (California).

Hinweis: Voranmeldung beim Dozenten im WS 25/26. / Notice: Pre-registration at your lecturer in WS 25/26.

Software Engineering

Modulkürzel:	SW_Eng_M-WI	**Art des Moduls:**	Wahlpflichtfach
Zuordnung zum Curriculum:	**Studiengang, -abkürzung, SPO-Nr.**		
	M-DENS, M-APE, M-GFTM		

Modulverantwortliche(r):	Bock, Jürgen	
Dozent(in):	Bock, Jürgen; Kastner, Maximilian	
Sprache:	Deutsch	
Leistungspunkte / SWS:	5 ECTS / 4 SWS	
Arbeitsaufwand:	Kontaktstunden:	47 h
	Selbststudium:	78 h
	Gesamtaufwand:	125 h
Lehrveranstaltungen des Moduls:	Software Engineering	
Lehrformen des Moduls:	SU/Ü-Seminaristischer Unterricht/Übung	

Studien- / Prüfungsleistungen:

LN - Seminararbeit mit Präsentation vor PZ

Weitere Erläuterungen:

Die Prüfung besteht aus einer Seminararbeit einschließlich mündlicher Präsentation. Der schriftliche Teil der Arbeit ist ein PDF-Dokument, welches in digitaler Form über die Moodle Plattform eingereicht wird, in Kombination mit den Beiträgen des Prüflings in einem Source Code Repository. Die Einreichungsfrist liegt im Prüfungszeitraum des jeweiligen Semesters und wird zu Beginn der Lehrveranstaltung durch den Dozenten und über Moodle bekannt gegeben. Die mündliche Präsentation umfasst einen Vortrag im Umfang von 10-15 Minuten. Dieser findet vor dem Prüfungszeitraum statt. Die Vortragsfolien sind ebenfalls über die Moodle Plattform bis zum Vortragstermin einzureichen.

Der Inhalt der Seminararbeit ist der persönliche Beitrag jedes Studierenden zu einem Softwareentwicklungsteam. Dabei übernimmt jeder Teilnehmer eine spezifische Rolle im Team. Details dazu werden zu Beginn der Lehrveranstaltung bekannt gegeben. Die Teamzusammenstellung findet über die Moodle Plattform statt. Durch Beitritt zu einem Team akzeptiert der Student die Aufgabenstellung und damit das Thema der Seminararbeit.

Empfohlene Voraussetzungen:

Keine

Angestrebte Lernergebnisse:

Nach Teilnahme an dem Modul sind die Studierenden in der Lage,

- die Grundlagen des Softwareengineerings zu erläutern.
- Softwareanforderungen zu ermitteln und zu strukturieren.
- Softwarekomponenten und Schnittstellen formal zu beschreiben.
- einfache Softwarekomponenten anhand von Modellen in einer höheren Programmiersprache zu entwickeln, zu testen, zu integrieren, zu deployen und zu dokumentieren.
- Entwicklungswerkzeuge (Softwareengineering Tool-Chain) effektiv anzuwenden.

• problemorientiert in Teams bei der Erstellung von Softwareanwendungen unter Verwendung agiler Projektmanagementmethoden zusammenzuarbeiten.
Inhalt:
• Grundlagen des Software Engineering • Systematische Analyse von Softwareanforderungen • Modellierung von Anforderungen und Komponenten eines Softwareprodukts • Spezifikation und Dokumentation von Schnittstellen zwischen Softwarekomponenten • Entwicklung von Softwaremodulen in Teams einschließlich Testing, Integration, Deployment und Dokumentation • Durchgängige Anwendung von Software Engineering Tools (IDE, Source Code Management, etc.) • Durchgängige Anwendung agiler Projektmanagementmethoden im Kontext eines Softwareprojekts
Literatur:
• THOMAS, David und Andrew HUNT, 2020. *The pragmatic programmer: your journey to mastery*. 20. Auflage. Boston: Addison-Wesley. ISBN 978-0-13-595705-9, 0-13-595705-2 • MILES, Russ und Kim HAMILTON, 2006. *Learning UML 2.0: [a pragmatic introduction to UML]*. Sebastopol, CA: O'Reilly & Associates. ISBN 0-596-00982-8 • GAMMA, Erich und andere, 1994. *Design Patterns - Elements of Reusable Object-Oriented Software*. ISBN 0-201-63361-2 • PREISSEL, René und Bjørn STACHMANN, 2019. *Git: dezentrale Versionsverwaltung im Team: Grundlagen und Workflows*. Heidelberg: dpunkt. verlag. ISBN 978-3-86490-649-7, 3-86490-649-0
Weitere Anmerkungen/Sonstiges:
Keine Anmerkungen.

Production and Logistics Networks			
Modulkürzel:	ProdLogis_M-APE	**Art des Moduls:**	Wahlpflichtfach
Zuordnung zum Curriculum:	**Studiengang, -abkürzung, SPO-Nr.**		
	M-EGM		

Modulverantwortliche(r):	Jattke, Andreas	
Dozent(in):	Jattke, Andreas	
Sprache:	English	
Leistungspunkte / SWS:	5 ECTS / 4 SWS	
Arbeitsaufwand:	Kontaktstunden:	47 h
	Selbststudium:	78 h
	Gesamtaufwand:	125 h
Lehrveranstaltungen des Moduls:	Production and Logistics Networks	
Lehrformen des Moduls:	SU/Ü - Lecture with practical exercises	

Studien- / Prüfungsleistungen:

schrP90 - written exam, 90 minutes

Further information:

None

Empfohlene Voraussetzungen:

None

Angestrebte Lernergebnisse:

The students are able to

- know the significance, elements, basic structure, design and execution of production and logistic networks in the automotive industry.
- capture and assess interactions between production network, location factors, suppliers, logistics network, own/external skills, own manufacturing penetration, product design/technologies, production design/technologies etc.
- know possible production strategies, their effects on the production and logistics network including suppliers' environment and can systematically assess and develop different production strategies.
- design skills strategies in conjunction with the production strategy and hence derive and establish skills development including supplier development.
- know procurement, intra/production and distribution logistics systems used in the automotive industry (e.g. JIT, milkrun, supermarket, kanban concept, single/multi-level, combined logistics systems etc.).
- assess and fundamentally calculate the effects of different logistics concepts.
- optimize supply chains (specific design, KPI, transport- and warehousing strategies, make or buy decisions, etc.).

Inhalt:

- Production networks and skills strategies
- Logistics systems and networks
- Logistics concepts in manufacture (intralogistics)

- Supply Chain management design methodologies
- Supply Chain KPIs
- Supply chain management in line with industry 4.0 (digitalisation)

Literatur:

- ERRASTI, Ander und Tim BAINES, 2013. *Global production networks: operations design and management*. Boca Raton, Fla. [u.a.]: CRC Press. ISBN 978-1-4665-6292-9
- ZHENG, Li, POSSEL-DÖLKEN, Frank, 2002. *Strategic Production Networks* [online]. Berlin, Heidelberg: Springer Berlin Heidelberg PDF e-Book. ISBN 978-3-540-24812-5. Verfügbar unter: https://doi.org/10.1007/978-3-540-24812-5.
- ABELE, Eberhard, 2008. *Global production: a handbook for strategy and implementation* [online]. Berlin [u.a.]: Springer PDF e-Book. ISBN 978-3-540-71653-2. Verfügbar unter: https://doi.org/10.1007/978-3-540-71653-2.
- STADTLER, Hartmut, KILGER, Christoph, MEYR, Herbert, 2015. *Supply chain management and advanced planning: concepts, models, software, and case studies* [online]. Berlin, Heidelberg: Springer Berlin Heidelberg PDF e-Book. ISBN 978-3-642-55309-7. Verfügbar unter: https://doi.org/10.1007/978-3-642-55309-7.

Weitere Anmerkungen/Sonstiges:

Bonussystem:

In lecture there may be tasks leading to bonus points for exam in case of good execution. Maximum 5 bonus points may be given.

Business Analytics & Artificial Intelligence

Modulkürzel:	BusAn_AI_M-EGM	**Art des Moduls:**	Wahlpflichtfach
Zuordnung zum Curriculum:	**Studiengang, -abkürzung, SPO-Nr.**		
	M-DENS, M-APE, M-GFTM, M-DL		

Modulverantwortliche(r):	Bock, Jürgen	
Dozent(in):	Ali, Faizan; Bock, Jürgen	
Sprache:	English	
Leistungspunkte / SWS:	5 ECTS / 4 SWS	
Arbeitsaufwand:	Kontaktstunden:	47 h
	Selbststudium:	78 h
	Gesamtaufwand:	125 h
Lehrveranstaltungen des Moduls:	Business Analytics & Artificial Intelligence	
Lehrformen des Moduls:	SU/Ü-Lecture with practical exercises	

Studien- / Prüfungsleistungen:

schrP90 - written exam, 90 minutes

Further information:

None

Empfohlene Voraussetzungen:

None

Angestrebte Lernergebnisse:

The students are able to

- explain the various conflict of objectives of supervised learning.
- apply different models of supervised learning.
- assess the quality of different models of supervised learning.
- apply different clustering methods.
- practically implement various machine learning methods using common software libraries.
- distinguish between different areas of artificial intelligence and select suitable technologies for specific fields of application.
- explain the basic principles and special concepts of formal knowledge representation.
- transfer concrete domain knowledge into a formal knowledge model and provide added value through automatic reasoning.

Inhalt:

- Linear regression
- Various classification algorithms
- Various clustering techniques
- Artificial Neural Networks
- Implementation of Machine Learning algorithms using suitable software tools and libraries
- Definition of Artificial Intelligence and overview over subdisciplines

- Formal knowledge representation and automatic reasoning

Literatur:

- JAMES, Gareth und andere, 2021. *An introduction to statistical learning: with applications in R*. New York, NY: Springer. ISBN 978-1-0716-1417-4, 1-0716-1417-7
- BISHOP, Christopher M., 2016. *Pattern recognition and machine learning*. softcover reprint of the original 1st edition 2006. Auflage. New York, NY: Springer. ISBN 978-1-4939-3843-8
- POINTER, Ian, 2019. *Programming PyTorch for deep learning: creating and deploying deep learning applications*. Bejing, Boston, Farnham, Sebastopol, Tokyo: O'Reilly Media, Inc.. ISBN 9781492045328
- HITZLER, Pascal, Sebastian RUDOLPH und Markus KRÖTZSCH, 2010. *Foundations of Semantic Web technologies*. Boca Raton [u.a.]: Chapman & Hall/CRC Press. ISBN 978-1-4200-9050-5

Weitere Anmerkungen/Sonstiges:

The course is held on-site. However, under special circumstances, it may also take place virtually. Course selection varies depending on availability and demand. The actual selection for each semester can be found in the timetable. Courses may be canceled at the beginning of the semester. Participation is limited in some cases.

Data Engineering and Analytics

Modulkürzel:	AI_DataEng	**Art des Moduls:**	Wahlpflichtfach
Zuordnung zum Curriculum:	**Studiengang, -abkürzung, SPO-Nr.**		
	M-APE, M-GFTM		

Modulverantwortliche(r):	Akmal, Muhammad Uzair	
Dozent(in):	Akmal, Muhammad Uzair	
Sprache:	English	
Leistungspunkte / SWS:	5 ECTS / 4 SWS	
Arbeitsaufwand:	Kontaktstunden:	47 h
	Selbststudium:	78 h
	Gesamtaufwand:	125 h
Lehrveranstaltungen des Moduls:	Data Engineering and Analytics	
Lehrformen des Moduls:	SU/Ü-Lecture with integrated exercises	

Studien- / Prüfungsleistungen:

schrP90 - written exam, 90 minutes

Further information:

None

Empfohlene Voraussetzungen:

None

Angestrebte Lernergebnisse:

Upon completion of the module, students will be able to:

- choose and calculate appropriate metrics and visualizations for describing a data set.
- understand and master fundamental data analysis and machine learning methods.
- acquire deep knowledge about model assessment and inference techniques for linear and non-linear models.
- know fundamentals of data engineering.

Inhalt:

- Data visualization
- Data cleaning and data quality
- Fundamentals of statistical learning and machine learning
- Linear Regression
- Classification
- Model assessment, selection and inference: Cross-Validation & Bootstrap
- Decision Trees
- Unsupervised Learning
- Neural networks (ANN, ResNet, CNN)
- Fundamentals of data engineering (data modelling, data warehouse, data lake, parallel and distributed computing, data pipelines)

Literatur:
• WILKE, Claus, March 2019. *Fundamentals of data visualization: a primer on making informative and compelling figures*. Beijing: O'Reilly. ISBN 978-1-492-03108-6 • JAMES, Gareth, WITTEN, Daniela, HASTIE, Trevor, TIBSHIRANI, Robert, TAYLOR, Jonathan, 2023. *An Introduction to Statistical Learning: with Applications in Python* [online]. Cham: Springer International Publishing PDF e-Book. ISBN 978-3-031-38747-0. Verfügbar unter: https://doi.org/10.1007/978-3-031-38747-0. • HASTIE, Trevor, TIBSHIRANI, Robert, FRIEDMAN, Jerome H., 2017. *The elements of statistical learning: data mining, inference, and prediction* [online]. New York, NY, USA: Springer PDF e-Book. ISBN 978-0-387-84858-7. Verfügbar unter: https://doi.org/10.1007/978-0-387-84858-7. • BISHOP, Christopher M., 2009. *Pattern recognition and machine learning*. New York [u.a.]: Springer. ISBN 0-387-31073-8, 978-1-4939-3843-8 • LESKOVEC, Jure, Anand RAJARAMAN und Jeffrey D. ULLMAN, 2020. *Mining of massive datasets*. Cambridge: Cambridge University Press. ISBN 978-1-108-47634-8 • RYZA, Sandy und andere, 2017. *Advanced analytics with Spark: patterns for learning from data at scale*. Beijing: O'Reilly. ISBN 978-1-4919-7295-3
Weitere Anmerkungen/Sonstiges:
No remarks.

Development of a decentralized energy supply concept for rural areas			
Modulkürzel:	WMod_DevEnergySupCon	**Art des Moduls:**	Wahlpflichtfach
Zuordnung zum Curriculum:	**Studiengang, -abkürzung, SPO-Nr.**		
	M-APE, M-GFTM		

Modulverantwortliche(r):	Wrobel-Wache, Stefanie	
Dozent(in):	Funk, Andrea; Wrobel-Wache, Stefanie	
Sprache:	English	
Leistungspunkte / SWS:	5 ECTS / 4 SWS	
Arbeitsaufwand:	Kontaktstunden:	47 h
	Selbststudium:	78 h
	Gesamtaufwand:	125 h
Lehrveranstaltungen des Moduls:	Development of a decentralized energy supply concept for rural areas	
Lehrformen des Moduls:	SU/Ü-Lecture with practical exercises	

Studien- / Prüfungsleistungen:

Proj - Project work with oral presentation (15 min) and written elaboration (5 - 25 pages)

Further information:

Project (Project Report (Group Work): 60%, Presentation & Stakeholder Dialogue: 40%)

Empfohlene Voraussetzungen:

None

Angestrebte Lernergebnisse:

After attending the seminar, students will be able to:

- use theoretical knowledge from their academic background to analyse regional challenges in the context of energy transition in rural areas.
- evaluate regulatory, economic, and organizational constraints affecting decentralized renewable energy expansion.
- develop and evaluate integrated technological, governance and cooperation models enabling municipalities to coordinate planning and realization of decentralized energy supply concepts.
- formulate strategic recommendations.
- communicate complex concepts to different stakeholders.

Inhalt:

- Design of a decentralized energy governance strategic concept for a rural region aiming to expand renewable energy production while retaining local value creation
- Analysis of the spatial, technical, regulatory, and organizational challenges that municipalities face when expanding wind and solar power energy structures, coordinating with grid operators, and engaging citizens and business partners
- Prioritized task catalogue
- Strategic recommendations for technical solutions, cooperative structures, and participation models that enable municipalities to shift from reactive to proactive energy planning.

- Applied research, stakeholder analysis, and concept development to create actionable pathways toward a regional energy transition
- Recommendations for organizational structure form

Based on real-world conditions in the Eichstätt district the project seminar addresses an interdisciplinary group of students (e.g. from GFTM, APE, Engineering & Management, Renewable Entergy Systems, Entrepreneurship Master).

Literatur:

- KRETSCHMER, Sandra, 2025. The Energy Transition in Germany - Essays on Incentives for Decentralisation and Support of the Transformation [online]. PDF e-Book. Verfügbar unter: 10.25593/open-fau-1538.
- COESTER, Andreas, 2025. *The German energy transition: economics of sustainable electricity supply* [online]. PDF e-Book. Verfügbar unter: 10.1007/978-3-658-48264-0 .
- BRADFIELD, Ronald, 2025. *Understanding the Future: An Introduction to Scenario Planning* [online]. PDF e-Book. ISBN 9783111617442. Verfügbar unter: https://www-degruyterbrill-com.thi.idm.oclc.org/isbn/9783111617442
- SCHWARZ, Jan Oliver, 2024. *Strategic foresight: an introductory guide to practice* [online]. PDF e-Book. ISBN 978-1-032-29921-1.
- RIES, Eric, 2019. *The lean startup: how constant innovation creates radically successful businesses*. London [u.a.]: Penguin Business. ISBN 978-0-670-92160-7
- UEBERNICKEL, Falk, JIANG, Li, BRENNER, Walter, 2020. *Design thinking: the handbook* [online]. Singapore: WS Professional PDF e-Book. ISBN 978-981-120-215-5. Verfügbar unter: https://www.worldscientific.com/worldscibooks/10.1142/11329#t=toc
- GRICHNIK, Dietmar und andere, 2023. *The Corporate Venturing Handbook: A Step-by-Step Guide to the Value Creation Process*. London: Kogan Page Ltd. ISBN 978-1-3986-1357-7, 1-3986-1357-6

Weitere Anmerkungen/Sonstiges:

- Sa 25.04.2026: 09.00 - 18.05
- Sa 09.05.2026: 09.00 - 18.05
- Sa 16.05.2026: 09.00 - 18.05
- Sa 20.06.2026: 09.00 - 18.05

Dates and further literature will be announced and confirmed at the beginning of the course.

Future Business Modelling

Modulkürzel:	FuBuMo_M-GFT	**Art des Moduls:**	Wahlpflichtfach
Zuordnung zum Curriculum:	**Studiengang, -abkürzung, SPO-Nr.**		
	M-APE, M-DL		

Modulverantwortliche(r):	Wrobel-Wache, Stefanie	
Dozent(in):	Wrobel-Wache, Stefanie	
Sprache:	English	
Leistungspunkte / SWS:	5 ECTS / 4 SWS	
Arbeitsaufwand:	Kontaktstunden:	47 h
	Selbststudium:	78 h
	Gesamtaufwand:	125 h
Lehrveranstaltungen des Moduls:	Future Business Modelling	
Lehrformen des Moduls:	SU/Ü-Lecture with practical exercises	

Studien- / Prüfungsleistungen:

schrP90 - written exam, 90 minutes

Further information:

None

Empfohlene Voraussetzungen:

None

Angestrebte Lernergebnisse:

The students

- are familiar with entrepreneurship-related theories, models, and ideas, and can reflect on what entrepreneurship is and what it means to develop an entrepreneurial mindset and culture.
- know and can discuss the relationship and meaning of technological, social and environmental trends and scenarios about business model development and innovation as well as the meaning of sustainability in the context of business development and risk management.
- are familiar with digital, sustainable, disruptive and forward-looking business models, can explain the special features of each and give examples of successful business models.
- know concepts of organisational resilience and can explain and discuss resilience in the context of entrepreneurship, business success and business modelling.
- know the entrepreneurship process, business modelling tools and key factors of successful business models.
- can develop future oriented business models by using different tools and methods.
- know the meaning of uncertainty for corporates and entrepreneurs and approaches and methods to deal with uncertainty in the business context.
- know the requirements for risk management and the four phases of risk management.
- can apply selected risk management tools and methods in the context of future oriented business modeling and develop an enterprise risk management system.
- can evaluate business models qualitatively and quantitively.

Inhalt:

General introduction

- Business Development, sustainability and future orientation of corporates

Introduction into Entrepreneurship

- Development of entrepreneurship as a research discipline
- Types of entrepreneurships
- Entrepreneurial mindset and culture
- Entrepreneurship process
- Business opportunities

Future oriented business modelling and business modelling tools

- Types of different business models (social, sustainable, digital, disruptive business models, business model patterns)
- Sources of business ideas, ideation, ideation tools
- Business modelling, business model innovation
- Business model evaluation
- Business planning
- Aspects of finance and accounting
- Risk management

Business environment and business organization

- Economic systems
- Technical, social and environmental environment
- Traditional and alternative business forms

Trends in Entrepreneurship

- Dealing with global challenges, megatrends, VUCA and uncertainty (design thinking, lean startup approach, effectuation)
- Data driven business models
- Disciplined entrepreneurship

Literatur:

- GEDEON, S., 2010. What is entrepreneurship? In: *Entrepreneurial Practice Review*. 1(3), S.16-35.
- GASSMANN, Oliver, Karolin FRANKENBERGER und Michaela CHOUDURY, 2020. *The business model navigator: the strategies behind the most successful companies*. Harlow, England: Pearson. ISBN 978-1-292-32712-9, 1-292-32712-X
- OSTERWALDER, Alexander und Yves PIGNEUR, 2010. *Business model generation: a handbook for visionaries, game changers, and challengers*. Hoboken, NJ: Wiley. ISBN 978-0-470-87641-1, 0-470-87641-7
- RIES, Eric, 2019. *The lean startup: how constant innovation creates radically successful businesses*. London [u.a.]: Penguin Business. ISBN 978-0-670-92160-7
- SARASVATHY, Sara, 2001. Causation and effectuation: Toward a theoretical shift from economic in-evitability to entrepreneurial contingency. http://entrepreneurscommunicate.pbworks.com/f/2001_Sarasvathy_Causation+adn+effectuation.pdf. In: *Academy of Management Review*. 26(2), S.243-263.
- HAHN, Rüdiger, 2022. *Sustainability management: global perspectives on concepts, instruments, and stakeholders*. Fellbach: Rüdiger Hahn. ISBN 978-3-9823211-0-3, 3-9823211-0-7
- DUCHNEK, Stephanie, 2020. Organizational resilience: a capability-based conceptualization. In: *Business Research*. (13), S.215-246.
- AULET, Bill, 2013. Disciplined entrepreneurship: 24 steps to a successful startup. Hoboken, NJ: Wiley. ISBN 978-1-118-69228-8, 978-1-118-72088-2

- HUNZIKER, Stefan, 2021. *Enterprise Risk Management: Modern Approaches to Balancing Risk and Reward* [online]. Wiesbaden: Springer Gabler PDF e-Book. ISBN 978-3-658-33523-6. Verfügbar unter: https://doi.org/10.1007/978-3-658-33523-6.
- OSTERWALDER, Alexander und andere, 2014. *Value proposition design: how to create products and services customers want*. Hoboken, NJ: Wiley. ISBN 978-1-118-96805-5, 1-118-96805-0
- SCHIRMER, J., R. EBER und I. BOURDON, 2021. 32 ways to innovate business models through data: Emerging data-driven solution business model patterns from a study of 471 late-stage data-driven startups. (https://scholarspace.manoa.hawaii.edu/handle/10125/71226). In: *Proceedings of the 54th Hawaii International Conference on System Sciences*, S. 4996-5005.
- UEBERNICKEL, Falk, JIANG, Li, BRENNER, Walter, PUKALL, Britta, NAEF, Therese, SCHINDLHOLZER, Bernhard, 2020. *Design thinking: the handbook* [online]. Singapore: World Scientific PDF e-Book. ISBN 978-981-120-215-5, 981-120-215-X. Verfügbar unter: https://doi.org/10.1142/11329.
- VANINI, Ute, RIEG, Robert, 2021. *Risikomanagement: Grundlagen - Instrumente - Unternehmenspraxis* [online]. Stuttgart: Schäffer-Poeschel Verlag PDF e-Book. ISBN 978-3-7910-4527-6, 978-3-7910-4526-9. Verfügbar unter: https://doi.org/10.34156/9783791045269.
- BULIGA, Oana, SCHEINER, Christian W., VOIGT, Kai-Ingo, 2016. Business model innovation and organizational resilience: towards an integrated conceptual framework. In: *J Bus Econ (2016)* (86), S.647–670.
- SOLTANIFAR, Mariusz, HUGHES, Matthew, GÖCKE, Lutz, 2021. *Digital entrepreneurship: impact on business and society* [online]. Cham, Switzerland: Springer PDF e-Book. ISBN 978-3-030-53914-6. Verfügbar unter: https://doi.org/10.1007/978-3-030-53914-6.
- ZUCCHELLA, Antonella, URBAN, Sabine, 2019. *Circular Entrepreneurship: Creating Responsible Enterprise* [online]. Cham: Palgrave Macmillan PDF e-Book. ISBN 978-3-030-18999-0. Verfügbar unter: https://doi.org/10.1007/978-3-030-18999-0.

Weitere Anmerkungen/Sonstiges:

Additional literature and self-study resources will be announced and provided throughout the course.

The course is held on-site. However, under special circumstances, it may also take place virtually.

Course selection varies depending on availability and demand. The actual selection for each semester can be found in the timetable. Courses may be canceled at the beginning of the semester. Participation is limited in some cases.

Global Business and Economics 1

Modulkürzel:	GBU_GBE1	**Art des Moduls:**	Wahlpflichtfach
Zuordnung zum Curriculum:	**Studiengang, -abkürzung, SPO-Nr.**		
	M-APE, M-GFTM		

Modulverantwortliche(r):	Gallier, Carlo	
Dozent(in):	Gallier, Carlo	
Sprache:	English	
Leistungspunkte / SWS:	5 ECTS / 4 SWS	
Arbeitsaufwand:	Kontaktstunden:	47 h
	Selbststudium:	79 h
	Gesamtaufwand:	126 h
Lehrveranstaltungen des Moduls:	Global Business and Economics 1	
Lehrformen des Moduls:	SU/Ü-Lecture with practical exercises	

Studien- / Prüfungsleistungen:

LN - written exam, 90 minutes

Further information:

None

Empfohlene Voraussetzungen:

None

Angestrebte Lernergebnisse:

The course has four main objectives:

- **Knowledge competencies**: Students will learn to apply economic theories to improve strategic decision-making in global business.
- **Methodological competencies**: Students will leverage this knowledge to develop methodological competencies to analyze competitive environments in global markets.
- **Personal competencies**: Students will apply their competencies to help themselves and others to make better decisions in complex business situations.
- **Social competencies**: Students will apply their competencies to collaborate effectively within diverse and multicultural teams, contributing to the effectiveness of global markets.

Inhalt:

We take an application-oriented approach to studying global markets, with special emphasis on topics like:

- firm behaviour, competition, and efficiency
- market power and collusion
- market failure and regulation
- emerging global challenges, such as climate change and inequality
- corporate social responsibility
- cross-cultural economics

• international trade and investments • and many more if time permits
Literatur:
• MANKIW, N. Gregory und Mark P. TAYLOR, 2023. *Economics*. Hampshire: Cengage. • ACEMOGLU, Daron, David LAIBSON und John A. LIST, 2018. *Economics*. • VELASQUEZ, Manuel G., 2013. *Business Ethics: Concepts and Cases*. Harlow: Pearson Education, Limited. ISBN 978-1-292-02281-9, 978-1-292-03601-4 • LÜTGE, Christoph, UHL, Matthias, 2021. *Business Ethics: An Economically Informed Perspective* [online]. Oxford, United Kingdom: Oxford University Press PDF e-Book. ISBN 978-0-19-189685-9. Verfügbar unter: 20.500.12854/112311.
Weitere Anmerkungen/Sonstiges:
The course is held on-site. However, under special circumstances, it may also take place virtually.

Global Business and Economics 2

Modulkürzel:	GBU_GBE2	**Art des Moduls:**	Wahlpflichtfach
Zuordnung zum Curriculum:	**Studiengang, -abkürzung, SPO-Nr.**		
	M-APE, M-GFTM		

Modulverantwortliche(r):	Rauscher, Alois	
Dozent(in):	Rauscher, Alois	
Sprache:	English	
Leistungspunkte / SWS:	5 ECTS / 4 SWS	
Arbeitsaufwand:	Kontaktstunden:	47 h
	Selbststudium:	79 h
	Gesamtaufwand:	126 h
Lehrveranstaltungen des Moduls:	Global Business and Economics 2	
Lehrformen des Moduls:	SU/Ü-Lecture with practical exercises	

Studien- / Prüfungsleistungen:

LN - written exam, 90 minutes

Further information:

None

Empfohlene Voraussetzungen:

None

Angestrebte Lernergebnisse:

Students will learn to:

Knowledge

- understand the role of multinational corporations in the global economy.
- explain the determination of exchange rates and the international monetary system.
- describe the dynamics of the foreign exchange market.
- understand international debt and equity markets.
- explain the functions and impacts of international financial institutions, such as the IMF and WTO, onglobal trade and commerce.

Methodology

- apply foreign exchange risk management techniques.
- assess and adapt global financial strategies in response to currency fluctuations and international market trends.
- conduct a country risk analysis.
- apply concepts related to capital budgeting and cross-border merger & acquisition management of a multinational corporation.

Personality

- critically evaluate economic data to develop well-founded solutions during case study discussions.
- approach complex business problems with critical thinking and creative problem-solving skills.

Social Competence

- collaborate effectively in multicultural teams to solve complex global business tasks.
- demonstrate intercultural communication skills to foster strong professional relationships.

Inhalt:

- The role of multinational corporations in the global economy
- Corporate governance from a global perspective
- The determination of exchange rates and the international monetary system
- The foreign exchange market
- Foreign exchange risk management
- International debt and equity markets
- The impact of economic policies on global business and country risk analysis
- Capital budgeting for the multinational corporation
- Critical aspects regarding cross-border mergers and acquisitions

Literatur:

- EUN, Cheol S., Bruce G. RESNICK und Tuugi CHULUUN, 2021. *International Financial Management*. New York: McGraw-Hill. ISBN 978-1-260-57531-6; 1-260-57531-4
- SHAPIRO, Alan C. und Paul HANOUNA, 2020. *Multinational Financial Management*. 11. Auflage. Hoboken: Wiley. ISBN 9781119559849

Weitere Anmerkungen/Sonstiges:

No remarks.

Hardware and Software Prototyping

Modulkürzel:	UXDM_FW_HSP	**Art des Moduls:**	Wahlpflichtfach
Zuordnung zum Curriculum:	**Studiengang, -abkürzung, SPO-Nr.**		
	M-APE		

Modulverantwortliche(r):	Axmann, Bernhard	
Dozent(in):	Alvarez, Ignacio; Riener, Andreas	
Sprache:	English	
Leistungspunkte / SWS:	5 ECTS / 4 SWS	
Arbeitsaufwand:	Kontaktstunden:	47 h
	Selbststudium:	79 h
	Gesamtaufwand:	126 h
Lehrveranstaltungen des Moduls:	Hardware and Software Prototyping	
Lehrformen des Moduls:	SU/Ü-Lecture with integrated exercises	

Studien- / Prüfungsleistungen:

Proj - Project work with oral presentation (15 min) and written elaboration (5 - 25 pages)

Further information:

None

Empfohlene Voraussetzungen:

None

Angestrebte Lernergebnisse:

After active participation in the course, students

- have learned how to design physical interactions by starting from observations of users' physical behaviour and translating these into sensing and response strategies.
- have learned how to use rapid prototyping tools such as breadboards, soldering equipment, and 3D printers, laser cutters, CNC milling/turning machines, etc. effectively and safely.
- have gained knowledge about the fundamentals of electronics, including basic circuit design, sensor and actuator integration, and microcontroller programming.
- have gained a deep understanding of common software prototyping concepts and tools for (physical) UI design.
- have gained knowledge about how to use CAD tools for designing 3D printable parts and understand the principles and limitations of additive manufacturing (3D printing).
- have gained basic knowledge about manufacturing and construction principles.
- have learned, how to integrate electronic components with mechanical structures to build interactive, functional prototypes.
- know, how to document their design process, communicate technical ideas clearly, and present their prototype
- have acquired knowledge of microcontroller electronics and know how they can be controlled by computers.
- have gained the knowledge to select and integrate appropriate software and hardware components (e.g., sensors and actuators) for a given use case.

- have gained the competence to implement appropriate connectivity patterns and design robust message flows between a prototype and external systems.
- have learned to design and build a companion UI that monitors and controls a physical prototype, including clear state/feedback handling.
- have gained a deep understanding of the potential of camera-based interactions and are able to prototype camera-based interactions using MediaPipe including meaningful multimodal feedback.
- have gained knowledge about the fundamentals of text to image synthesis (latent diffusion).
- have learned how to use local tools to support creative design processes using different inputs.

Self- and social competences:
Upon completion of the module, students

- have developed self-management and reflective skills by evaluating their own contributions and learning progress in physical computing projects.
- are able to present and justify design trade-offs to peers and stakeholders.
- have learned to independently acquire missing skills needed to advance their prototypes.
- are able to balance technical feasibility with usability and user experience considerations.
- are able to collaborate effectively in small intercultural and interdisciplinary teams and assume roles responsibly to successfully contribute to joint project outcomes.

Inhalt:

This course combines theory lectures about various aspects of software and hardware prototyping with practical sessions and hands-on project work, in which the students get the chance to apply and deepen the acquired knowledge.

A) Electronics (microcontroller, sensors, actuators, communication)

- Introduction to hardware/software prototyping, including advantages, limitations, typical use cases, and illustrative examples
- Fundamentals of physical interaction, including (Arduino) microcontrollers, basic sensors, and actuators
- Visual programming for physical computing using vvvv; integration between visual programming environments and microcontrollers
- Device-to-device communication and connectivity pattern (Peer-to-peer communication, orchestration via technologies such as BLE, Wi-Fi, MQTT)
- Integration of user interfaces and embedded systems (i.e., bidirectional communication between physical prototypes and digital interfaces)

B) Physical Product Design and Prototyping

- Digital modelling and fabrication workflows for enclosures and mechanical components (e.g., Autodesk Fusion 360, 3D printing, laser cutting, CNC milling/turning machines)
- Foundations of generative AI for design, including an overview of Latent Diffusion Model (LDM) theory
- AI-supported image generation and visualization workflows for concept development and design exploration (e.g., image generation, customization, and 2D-to-3D ideation using ComfyUI)
- Product design with real-time AI-assisted sketching and visual ideation using digital drawing tools (Krita)

C) Extended Topics

- Computer vision-based interaction prototyping (e.g., camera input to enable gesture- and vision-driven interactions with MediaPipe)
- Design and implementation of companion UIs, enabling monitoring and control of physical prototypes via connected applications (e.g., React WebApp)

The lecture is complemented by an excursion to a makerspace (e.g. brigk Makerspace or TUM Makerspace).

Literatur:

- IGOE, Tom, 2017. Making things talk: [practical methods for connecting physical objects; using sensors, networks, and Arduino to see, hear, and feel your world]. Sebastobol, Ca.: MakerMedia. ISBN 978-1-68045-215-0

- BARTH, Jan, 2013. *Prototyping Interfaces: Interaktives Skizzieren mit vvvv*. Mainz: Schmidt. ISBN 978-3-87439-843-5

REAS, Casey und Ben FRY, 2014. *Processing: a programming handbook for visual designers and artists*. Cambridge, Mass. [u.a.]: MIT Press. ISBN 978-0-262-02828-8

- VAN DER AA, Han und andere, 2023. *Enterprise, Business-Process and Information Systems Modeling: 24th International Conference, BPMDS 2023, and 28th International Conference, EMMSAD 2023, Zaragoza, Spain, June 12-13, 2023, Proceedings*. Cham: Springer. ISBN 978-3-031-34241-7

Weitere Anmerkungen/Sonstiges:

The teaching concept of this course closely connects theoretical foundations and practical applications. Thus, this course is designed workshop-like: The learning contents are presented in relation to concrete areas of application and are deepened by concrete group and single tasks in the laboratory. The active participation allows students to immediately apply and deepen their understanding through experiential learning.

In addition, students will work in small groups (2–3 students) on a project of their own. In this project, they will design and build a physical computing prototype, including the construction of housing, the integration of sensors, actuators, and microcontrollers, as well as the implementation of software for control logic, communication, and system behavior.

SUS - Social Impact, Sustainability and Compliance

Modulkürzel:	GBU-SUS-SISC	**Art des Moduls:**	Wahlpflichtfach
Zuordnung zum Curriculum:	**Studiengang, -abkürzung, SPO-Nr.**		
	M-APE, M-GFTM		

Modulverantwortliche(r):	Loza Adaui, Cristian Rolando	
Dozent(in):	Loza Adaui, Cristian Rolando	
Sprache:	English	
Leistungspunkte / SWS:	5 ECTS / 4 SWS	
Arbeitsaufwand:	Kontaktstunden:	47 h
	Selbststudium:	79 h
	Gesamtaufwand:	126 h
Lehrveranstaltungen des Moduls:	SUS - Social Impact, Sustainability and Compliance	
Lehrformen des Moduls:	SU/Ü-Seminaristischer Unterricht/Übung	

Studien- / Prüfungsleistungen:

Proj - Project work with oral presentation (15 min) and written elaboration (5 - 25 pages)

Further information:

None

Empfohlene Voraussetzungen:

None

Angestrebte Lernergebnisse:

This course broadens students' understanding of the evolving role of business in addressing societal challenges. Through a combination of theoretical exploration and action learning in collaboration with the Social Impact Start-Up Academy (SISTAC), students will gain critical knowledge and skills in social impact assessment, sustainability management, and compliance. The course emphasizes the practical application of concepts through real-world engagement with a social impact start-up.

At the end of the course:

Knowledge

- Students understand sustainability management principles and their practical application in global business contexts.
- Students learn and apply diverse methods for assessing social impact.
- Students demonstrate knowledge of global regulatory frameworks and compliance requirements relevant to international business operations.

Methodology

- Students deepen their understanding of global business management by engaging directly with a social impact start-up through hands-on collaboration.
- Students enhance their analytical skills by independently evaluating business models and developing actionable proposals that address social impact, sustainability, and compliance.
- Students analyse the influence of cultural and social factors on managerial interventions within the complex socio-economic systems of a social-impact start-up operating in a developing country.

- Students refine their proposals based on iterative feedback from stakeholders, ensuring alignment with the real needs of the start-up.

Personality

- Students strengthen an awareness of their role as change agents within the global business community and its significance for advancing sustainable development.
- Students enhance their capacity for self-reflection in the action-learning process.
- Students embrace sustainability as a personal and professional value, integrating it into their future endeavours.
- Students cultivate a strong ethical mindset, enabling responsible decision-making and business practices in diverse global contexts.

Social Competence

- Students develop strategies to effectively address the organizational challenges of working in groups.
- Students learn to communicate with sensitivity to intercultural differences and expectations.
- Students acquire the skills to effectively communicate the importance of sustainability, social responsibility, and compliance to internal and external audiences.
- Students evaluate critically and improve their debate, presentation, and communication skills through practice and reflection.

Inhalt:

- Stakeholder capitalism and corporate purpose in the 21st century
- Foundations of sustainability and social impact
- Social Impact assessment tools and methods
- Sustainability management in practice
- Compliance and global regulatory frameworks
- Action learning: Social impact start-up collaboration

Literatur:

- HAHN, Rüdiger, 2022. *Sustainability Management: Global perspectives on concepts, instruments, and stakeholders*. Fellbach: Rüdiger Hahn. ISBN 978-3-982311-0-3
- RASCHE, Andreas und andere, 2023. *Corporate Sustainability: managing responsible business in a globalised world*. Cambridge: Cambridge University Press. ISBN 978-1-009-11492-9
- VANCLAY, Frank und Ana Maria ESTEVES, 2024. *Handbook of Social Impact Assessment and Management*. Cheltenham, UK: Edward Elgar. ISBN 978-1-80220-887-0
- SANDERS, Nada R. und John D. WOOD, 2015. *Foundations of Sustainable Business: Theory, Function, and Strategy*. Hoboken: Wiley. ISBN 978-1-118-44104-6
- YOUNG, Scott T. und K. Kathy DHANDA, 2013. *Sustainability: Essentials for business*. Thousand Oaks: Sage. ISBN 978-1-4129-8284-9
- RIDLEY-DUFF, Rory und Mike BULL, 2016. *Understanding Social Enterprise: Theory and practice*. London: Sage. ISBN 978-1-44629-553-3
- HAZENBERG, Richard und Claire PATERSON-YOUNG, 2022. *Social Impact Measurement for a Sustainable Future*. Cham: Palgrave Mcmillan. ISBN 978-3030-83152-3

Weitere Anmerkungen/Sonstiges:

The course is held on-site. However, under special circumstances, it may also take place virtually.

Strategic Foresight and Trend Analysis			
Modulkürzel:	StratFor_M-GFT	**Art des Moduls:**	Wahlpflichtfach
Zuordnung zum Curriculum:	**Studiengang, -abkürzung, SPO-Nr.**		
	M-WI, M-DENS, M-EGM, M-DL		

Modulverantwortliche(r):	Schwarz, Jan	
Dozent(in):	Schwarz, Jan	
Sprache:	English	
Leistungspunkte / SWS:	5 ECTS / 4 SWS	
Arbeitsaufwand:	Kontaktstunden:	47 h
	Selbststudium:	79 h
	Gesamtaufwand:	126 h
Lehrveranstaltungen des Moduls:	Strategic Foresight and Trend Analysis	
Lehrformen des Moduls:	SU/Ü-Lecture with practical exercises	

Studien- / Prüfungsleistungen:

mdlP - oral exam, 15 minutes
Further information:
None

Empfohlene Voraussetzungen:

None

Angestrebte Lernergebnisse:

The students:

- understand the most important foresight methods and can distinguish and explain them.
- can apply the methods learned in case studies.
- can methodically analyse trends and derive future developments.
- are aware of challenges in future thinking and can address these.

Inhalt:

- Customer-, technology-, and competitor-foresight
- Trend analysis and strategic early identification
- Visioning
- Strategic simulation methods
- Prognostic crowdsourcing
- Delphi method
- Scenario technique
- Trendreceiver method
- Analysis of Science Fiction

Literatur:

- ELLER, E., HOFMANN, R., SCHWARZ, J.O., 2020. The Customer Foresight Territory. In: *Marketing Review St Gallen*. (3), S.888–895.
- HEIJDEN, Kees van der, 2009. *Scenarios: the art of strategic conversation*. Chichester [u.a.]: Wiley. ISBN 0-470-02368-6, 978-0-470-02368-6
- KRUPP, Steven, Paul J. SCHOEMAKER und David J. TEECE, 2014. *Winning the long game: how strategic leaders shape the future*. New York: Public Affairs. ISBN 1-61039-447-X, 978-1-61039-447-5
- LIEBL, Franz, SCHWARZ, Jan Oliver, 2010. Normality of the Future: Trend Diagnosis for Strategic Foresight. In: *Futures*. (42 (4)), S.313-327.
- ORIESEK, Daniel F., SCHWARZ, Jan Oliver, 2021. *Winning the uncertainty game: turning strategic intent into results with wargaming* [online]. London; New York: Routledge PDF E-Book. ISBN 9781000289855, 9780367853594. Verfügbar unter: https://doi.org/10.4324/9780367853594.
- ROHRBECK, René, MENES ETINGUE, Kum, 2018. Corporate Foresight and Its Impact on Firm Performance: A Longitudinal Analysis. In: *Technological Forecasting and Social Change*. Volume 129(April), S.105-116. ISSN https://doi.org/10.1016/j.techfore.2017.12.013
- ROHRBECK, René, BATTISTELLA, Cinzia, HUIZINGH, Eelko, 2015. Corporate Foresight: An Emerging Field with a Rich Tradition. In: *Technological Forecasting & Social Change*. Volume 101(December), S.1-9. ISSN https://doi.org/10.1016/j.techfore.2015.11.002
- ROHRBECK, René, SCHWARZ, Jan Oliver, 2013. The Value Contribution of Strategic Foresight: Insights from an Empirical Study of Large European Companies. In: *Technological Forecasting and Social Change*. Volume 80(8), S.1593–1606. ISSN https://doi.org/http://dx.doi.org/10.1016/j.techfore.2013.01.004
- SCHOEMAKER, Paul J. und Robert E. GUNTHER, May 2013. *Profiting from uncertainty: strategies for succeeding no matter what the future brings*. New York: Atria Books. ISBN 978-1-5011-6175-9
- SCHWARZ, Jan Oliver, 2015. The 'Narrative Turn' in Developing Foresight: Assessing How Cultural Products Can Assist Organisations in Detecting Trends. In: *Technological Forecasting and Social Change*. (90 (Part B)), S.510–513. ISSN https://doi.org/http://dx.doi.org/10.1016/j.techfore.2014.02.024
- SCHWARZ, Jan Oliver, ROHRBECK, René, WACH, Bernhard, 2019. Corporate Foresight as a Microfoundation of Dynamic Capabilities. In: *FUTURES & FORESIGHT SCIENCE*. (e28) ISSN https://doi.org/10.1002/ffo2.28

Weitere Anmerkungen/Sonstiges:

No additional remarks.

Technology Design and Evaluation

Modulkürzel:	TechDesEva_M-GFT	**Art des Moduls:**	Wahlpflichtfach
Zuordnung zum Curriculum:	**Studiengang, -abkürzung, SPO-Nr.**		
	M-WI, M-DENS, M-EGM		

Modulverantwortliche(r):	Schönmann, Alexander	
Dozent(in):	Schönmann, Alexander	
Sprache:	English	
Leistungspunkte / SWS:	5 ECTS / 4 SWS	
Arbeitsaufwand:	Kontaktstunden:	47 h
	Selbststudium:	79 h
	Gesamtaufwand:	126 h
Lehrveranstaltungen des Moduls:	Technology Design and Evaluation	
Lehrformen des Moduls:	SU/Ü-Lecture with practical exercises	

Studien- / Prüfungsleistungen:

schrP90 - written exam, 90 minutes

Further information:

None

Empfohlene Voraussetzungen:

None

Angestrebte Lernergebnisse:

After attending the course, the students will have the following knowledge:

- know and apply important methods of technology management and can explain them.
- can propose appropriate technology development process models based on use case and company size.
- evaluate technological solutions in a team and represent advantages and disadvantages for this.
- design the implementation of workshops for eliciting requirements for development process models.
- know the tasks of technology development and know how to manage R&D processes.

Inhalt:

- Modern technologies and technology trends
- Organisation and role of Technology Management
- Technology Dynamics (Lifecycle models)
- Technology Intelligence (Technology scanning, Technology monitoring, Technology scouting, Technology identification, search field description)
- Technology information sources (formal, informal sources)
- Technology evaluation (maturity, potential, economic efficiency, Technology portfolio analysis)
- Technology planning (Roadmaps)
- R&D Management
- Technology development (Technology Stage Gate)

- Application-specific selection of adequate technologies
- Linking Technology development and Product development processes
- New Product development: Development strategies and degree of newness; “Valley of death”
- Product Development processes: e.g. V-Model, Spiral model, Lean Start-up, Trends in process design
- Quality Function Deployment
- Product Architecture: functional and physical elements (differential design vs. integral design), Types of modularity
- Role of design in the development process (e.g. DFX)
- Digital Technologies, Digital Ecosystems
- Biomimetics (learning from nature)
- Technology exploitation strategies
- Technology protection
- Case studies and Industry examples on latest trends and technologies

Literatur:

- TROTT, Paul, 2021. *Innovation management and new product development*. Harlow, England: Pearson. ISBN 978-1-292-25152-3
- SCHUH, Günther, 2011. *Technologiemanagement* [online]. Berlin [u.a.]: Springer PDF e-Book. ISBN 978-3-642-12529-4, 978-3-642-12530-0. Verfügbar unter: https://doi.org/10.1007/978-3-642-12530-0.
- KARAOMERLIOGLU, Dilek Cetindamar, Robert PHAAL und David PROBERT, 2016. *Technology management: activities and tools*. New York, NY: Palgrave Macmillan. ISBN 978-1-137-43185-1
- SAVIOZ, Pascal, 2004. *Technology Intelligence: Concept Design and Implementation in Technology Based SMEs*. Softcover reprint of the original 1. Auflage. London: Palgrave Macmillan UK. ISBN 978-1-349-51002-3, 1-349-51002-5
- ULRICH, Karl T., Steven D. EPPINGER und Maria C. YANG, 2020. *Product design and development*. New York, NY: McGraw-Hill. ISBN 978-1-260-56643-7, 1-260-56643-9
- MARITAN, Davide, 2015. *Practical Manual of Quality Function Deployment* [online]. Cham [u.a.]: Springer International Publishing PDF e-Book. ISBN 978-3-319-08521-0, 978-3-319-08520-3. Verfügbar unter: https://doi.org/10.1007/978-3-319-08521-0.
- EVERS, Natasha, James S. CUNNINGHAM und Thomas HOHOLM, 2021. *Technology entrepreneurship: bringing innovation to the marketplace*. London: Red Globe Press. ISBN 978-1-352-01117-3

Weitere Anmerkungen/Sonstiges:

A voluntary bonus system is offered: In the course, topics on methods of technology management are offered for individual processing and presentation, which lead to bonus points for the examination performance for each qualitatively processed task. The creditability as well as maximum crediting of bonus points takes place according to the APO.

Lectures contain digital learning elements for self-study, such as learning videos or meetings via web conferences.

The examination can be held in digital form on a PC at the university campus.

Course selection varies depending on availability and demand. The actual selection for each semester can be found in the timetable. Courses may be canceled at the beginning of the semester. Participation is limited in some cases.

Nachhaltiges Value Management

Modulkürzel:	NaValMana_M-DES	**Art des Moduls:**	Wahlpflichtfach
Zuordnung zum Curriculum:	**Studiengang, -abkürzung, SPO-Nr.**		
	M-WI		

Modulverantwortliche(r):	Hecht, Dirk	
Dozent(in):	Hecht, Dirk; Ziegltrum, Dieter	
Sprache:	Deutsch	
Leistungspunkte / SWS:	5 ECTS / 4 SWS	
Arbeitsaufwand:	Kontaktstunden:	47 h
	Selbststudium:	78 h
	Gesamtaufwand:	125 h
Lehrveranstaltungen des Moduls:	Nachhaltiges Value Management	
Lehrformen des Moduls:	SU/Ü-Seminaristischer Unterricht/Übung	

Studien- / Prüfungsleistungen:

LN - schriftliche Prüfung, 90 Minuten

Weitere Erläuterungen:

Keine

Empfohlene Voraussetzungen:

Keine

Angestrebte Lernergebnisse:

Die Studierenden

- verstehen die Grundprinzipien und Zielsetzungen des Value Managements (VM).
- untersuchen die Rolle von VM in der Optimierung von Prozessen, Produkten und Dienstleistungen.
- bewerten die Einsatzmöglichkeiten von VM in verschiedenen Industriezweigen.
- entwickeln Strategien, um ökologische und soziale Nachhaltigkeitsziele mit den Methoden des VM zu integrieren.
- wenden Methoden von Life Cycle Costing (LCC) und Total Cost of Ownership (TCO) in Verbindung mit VM an.
- bewerten die Effekte nachhaltigkeitsorientierter VM-Ansätze auf wirtschaftliche und ökologische Zielsetzungen.
- können Fallstudien zu aktuellen Industriethemen selbstständig erarbeiten.

Inhalt:

- Value Management und Wertanalyse
- Workshops zu Value Engineering
- Grundkenntnisse E-Technik, passive Bauelemente (R, L, C), aktive Bauelemente (Dioden, Transistoren, Operationsverstärker)
- Value Chain von Leiterplatten, Workshops zu technischen und kommerziellen Fragestellungen
- Value Engineering (Konzeptwertanalysen bis zu Produktkalkulation)

- Zero Base, Best Practice, Optimierung von Prozess und Produkten
- Konzeptwertgestaltung
- Integration frühe Phase und nachhaltige Wertverbesserung
- Nachhaltigkeit als unabdingbares Kriterium zum Werterhalt
- Fallstudien zu aktuellen Themen aus der Industrie

Literatur:

- Ohne Autor, 2011. *Wertanalyse - das Tool im Value Management: Idee, Methode, System* [online]. Berlin [u.a.]: Springer PDF e-Book. ISBN 978-3-540-79516-2, 978-3-540-79517-9. Verfügbar unter: https://doi.org/10.1007/978-3-540-79517-9.
- HERING, Ekbert, Klaus BRESSLER und Jürgen GUTEKUNST, 2017. *Elektronik für Ingenieure und Naturwissenschaftler*. Berlin: Springer Vieweg. ISBN 978-3-662-54213-2, 3-662-54213-7
- KELLER, Gustl, 1995. *Oberflächenmontagetechnik: eine praxisnahe Einführung in die SMT; mit 14 Tabellen*. Saulgau/Württ.: Leuze. ISBN 3-87480-112-8

Weitere Anmerkungen/Sonstiges:

In diesem Modul werden anhand Fallstudien und mit Lehrbeauftragten aus der Industrie aktuelle Themen durch die Studierenden selbständig erarbeitet.

- Fr 08.05.2026: 09.00 - 17.00
- Fr 15.05.2026: 09.00 - 17.00
- Fr 29.05.2026: 09.00 - 17.00
- Fr 12.06.2026: 09.00 - 17.00
- Fr 19.06.2026: 09.00 - 17.00

Design Culture Theory and Methods

Modulkürzel:	DCT_M-DL	**Art des Moduls:**	Wahlpflichtfach
Zuordnung zum Curriculum:	**Studiengang, -abkürzung, SPO-Nr.**		
	M-EGM, M-GFTM		

Modulverantwortliche(r):	Rothbucher, Bernhard	
Dozent(in):	Rothbucher, Bernhard; Schulze, Tanja	
Sprache:	English	
Leistungspunkte / SWS:	5 ECTS / 4 SWS	
Arbeitsaufwand:	Kontaktstunden:	47 h
	Selbststudium:	78 h
	Gesamtaufwand:	125 h
Lehrveranstaltungen des Moduls:	Design Culture Theory and Methods	
Lehrformen des Moduls:	SU/Ü-Lecture with integrated exercises	

Studien- / Prüfungsleistungen:

SA - Seminar paper with oral examination (15 min), written elaboration (8-15 pages) and presentation (15-20 pages)

Further information:

None

Empfohlene Voraussetzungen:

None

Angestrebte Lernergebnisse:

After attending the course, the students

- can work on complex tasks in cross-functional and international teams, solve conflicts in the team and take over team leadership.
- can organise themselves and manage their time as well as work in a goal-oriented and independent manner.
- know the performance and limits of the methods learned and can name them.
- apply frameworks for responsible innovation to ensure the ethical development and application of new technologies.
- define and explain the concepts of business ethics and technology ethics.
- can apply scientific standards to their work assignment.
- can communicate the results of their research to an expert audience.

Inhalt:

- Cultural Probing
- Intercultural Communication
- Design Culture Excursion
- Business Ethics
- Sustainability and Social Responsiveness

Literatur:
• MEYER, Erin, 2015. *The culture map: decoding how people think, lead, and get things done across cultures*. New York, NY: PublicAffairs. ISBN 978-1-61039-276-1 • BOEIJEN, Annemiek van, Jaap DAALHUIZEN und Jelle ZIJLSTRA, 2020. *Delft design guide: perspectives, models, approaches, methods*. Amsterdam, The Netherlands: BIS Publishers. ISBN 978-90-6369-540-8, 90-6369-540-3 • BOEIJEN, Annemiek van und Yvo ZIJLSTRA, 2020. *Culture sensitive design: a guide to culture in practice*. Amsterdam: BIS Publishers. ISBN 978-90-6369-561-3 • SAGMEISTER, Simon und Joe Paul KROLL, 2018. *Business culture design: develop your corporate culture with the culture map*. 1. Auflage. Frankfurt, New York: Campus Verlag. ISBN 978-3-593-50840-5, 3-593-50840-0
Weitere Anmerkungen/Sonstiges:
No remarks.

Design Leadership Methods

Modulkürzel:	DLM_M-DL	**Art des Moduls:**	Wahlpflichtfach
Zuordnung zum Curriculum:	**Studiengang, -abkürzung, SPO-Nr.**		
	M-EGM, M-GFTM		

Modulverantwortliche(r):	Rothbucher, Bernhard	
Dozent(in):	Rothbucher, Bernhard	
Sprache:	English	
Leistungspunkte / SWS:	5 ECTS / 4 SWS	
Arbeitsaufwand:	Kontaktstunden:	47 h
	Selbststudium:	78 h
	Gesamtaufwand:	125 h
Lehrveranstaltungen des Moduls:	Design Leadership Methods	
Lehrformen des Moduls:	SU/Ü-Lecture with integrated exercises	

Studien- / Prüfungsleistungen:

StA - Student research project, written elaboration 8-15 pages, presentation 15-20 pages

Further information:

None

Empfohlene Voraussetzungen:

None

Angestrebte Lernergebnisse:

After attending the course, the students can

- define and explain the concept, principles, and process of design leadership methods.
- compare different methods of design leadership methods and evaluate their suitability for different purposes.
- apply methods of design leadership on projects in product and service design.
- relate themselves to the principles of design leadership methods.
- can analyse an existing team structure and can develop a strategy to transform it into a preferred one.
- use case studies from the research literature and relate it to their real-world business situation;

Inhalt:

- Foundations of Design Leadership
- Integration Tools
- Innovation Project Simulation
- Sociography
- Visual Communication

Literatur:
• PICCHI, Andrea, 2022. *Design Management: Create, Develop, and Lead Effective Design Teams* [online]. Berkeley, CA: Apress PDF e-Book. ISBN 978-1-4842-6954-1. Verfügbar unter: https://doi.org/10.1007/978-1-4842-6954-1. • COOPER, Rachel, 2017. *The handbook of design management*. London: Bloomsbury. ISBN 978-1-3500-0001-8, 978-1-8478-8488-6 • ELKINGTON, Rob und andere, 2018. *Exceptional leadership by design: how design in great organizations produces great leadership*. Bingley, UK: Emerald Publishing. ISBN 978-1-78743-901-6 • CALABRETTA, Giulia, Gerda GEMSER und Ingo KARPEN, 2016. *Strategic design: eight essential practices every strategic designer must master*. Amsterdam: BIS publishers. ISBN 90-6369-445-8, 978-90-6369-445-6 • QUAYLE, Moura, 2017. *Designed leadership* [online]. New York ; Chichester, West Sussex: Columbia University Press PDF e-Book. ISBN 978-0-231-54468-9. Verfügbar unter: https://doi.org/10.7312/quay17312.
Weitere Anmerkungen/Sonstiges:
No remarks.

Technology Commercialization & Intellectual Property Management

Modulkürzel:	EDB_TC&IPM	**Art des Moduls:**	Wahlpflichtfach
Zuordnung zum Curriculum:	**Studiengang, -abkürzung, SPO-Nr.**		
	M-GFTM, M-DL		

Modulverantwortliche(r):	Bader, Martin	
Dozent(in):	Bader, Martin; Freytag, Rudolf; Kleyn, Madelein	
Sprache:	Englisch	
Leistungspunkte / SWS:	5 ECTS / 4 SWS	
Arbeitsaufwand:	Kontaktstunden:	47 h
	Selbststudium:	78 h
	Gesamtaufwand:	125 h
Lehrveranstaltungen des Moduls:	Technology Commercialization & Intellectual Property Management	
Lehrformen des Moduls:	SU/Ü – Lecture with practical exercises	

Studien- / Prüfungsleistungen:

Seminar paper with colloquium

Further information:

None

Empfohlene Voraussetzungen:

None

Angestrebte Lernergebnisse:

On completing the module part Technology-Commercialization, the students will have achieved the following learning outcomes:

- Understand the Concept of Technology Transfer and commercialization
- Consider the processes and different options for commercializing IP
- Understand how to de-risk technology and get it ready for market
- Understand how SMEs can successfully transfer technology and use intellectual property strategically
- Know how to negotiate and how to (successfully) close deals

On completing the module part Intellectual Property Management, the students will have achieved the following learning outcomes based on scientific methods.

Students are able to:

- Understand the relevance of intellectual property (IP) and intellectual property rights (IPRs) in the context of business innovation and its role for the innovation economy, particularly for small and medium enterprises (SMEs) and startups.
- Understand what role and impact have IPRs and patents in digital businesses.
- Understand how digital business models can be protected.
- Understand and analyse contents and structures of complex practical challenges in the current innovation ecosystem.
- Filter, structure and process relevant information from experiences and opinions.

- Evaluate and reflect the IP/IPRs needs of startups and SMEs in applying IP in business; based on the scientific state of the art in innovation and intellectual property management research, practical relevance and interdisciplinary demands of the different stakeholders.
- Briefly retrieve these intellectual property rights in reality, e.g., how to derive a patent publication of a company from the public patent databases, e.g., Espacenet

Inhalt:

The module part Technology-Commercialization will follow the outline:

- Defining Technology Transfer and commercialization
- Options of technology commercialization: The Technology Transfer Process (Starting a business or obtaining a license)
- Stakeholders' engagement
- Some considerations for technology commercialization for different industries
- IP Strategy: defining it, developing it, implementing it
- Derisking: Do I have a business and what about it?
- Derisking: Freedom to operate considerations
- Derisking: Funding considerations
- Technology licensing: Basics, negotiation tactics, different forms of licensing
- Dealmaking game

In contrast to large companies, Startups as well as Small and Medium Enterprises (SMEs) across industries often have no differentiated processes, fewer research activities, and often no software tools to manage their intellectual property (IP). These often focus on clear cost/benefit aspects of a patent. Therefore, startup need to apply more stringent criteria. They usually have a widely networked but very lean internal structure. Frequently, all IP management-related activities, e.g., the patent filing process, including file management and search activities, therefore usually involve a high degree of outsourcing to external patent law firms and consultants. In addition, the problem of IP enforceability may arise regarding available resources and high costs. E.g., in contrast to large companies, startups are often disadvantaged and therefore generally prefer to keep an invention confidential or save costs on IP management instead of building a case investing in IP as a value drive, especially about their envisioned growth or exit strategy, respectively.

The module part Intellectual Property Management will follow the outline:

- Fundamentals of intellectual property rights
- Patent protection strategies
- Evaluating and valuing patents
- Successful practices in commercializing patents
- Organizing patent management
- Patent management by Industry
- Patent management in new technology environments
- Generally useful information for startups when dealing with patents

Literatur:

- GASSMANN, Oliver, Martin A. BADER und Mark THOMPSON, 2021. *Patent Management: Protecting Intellectual Property and Innovation*. Cham, Switzerland: Springer. ISBN 978-3-030-59008-6
- BADER, Martin A., SÜZEROGLU-MELCHIORS, Sevim, 2023. *Intellectual Property Management for Start-ups: Enhancing Value and Leveraging the Potential* [online]. Cham: Springer PDF e-Book. ISBN 978-3-031-16993-9. Verfügbar unter: https://doi.org/10.1007/978-3-031-16993-9.
- Ohne Autor. [online]. [Zugriff am:]. Verfügbar unter: https://www.wipo.int/e-docs/pubdocs/en/wipo_casestudy_ip_comm_za.pdf
- LAX, David A., SEBENIUS, James K.. *Deal Making 2.0: A Guide to Complex Negotiations* [online]. Harvard Business Reviev: Harvard Business Publishing (HBP), Nov 2012 [Zugriff am: 28.12.2023]. Verfügbar unter: https://hbr.org/2012/11/deal-making-20-a-guide-to-complex-negotiations

- BADER, Martin A., 2006. Intellectual property management in R&D collaborations: The case of the service industry sector. Heidelberg: Physica. ISBN 3-7908-1702-3, 978-3-7908-1702-7
- BONAKDAR, Amir, FRANKENBERGER, Karolin, BADER, Martin A., GASSMAN, Oliver, 2017. *Capturing value from business models: The role of formal and informal protection strategies* [online]. International Journal of Technology Management, 2017 Vol.73 No.4, pp.151 - 175: International Journal of Technology Management, 20.03.2017. Verfügbar unter: 10.1504/IJTM.2017.083073
- Ohne Autor. *How to revolutionize your industry* [online]. Verfügbar unter: https://www.youtube.com/watch?v=B4ZSGQW0UMI
- FECHTELPETER, C. und andere, 2020. Integrated technology transfer concept for fostering innovation in SMEs. In: *26th International Association for Management of Technology Conference, IAMOT 2017*, S. 1028-1048.
- Hau, Yong. (2016). An empirical analysis of the influence of external knowledge network on SMEs' new technology development and technology commercialization capabilities in the perspective of open innovation. Journal of Digital Convergence. 14. 149-156. 10.14400/JDC.2016.14.5.149.
- Jo, D.H. & Park, J.W. (2017). The Determinants of Technology Commercialization Performance of Technology-based SMEs. KSII Transactions on Internet and Information Systems. 11. 4146-4161. 10.3837/tiis.2017.08.023.
- Park, T., Ryu, D. 2015 Drivers of technology commercialization and performance in SMEs: the moderating effect of environmental dynamisms Management Decision, 53 (2), pp. 338-353.
- TECHNOLOGY TRANSFER INNOVATION, Tom Hockaday, Publisher: Johns Hopkins University Press, Publication Date: April 2020: http://www.technologytransferinnovation.com/book.html
- Van Hemert, P., Nijkamp, P., Masurel, E. 2013 From innovation to commercialization through networks and agglomerations: analysis of sources of innovation, innovation capabilities and performance of Dutch SMEs Annals of Regional Science, 50 (2), pp. 425-452.
- Walker, Andy & Ellis, Harry. (2011). TECHNOLOGY TRANSFER: STRATEGY, MANAGEMENT, PROCESS AND INHIBITING FACTORS. A STUDY RELATING TO THE TECHNOLOGY TRANSFER OF INTELLIGENT SYSTEMS. International Journal of Innovation Management. 04. 10.1142/S1363919600000068.
- Alpaydin, Utku & Fitjar, Rune. (2020). Proximity across the Distant Worlds of University-Industry Collaborations. Papers in Regional Science. 100. 10.1111pirs.12586.
- Etzkowitz, Henry. (2003). Innovation in Innovation: The Triple Helix of University-Industry-Government Relations. Social Science Information Sur Les Sciences Sociales - SOC SCI INFORM. 42. 293-337. 10.1177/05390184030423002.
- Jin, C.-H., Lee, J.-Y. 2020 The impact of entrepreneurship on managerial innovation capacity: The moderating effects of policy finance and management support South African Journal of Business Management, 51 (1), art. no. a246.
- Thompson, N.A., Herrmann, A.M., Hekkert, M.P. 2018 SME Knowledge Commercialization Through Public Sector Partnerships International Journal of Innovation and Technology Management, 15 (3), art. no. 1850021.
- Festel, G. 2015 Technology transfer models based in academic spin-offs within the industrial biotechnology sector International Journal of Innovation Management, 19 (4), art. no. 1550031.
- Kim, S.-S. 2020 Research on the effect factors of technical performance on SMEs by industrial sectors Entrepreneurship and Sustainability Issues, 8 (2), pp. 1120-1141.
- Meijer, L.L.J., Huijben, J.C.C.M., van Boxstael, A., Romme, A.G.L. 2019 Barriers and drivers for technology commercialization by SMEs in the Dutch sustainable energy sector Renewable and Sustainable Energy Reviews, 112, pp. 114-126.
- Glover, Garrett and Rader, Randall R., Why Every Company Should Have a Written Ip Licensing Policy (October 20, 2021). les Nouvelles - Journal of the Licensing Executives Society, Volume LVI No. 4, December 2021, Available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3946573.
- John Cronin and Paul DiGiammarino, Understanding and unifying diverse IP strategy perspectives, 2009, www.iam-media.com.

- Kim, M.-S., Lee, C.-H., Choi, J.-H., Jang, Y.-J., Lee, J.-H., Lee, J., Sung, T.-E. 2021 A study on intelligent technology valuation system: Introduction of kibo patent appraisal system II Sustainability (Switzerland), 13 (22), art. No. 12666.
- Patel, Developing an IP Checklist https://assets.fenwick.com/legacy/FenwickDocuments/Patent_Checklist.pdf.
- Gliga, G., Evers, N. 2010 Marketing challenges for high-tech SMEs Innovative Marketing, 6 (3), pp. 104-112.
- Kwon, Y.-I., Son, J.-K. 2018 A case study on the promising product selection indicators for small and medium-sized enterprises (SMEs) Journal of Open Innovation: Technology, Market, and Complexity, 4 (4), art. no. 56.
- Redondo, M., Camarero, C. and van der Sijde, P. (2021), "Exchange of knowledge in protected environments. The case of university business incubators", European Journal of Innovation Management, Vol. ahead-of-print No. ahead-of-print. https://doi.org/10.1108/EJIM-08-2020-0341.
- Taekyung Park & Jaehoon Rhee (2013) Network types and performance in SMEs: the mediating effects of technology commercialization, Asian Journal of Technology Innovation, 21:2, 290-304, DOI: 10.1080/19761597.2013.866311.
- Han, Junghee. (2017). Technology Commercialization through Sustainable Knowledge Sharing from University-Industry Collaborations, with a Focus on Patent Propensity. Sustainability. 9. 1808. 10.3390/su9101808.
- Kleyn, Madelein, Freedom to Operate Conundrum (October 20, 2021). les Nouvelles - Journal of the Licensing Executives Society, Volume LVI No. 4, December 2021, available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3946602.
- Daniel Gredel, Matthias Kramer, Boris Bend, Patent-based investment funds as innovation intermediaries for SMEs: In-depth analysis of reciprocal interactions, motives and fallacies, Technovation, Volume 32, Issues 9–10, 2012, Pages 536-549, ISSN 0166-4972, https://doi.org/10.1016/j.technovation.2011.09.008.
- Bobrowicz D. 2007. A Checklist for Negotiating License Agreements. In Intellectual Property Management in Health and Agricultural Innovation: A Handbook of Best Practices (eds. A Krattiger, RT Mahoney, L Nelsen, et al.). MIHR: Oxford, U.K., and PIPRA: Davis, U.S.A. Available online at www.ipHandbook.org.
- Vigil, Robert L. and Zhang, Xiao, Apportioning Value in Patent Portfolio License and Sale Agreements (October 19, 2020). les Nouvelles - Journal of the Licensing Executives Society, Volume LV No. 4, December 2020, Available at SSRN: https://ssrn.com/abstract=3714864.
- Asgari, M.J., Zakery, A., Pishvaee, M.S. 2021 Open innovation antecedents and its consequences on commercialization performance in small and medium-sized enterprises 2021 Kybernetes, 10.1108/K-07-2020-0458.
- Erik E. Lehmann, Michele Meoli & Stefano Paleari (2021) Innovation, entrepreneurship and the academic context, Industry and Innovation, 28:3, 235-246, DOI: 10.1080/13662716.2021.1904843.
- http://www.buildingipvalue.com/08_intro/31-36IAG.pdf
- https://sifted.eu/articles/university-spinouts-system-not-broken/
- https://www.computerworld.com/article/3558568/university-spinouts-what-are-the-benefits-of-the-system-and-how-does-it-work.html
- https://www.firma.de/en/company-formation/the-gmbh-the-pros-and-cons-of-the-german-limited-liability-company-llc/
- https://www.gov.uk/government/publications/intellectual-asset-management-for-universities
- https://www.mtu.edu/research/innovation/commercialize-technology/process/
- https://www.ucop.edu/knowledge-transfer-office/innovation/training-and-education/technology-commercialization-process.html
- https://www.utoledo.edu/research/TechTransfer/TTandCommProcess.html
- Lee, Jun & Hong, Jung-Wan & Lee, Seok Kee. (2016). A Study on Business Model Consulting Framework for Technology Commercialization of ICT SMEs. Indian Journal of Science and Technology. 9. 10.17485ijst2016v9i2697315

- VIGIL, Robert L., ZHANG, Xiao, 2020. Apportioning Value In Patent Portfolio License And Sale Agreements. In: *les Nouvelles - Journal of the Licensing Executives Society*. 2020(Vol. LV (4)), S.21. ISSN https://www.ssrn.com/abstract=3714864
- BOBROWICZ, Donna, 2007. A Checklist for Negotiating License Agreements. In: Anatole KRATTIGER, Hrsg. *Intellectual Property Management in Health and Agricultural Innovation: A Handbook of Best Practices*. Oxford, U.K.: MIHR, S. 20. ISBN www.iphandbook.org

Weitere Anmerkungen/Sonstiges:

No remarks.

Entrepreneurship & Innovation Management			
Modulkürzel:	ES_Inno_Mgt_M_EGM	**Art des Moduls:**	Wahlpflichtfach
Zuordnung zum Curriculum:	**Studiengang, -abkürzung, SPO-Nr.**		
	M-DL		

Modulverantwortliche(r):	Albrecht, Tobias	
Dozent(in):	Albrecht, Tobias	
Sprache:	English	
Leistungspunkte / SWS:	5 ECTS / 4 SWS	
Arbeitsaufwand:	Kontaktstunden:	47 h
	Selbststudium:	78 h
	Gesamtaufwand:	125 h
Lehrveranstaltungen des Moduls:	Entrepreneurship & Innovation Management	
Lehrformen des Moduls:	SU/Ü-Lecture with practical exercises	

Studien- / Prüfungsleistungen:

Proj - Project work with oral presentation (15 min) and written elaboration (5 - 25 pages)
Further information:
None

Empfohlene Voraussetzungen:

None

Angestrebte Lernergebnisse:

The students get to:

- understand the challenges and pitfalls of starting up a company.
- comprehend important aspects of innovations.
- be able to apply innovation management tools.
- know how to implement start-up specific management concepts.
- be able to develop convincing business plans.
- be able to effectively work as a team.
- further improve their presentation skills.
- understand the relevance of innovation and entrepreneurship for society.
- understand the effectiveness of intercultural competencies by developing innovative ideas.

Inhalt:

Theory

- What is entrepreneurship?
- Innovation: types, sources, how to find?
- Innovation management and strategy
- Start-ups: strategy agile product development, marketing, financing
- Business plans

- Other relevant topics: e.g. legal forms, intellectual property right

Start-up project:

- Creating of a business concept along 3 milestones, incl. pitch-presentations
- Formulating a business plan as a team
- Development of a prototype/mock-up ad a pitch-Videos

Literatur:

- KAWASAKI, Guy, 2015. *The art of the start 2.0: the time-tested, battle-hardened guide for anyone starting anything*. London: Portfolio Penguin. ISBN 978-0-241-18726-5
- RIES, Eric, 2019. *The lean startup: how constant innovation creates radically successful businesses*. London: Penguin Business. ISBN 978-0-670-92160-7
- TIDD, Joe und John R. BESSANT, 2025. *Managing innovation: integrating technological, market and organizational change*. Hoboken, NJ: Wiley. ISBN 978-1-394-25206-0

Weitere Anmerkungen/Sonstiges:

The course is held on-site. However, under special circumstances, it may also take place virtually. Course selection varies depending on availability and demand. The actual selection for each semester can be found in the timetable. Courses may be canceled at the beginning of the semester. Participation is limited in some cases.

Advanced Video Marketing

Modulkürzel:	FW_M_AdvVidMar	**Art des Moduls:**	Wahlpflichtfach
Zuordnung zum Curriculum:	**Studiengang, -abkürzung, SPO-Nr.**		
	M-WI, M-APE, M-DL, M-EGM, M-GFTM, M-DES		

Modulverantwortliche(r):	Huber, Sina	
Dozent(in):	Huber, Sina	
Sprache:	Deutsch/Englisch	
Leistungspunkte / SWS:	5 ECTS / 4 SWS	
Arbeitsaufwand:	Kontaktstunden / Contact hours:	47 h
	Selbststudium / Self-study:	78 h
	Gesamtaufwand / Total workload:	125 h
Lehrveranstaltungen des Moduls:	Applied Video Marketing	
Lehrformen des Moduls:	SU/Ü-Seminaristischer Unterricht/Übung SU/Ü-Lecture with practical exercises	

Studien- / Prüfungsleistungen:

Proj - Projektarbeit mit mdl. Präsentation (15 Min.) und schriftlicher Ausarbeitung (5 Seiten) / Project thesis (5 pages) with oral presentation (15 minutes)

Weitere Erläuterungen / Further information:
Keine / None

Empfohlene Voraussetzungen:

Keine / None

Angestrebte Lernergebnisse:

Das Modul Advanced Video Marketing: Explaining Complex Concepts behandelt die videobasierte Vermittlung komplexer technischer, wissenschaftlicher oder analytischer Inhalte.

In Teamarbeit entwickeln die Studierenden erklärende Videoinhalte aus ihrem eigenen Fachgebiet. Dabei setzen sie sich mit der Herausforderung auseinander, komplexe Inhalte verständlich darzustellen, ohne sie fachlich zu verfälschen oder unzulässig zu vereinfachen.

Nach Abschluss des Moduls können die Studierenden:

- komplexe fachliche Inhalte präzise und verständlich per Video erklären.
- Erklärungen gezielt auf unterschiedliche Zielgruppen ausrichten.
- geeignete Videoformate für erklärende Inhalte auswählen und begründen.
- abstrakte Modelle, Prozesse oder Methoden visuell und sprachlich aufbereiten.
- Vereinfachungen, Annahmen und Grenzen kritisch reflektieren.
- erklärende Videos hinsichtlich fachlicher Korrektheit, Verständlichkeit und Wirkung bewerten.
- eigenständig und verantwortungsvoll in anspruchsvollen, projektbasierten Teams arbeiten.

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The course Advanced Video Marketing: Explaining Complex Concepts focuses on the communication of complex technical, scientific, or analytical content through video.

Students work in teams to develop explanatory video content based on their own field of study. The course addresses the challenge of making complex concepts understandable without oversimplifying them.

After completing the course, students will be able to:

- explain complex technical or scientific concepts clearly and accurately using video.
- structure explanations according to different target audiences (e.g. peers, decision-makers, non-experts).
- select and justify appropriate video formats for explanatory purposes.
- translate abstract models, processes, or methods into visual and verbal explanations.
- reflect critically on simplification, assumptions, and limitations in video communication.
- evaluate explanatory videos with respect to correctness, clarity, and impact.
- work independently and responsibly in advanced, project-based teams.

Inhalt:

Das Modul ist projektorientiert aufgebaut und legt den Schwerpunkt auf die iterative Entwicklung erklärender Videoinhalte. Behandelte Inhalte sind unter anderem:

- Prinzipien der videobasierten Erklärung komplexer Inhalte
- Abstraktionsebenen und zielgruppenorientierte Vermittlung
- erklärendes Storytelling für Prozesse, Modelle und Systeme
- Visualisierung von Wissen
- Kombination von sprachlicher Erklärung und visuellen Elementen
- Zielkonflikt zwischen fachlicher Genauigkeit und Verständlichkeit
- Expertenrolle vor der Kamera und argumentatives Erklären
- Feedback, Überarbeitung und kritische Reflexion der Inhalte
- Präsentation und Diskussion der finalen erklärenden Videoprojekte

Die Studierenden erstellen im Verlauf des Semesters mehrere Entwürfe erklärender Videos und fassen ihre Ergebnisse in einem abschließenden Videoportfolio zusammen

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The module is structured around applied explanatory video projects and iterative refinement. Key topics include:

- principles of explaining complex concepts through video
- abstraction levels and audience-oriented explanation
- explanatory storytelling for processes, models, and systems
- visualisation of knowledge (diagrams, overlays, screen capture)
- combining verbal explanation with visual elements
- accuracy vs. accessibility in technical communication
- expert presence on camera and argument-driven explanations
- feedback, revision, and critical reflection of explanatory content
- presentation and discussion of final explanatory video projects

Students produce multiple explanatory video drafts and compile a final portfolio of completed videos

Literatur:

- MAYER, R. E., 2020. *Multimedia learning*. Cambridge: Cambridge University Press.
- ILLINGWORTH, S. und G. ALLEN, 2024. *Effective science communication: A practical guide to surviving as a scientist*.
- PATTISS, Jörg, 2018. *Praxisratgeber Video Marketing: Strategie, Produktion, Tools, Verbreitung*.

Weitere Anmerkungen/Sonstiges:
Keine Anmerkungen / No remarks.