



Modulhandbuch HT-M

Module catalogue

Fakultät für Holztechnik und Bau

Faculty of Wood Technology and Construction

Studien- und Prüfungsordnung vom 23.01.2023
gültig für Studierende mit Studienbeginn ab 1.10.2023

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2. Modulplan *Curriculum*

Vollzeitstudium *full-time studies*

Master Holztechnik (Wood Technology) SPO 2023

CREDIT POINTS (CP)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
1	Advanced Mathematics		Scientific Working		Programming for Data Science				Advanced wood-based materials				Advanced technical and management modules						Ethics of Sustainability		Supply Chain Manag.		Mass Customization		Leadership		30				
2	Statistics & Data Science				Energy, Wood Supply, Logistics				Advanced technical and management modules										Scientific Methods		Financing		Investment		30						
3	Master's Thesis																												30		
Total 90 CP																															
Mathematics and Sciences					Skills for Management					General modules					Electives																

Teilzeitstudium *part-time studies*

Master Holztechnik (Wood Technology) SPO 2023

CREDIT POINTS (CP)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
1 or 3	Advanced Mathematics			Advanced wood-based materials					Supply Chain Manag		Leadership		Ethics of Sustainability		Advanced technical and management modules	15
2 or 4	Scientific Methods			Financing		Investment		Advanced technical and management modules								15
3 or 1	Scientific Working		Programming for Data Science					Mass Customization		Advanced technical and management modules						15
4 or 2	Statistics & Data Science					Energy, Wood Supply, Logistics					Advanced technical and management modules					15
5	Master's Thesis														30	
6																
Total 90 CP																
Mathematics and Sciences			Skills for Management													
General modules			Electives													

3. Erklärung der Abkürzungen *Explanation of abbreviations*

MA	=	Masterarbeit <i>Master's Thesis</i>
ECTS	=	European Credit Transfer System
eIP	=	elektronische Prüfung <i>electronical examination</i>
Ex	=	Exkursion <i>Excursion</i>
FWPM	=	Fachbezogenes Wahlpflichtmodul <i>Specialist required Elective Courses</i>
LN	=	Leistungsnachweis
mdIP	=	mündliche Prüfung <i>oral examination</i>
P	=	Prüfungen <i>exams</i>
Pr	=	Praktikum <i>work experience</i>
PStA	=	Prüfungsstudienarbeit <i>coursework (such as a work experience report, or a colloquium for group work with an additional, individual examination)</i>
S	=	Seminar <i>seminar</i>
schrP	=	schriftliche Prüfung <i>written examination</i>
SU	=	Seminaristischer Unterricht <i>seminar-based lectures</i>
SV	=	Seminarvortrag <i>seminar presentation</i>
SWS	=	Semesterwochenstunden <i>hours per week per semester</i>
TN	=	Teilnahmenachweis <i>attendance certification</i>
Ü	=	Übung <i>practical exercise</i>

4. Häufigkeit und Verwendbarkeit in anderen Studiengängen *Frequency and applicability in other degree programmes*

Modul-Nr. <i>Module Nr.</i>	Modul-Name <i>Module name</i>	Angeboten im <i>offered in</i>		Gemeinsames Modul mit anderen Studiengängen (Master) <i>Joint module with other degree programmes (Master)</i>
		WiSe	SoSe	
MG 04	Advanced Mathematics	x		
MG 05	Scientific Working	x		
MG 06	Statistics & Data Science		x	
MG 07	Programming for Data Science	x		WI-M
MM 03	Financing		x	
MM 04	Investment		x	
MM 07	Mass Customization	x		
MM 08	Leadership	x		
MM 09	Scientific Methods		x	
MM 10	Supply Chain Management	x		
MM 11	Ethics of Sustainability	x		
MF 02	Excursion		x	
MF 03	Project Seminar: Systems Engineering		x	
MF 04	Furniture – Product Safety and Testing		x	
MF 05	Special Aspects of the Wood Processing industries		x	
MF 06	Change Management		x	
MF 13	Quality Management		x	
MF 21	Innovation Management and New Product Development	x		
MF 24	Machine Learning & Artificial Intelligence	x		GP-M WIF-B
MF 25	Data driven production design		x	
MW 01	Energy, Wood Supply and Logistics		x	
MW 03	Advanced wood-based materials	x		

5. Übersicht Workload *Overview Course Workload*

SPO Nr.	Modul- Nr. <i>Module Nr.</i>	Modul-Name <i>Module name</i>	SWS <i>contact hours/week</i>				Prä- senz- zeit <i>contact hours</i> in h	Ex- kursio n <i>Excurs ion</i> in h	Häusliche Vor- und Nach- bereitung und Prü- fungsvorbe- reitung <i>preparation and follow- up work at home, exam pre- paration</i> in h	ECTS
1	MG 04	Advanced Mathema- tics	2				30		60	3
1	MG 05	Scientific Working		2			30		30	2
1	MG 06	Statistics & Data Sci- ence	4				60		90	5
1	MG 07	Programming for Data Science	4				60		90	5
2	MM 03	Financing	2				30		30	2
2	MM 04	Investment	2				30		30	2
2	MM 07	Mass Customization	2				30		30	2
2	MM 08	Leadership		4			60			2
2	MM 09	Scientific Methods		2			30		60	3
2	MM 10	Supply Chain Ma- nagement	2				30		30	2
2	MM 11	Ethics of Sustainability	2				30		30	2
3	MF 02	Excursion		2				50	10	2
3	MF 03	Project Seminar: Sys- tems Engineering		2			30		90	4
3	MF 04	Furniture – Product Safety and Testing		2			30		90	4
3	MF 05	Special Aspects of the Wood Processing in- dustries	2				30		30	2
3	MF 06	Change Management	2				30		30	2
3	MF 13	Quality Management	2				30		30	2

SPO Nr.	Modul- Nr. <i>Module Nr.</i>	Modul-Name <i>Module name</i>	SWS <i>contact hours/week</i> SU S Ü Pr				Prä- senz- zeit <i>contact hours</i> in h	Ex- kursio n <i>Excurs ion</i> in h	Häusliche Vor- und Nach- bereitung und Prü- fungsvorbe- reitung <i>preparation and follow- up work at home, exam pre- paration</i> in h	ECTS
3	MF 21	Innovation Manage- ment and New Pro- duct Development	2				30		90	3
3	MF 24	Machine Learning & Artificial Intelligence	4				60		90	5
3	MF 25	Data driven produc- tion design	2				30		30	2
4	MW 01	Energy, Wood Supply and Logistics	5				75		75	5
4	MW 03	Advanced wood-ba- sed materials	4				60		90	5
5	MA 01	Master's Thesis					0		900	30
		Summe	51 - 57				2700			90

6. Modulbeschreibungen *Module descriptions*

Anmerkung zu den Prüfungsmodalitäten

Die in den Modulbeschreibungen angegeben erlaubten Hilfsmittel in den Prüfungen stellen einen Stand beim Erstellen der Beschreibungen dar und können von Semester zu Semester aus verschiedenen Gründen abweichen.

Deshalb gilt:

„Die verbindliche Bekanntmachung der Prüfungsmodalitäten in Pflicht- und Wahlpflichtmodulen, sowie der näheren Bestimmungen zu den Leistungs- und Teilnahmenachweisen, erfolgt durch die Bekanntmachung auf der Homepage der TH-Rosenheim.“

Note on the examination modalities

The permitted aids in the examinations specified in the module descriptions represent the status at the time the descriptions were created and may differ from semester to semester for various reasons.

The following therefore applies:

„The mandatory examination requirements and examination format(s) and regulations for each module, as well as the graded components, their respective weighting and the participation requirements, are decided each semester by the HTB Faculty Council. This information is published by the Examinations Office each semester on the website of the TH Rosenheim.“

<https://www.th-rosenheim.de/studium-und-weiterbildung/im-studium/studienorganisation/studienregelungen/pruefungsankuendigungen>

Modul Nr. MG 04	Advanced Mathematics
Courses of the module	(1) Advanced Mathematics
Duration of the module	1 semester
Semester of study	1 st semester
Responsible for the module	Prof. Dr. Birgit Naumer
Lecturer	Prof. Dr. Birgit Naumer
Teaching Language	English
Credit Points (ECTS)	3 ECTS
Type of Teaching Method	2 SWS (contact hours/week) = seminar-type teaching
Total workload	Contact hours (15 weeks * 2 SWS) = 30 h preparation and follow-up work at home, exam preparation = 60 h total (3 ECTS * 30 h/ECTS) = 90 h
Assignment to the curriculum	HT-M SPO 20192 HT-M SPO 20232
Applicability in other degree programmes	
Course prerequisites	- fundamental knowledge of mathematics, especially Calculus
Module Objectives / Intended Learning Outcomes (1)	This course imparts the following knowledge: - Knowledge of roundoff errors and limited accuracy of numerical methods assessing algorithmic variants with respect to their use, performance and reliability of results. - Knowledge of numerical methods and having an idea of how, why, and when they can be expected to work. skills: - Having the vocabulary to discuss about the mathematical topics covered in the course. competences: - Ability for further study of numerical analysis and scientific computing based on the foundation of the course.
Contents (1)	- floating point numbers and errors caused by floating point arithmetic - polynomial interpolation and splines - numerical integration - numerical solution of ordinary differential equations

Modul Nr. MG 04	Advanced Mathematics
Literature (1)	• Applied Numerical Methods with MATLAB for Engineers and Scientists: Steven C. Chapra, McGraw-Hill Education • Numerical Analysis: R. L. Burden, J. D. Faires, Brooks/Cole Cengage Learning
Examination Attainments & Performance Rating	participation in the self-study units written exam (60 min)
Resources during the exam	non-programmable pocket calculator; Open book
Remarks	self-study units with on-line quizzes, peer instruction

Modul Nr. MG 05	Scientific Working
Courses of the module	(1) Scientific Working
Duration of the module	1 semester
Semester of study	1 st semester
Responsible for the module	Prof. Dr. Michael Risse
Lecturer	Prof. Dr. Michael Risse
Teaching Language	English
Credit Points (ECTS)	2 ECTS
Type of Teaching Method	2 SWS (contact hours/week) = seminar-type teaching
Total workload	Contact hours (15 weeks * 2 SWS) = 30 h preparation and follow-up work at home, exam preparation = <u>30 h</u> total (2 ECTS * 30 h/ECTS) = <u>60 h</u>
Assignment to the curriculum	HT-M SPO 20192 HT-M SPO 20232
Applicability in other degree programmes	
Course prerequisites	
Module Objectives / Intended Learning Outcomes (1)	This course imparts the following knowledge: - to understand the importance of methodological approaches to scientific work - to understand and apply citation rules - to analyse and present scientific data skills: - to perform a literature search of peer-reviewed articles in order to place a scientific work within the current state of research - to define research questions for a scientific work in an area of wood technology - to engage in scientific discussions - to write scientific report and present own research results in a poster format competences:

Modul Nr. MG 05	Scientific Working
	- to understand the importance and relevance of scientific work in wood technology, including topics such as sustainability assessments, circular economy, value chain optimisation, among others. - to critically evaluate scientific publications - to reflect independently on and examine critically a scientific problem
Contents (1)	Modul 1: Introduction, Developing Research Questions, Idea Structuring Modul 2: Literature Search, Scientific Writing Modul 3: Topic and Research Question Presentation, Scientific Report Writing Modul 4: Individual Group Feedback Modul 5: Presenting Data Modul 6: Project Work Modul 7: Poster Presentations
Literature (1)	- Glasman-Deal, H. (2020). Science research writing: for native and non-native speakers of English. World Scientific. - Markman, R., Markman, P. T., Waddell, M. L. (2001). 10 Steps in Writing the Research Paper. Vereinigtes Königreich: Barrons Educational Series. - Required reading and papers will be provided during the lecture.
Examination Attainments & Performance Rating	Project Poster (50%) – Group including Poster Presentation (20%) – Group Data Presentation (20%) – Individual Article Presentations (Mind Map) (10%) – Group
Resources during the exam	
Remarks	Group Work, Class attendance is compulsory.

Modul Nr. MG 06	Statistics & Data Science
Courses of the module	(1) Statistics & Data Science
Duration of the module	1 semester
Semester of study	2 nd semester
Responsible for the module	Prof. Dr. Benjamin Tischler
Lecturer	Prof. Dr. Benjamin Tischler
Teaching Language	English
Credit Points (ECTS)	5 ECTS
Type of Teaching Method	4 SWS (contact hours/week) = seminar-type teaching
Total workload	Contact hours (15 weeks * 4 SWS) = 60 h preparation and follow-up work at home, exam preparation = 90 h total (5 ECTS * 30 h/ECTS) = <u>150 h</u>
Assignment to the curriculum	HT-M SPO 20192 HT-M SPO 20232
Applicability in other degree programmes	
Course prerequisites	- Basic knowledge of statistics (mean, standard deviation and variance) and good grasp of essentials of calculus and some linear algebra - basic programming skills in Python (control structures e.g. for- and while-loops, if-else; basic data structures e.g. lists, dictionaries, tuples, sets; functions; plotting data; using methods and attributes of objects) as can be acquired: 1. in the module “Programming for Data Science” – if you do not have Python skills and/or if you want to take highly complementary courses it is recommended to take the “Programming for Data Science” module in the same semester or before attending this module 2. in the numerous free online Python tutorials & courses – use google
Module Objectives / Intended Learning Outcomes (1)	This course imparts the following knowledge: Knowledge of statistical methods for describing and visualizing information

Modul Nr. MG 06	Statistics & Data Science
	• Knowledge of statistical and machine learning methods for predictions • Knowledge of statistical methods for statistical inference (quantifying uncertainty) • Knowledge of the numerous valuable applications for Statistics and Machine Learning skills: • Being able to use and programm Statistics and Data Science Methods in Python competences: • Being a competent user of data and of methods that help to analyse and use the information stored in data • Having an overview of both the fields of Statistics and Data Science (including Machine Learning i.e. Artificial Intelligence) • Inspiration on where and how to use Statistics and Data Science in the real world to solve problems and create value
Contents (1)	• Descriptive Statistics & Visualization • Data Generation & Design of Experiments • Introduction to Probability & Stochastics • Statistical Inference • Regression • Introduction to Data Science, Machine Learning & Artificial Intelligence • Supervised Machine Learning • Unsupervised Machine Learning • Neural Networks & Deep Learning
Literature (1)	• David Freedman, Robert Pisani, Roger Purves 2007, Statistics 4ed • Jeffrey Wooldridge 2012 Introductory Econometrics: A Modern Approach • Trevor Hastie, Robert Tibshirani, Jerome H. Friedman 2008 The Elements of Statistical Learning https://hastie.su.domains/Papers/ESLII.pdf • Ian Goodfellow, Yoshua Bengio, Aaron Courville 2016 Deep Learning https://www.deeplearningbook.org/
Examination Attainments & Performance Rating	participation in the self-study units written exam (90 min)
Resources during the exam	non-programmable pocket calculator; 2 one-sided pages handwritten
Remarks	demonstrating results of programmes, interactive teaching tools

Modul Nr. MG 07	Programming for Data Science
Courses of the module	(1) Programming for Data Science
Duration of the module	1 semester
Semester of study	1 st semester
Responsible for the module	Prof. Dr. Noah Klarmann
Lecturer	Prof. Dr. Noah Klarmann
Teaching Language	English
Credit Points (ECTS)	5 ECTS
Type of Teaching Method	4 SWS (contact hours/week) = seminar-type teaching
Total workload	Contact hours (15 weeks * 4 SWS) = 60 h preparation and follow-up work at home, exam preparation = 90 h total (5 ECTS * 30 h/ECTS) = <u>150 h</u>
Assignment to the curriculum	HT-M SPO 20192 HT-M SPO 20232
Applicability in other degree programmes	(1) Master degree programme in Industrial Engineering
Course prerequisites	- elementary math skills - Participants must bring their own laptop to the course.
Module Objectives / Intended Learning Outcomes (1)	This course imparts the following knowledge: The course starts with a language-agnostic introduction to basic terms and concepts of programming such as control flows (e.g., if conditions, for loops), data types (e.g., integers, strings, floats), functions (modularized code segments) and the various programming paradigms (e.g., procedural, object-oriented). Moreover, the concept of data-oriented programming is introduced. Students are going to understand under which conditions data is valuable and how it can support decision making in a variety of different applications. skills: In the first part of the course, participants learn to write programs in Python by solving assignments in supervised exercises. The tutorials address typical problems that the participants will face in their future professional life. In the second part of the course, attendees learn how to develop programs that can handle large

Modul Nr. MG 07	Programming for Data Science
	data sets. For this purpose, the commonly used data science libraries are introduced. This includes standard pre-processing steps such as cleaning, transforming, merging, or reshaping the data. Furthermore, students learn to extract valuable insights from large data sets by calculating arbitrary metrics (e.g., statistical properties) and/or visualizing the data. competences: Data-driven decision making for strategic and operational purposes is inherently objective and efficient and hence frequently lead to significant competitive advantages for companies. To this end, data scientists work at the interface between management and the data-producing entities, where they require programming skills as well as domain knowledge to holistically grasp the problem and to extract the right answers from the data. In this context, the course provides the knowledge and skills necessary to address real-world problems that course participants will face in their future professional roles as managers or engineers/developers. In addition to programming skills and basic data analysis techniques, students will gain a foundation to explore more advanced concepts - such as machine learning - that are subject of subsequent courses.
Contents (1)	The course is structured in the following three parts: 1. Programming: Learning to write arbitrary programs in Python (control flows, data types/structures, functions, input and output operations, modules, classes, standard libraries). 2. Data science libraries: Introduction to the standard data science libraries (pandas, matplotlib, NumPy, SciPy). 3. Practical use cases: In the final phase of the course, the participants apply the introduced techniques to real-world data sets.
Literature (1)	• [1] Matthes, E. Python - Crash Course. 2nd ed., no starch press, 2019, ISBN: 978-1-59327-928-8. • [2] McKinney, W. Python for Data Analysis. 2nd ed., O Reilly, 2017, ISBN: 978-1-491-95766-0. • [3] van Rossum, G. Python Tutorial. 3.7.0, Python Software Foundation, 2018.
Examination Attainments & Performance Rating	written exam (60 min)
Resources during the exam	none
Remarks	demonstrating results of programmes

Modul Nr. MM 03	Financing
Courses of the module	(1) Financing
Duration of the module	1 semester
Semester of study	2 nd semester
Responsible for the module	Prof. Andreas Heinzmann
Lecturer	Mr. Philipp Koecke
Teaching Language	English
Credit Points (ECTS)	2 ECTS
Type of Teaching Method	2 SWS (contact hours/week) = seminar-type teaching
Total workload	Contact hours (15 weeks * 2 SWS) = 30 h preparation and follow-up work at home, exam preparation = <u>30 h</u> total (2 ECTS * 30 h/ECTS) = <u>60 h</u>
Assignment to the curriculum	HT-M SPO 20192 HT-M SPO 20232
Applicability in other degree programmes	
Course prerequisites	
Module Objectives / Intended Learning Outcomes (1)	This course imparts the following knowledge: • to understand the different legal company forms • to know about different categories of funding and how to combine them skills: • to read and adapt a Business Plan competences: • Valuation of a company according to the different valuation methods
Contents (1)	• Legal company forms • Forms of Financing • Business Plan • Balance Sheet • Debt financing • Valuation Methods
Literature	Will be provided during class.

Modul Nr. MM 03	Financing
(1)	
Examination Attainments & Performance Rating	Case Study
Resources during the exam	
Remarks	Blocked lectures

Modul Nr. MM 04	Investment
Courses of the module	(1) Investment
Duration of the module	1 semester
Semester of study	2 nd semester
Responsible for the module	Prof. Andreas Heinzmann
Lecturer	Mr. Matthias Eichholz
Teaching Language	English
Credit Points (ECTS)	2 ECTS
Type of Teaching Method	2 SWS (contact hours/week) = seminar-type teaching
Total workload	Contact hours (15 weeks * 2 SWS) = 30 h preparation and follow-up work at home, exam preparation = <u>30 h</u> total (2 ECTS * 30 h/ECTS) = <u>60 h</u>
Assignment to the curriculum	HT-M SPO 20192 HT-M SPO 20232
Applicability in other degree programmes	
Course prerequisites	•
Module Objectives / Intended Learning Outcomes (1)	This course imparts the following knowledge: • about investing into assets used to produce goods skills: • Discuss the process of investment applications and who is involved • To examine of the economic benefits of an individual investment competences: • Elaborate if an investment idea is valuable and how to compare different ideas
Contents (1)	• Definition of investments • Why do companies invest/ Types of investments • Financing an investment • Traps in investing processes • Different kind of stakeholders/ Decision processes • Different investment methods

Modul Nr. MM 04	Investment
	• Financial planning/ forecasting and controlling of investments • Financial planning – Budgeting, Mid-term planning • Depreciation methods/ Equipment lifetime • View in balance sheet • Financial Instruments (Shares, Bonds)
Literature (1)	• Bruns, C. / Meyer-Bullerdiek, F. (2003), Professionelles Portfoliomanagement, Stuttgart, Schäffer-Poeschel-Verlag • Eller, R. (2013) Risikomanagement in mittelständischen Unternehmen, in Eller, R. / Heinrich, M. / Perrot, R. / Reif, M. (Hrsg.) (2013), Jahrbuch Treasury and Private Banking 2013, Berlin, Roland Eller Consulting (S. 391 – 410) • Grill, W. / Perczynski, H. (2001), Wirtschaftslehre des Kreditwesens, Stuttgart, Deutscher Sparkassenverlag • Korn, N. (2011), VOM® - Value Objectives Motivation, Finanz-Fitness und Erfolgsmanagement, Norderstedt, Books on Demand-Verlag • Perridon, L. / Steiner, M. / Rathgeber, A. (2012), Finanzwirtschaft der Unternehmung, München, Vahlen-Verlag • Rollwage, N. (Hrsg.) (2012), Finanzierung, Schinderlegli, WRW-Verlag • Wöhe, g. / Döring, U. (2010), Einführung in die Allgemeine Betriebswirtschaftslehre, München, Vahlen-Verlag
Examination Attainments & Performance Rating	Case Study
Resources during the exam	
Remarks	Blocked lectures

Modul Nr. MM 07	Mass Customization
Courses of the module	(1) Mass Customization
Duration of the module	1 semester
Semester of study	1 st semester
Responsible for the module	Prof. Andreas Heinzmann
Lecturer	Mr. Frank Wiegmann
Teaching Language	English
Credit Points (ECTS)	2 ECTS
Type of Teaching Method	2 SWS (contact hours/week) = seminar-type teaching
Total workload	Contact hours (15 weeks * 2 SWS) = 30 h preparation and follow-up work at home, exam preparation = 30 h total (2 ECTS * 30 h/ECTS) = <u>60 h</u>
Assignment to the curriculum	HT-M SPO 20192 HT-M SPO 20232
Applicability in other degree programmes	
Course prerequisites	- Basics/Fundamental Knowledge of Automation - Basics/Fundamental Knowledge of Leadership - Basics/Fundamental Knowledge of Project Management
Module Objectives / Intended Learning Outcomes (1)	This course imparts the following knowledge : - to understand the definition of terms related to business and strategy development - to explain Taylor principles and their relevance in modern business practices skills : - to develop effective strategies based on an understanding of market trends, environmental factors, and competition - to create an interactive value proposition that engages customers and drives revenue growth competences : - To demonstrate critical thinking skills by analysing complex business problems and developing innovative solutions - To show adaptability by adjusting strategies in response to changing market conditions or customer needs

Modul Nr. MM 07	Mass Customization
	To display leadership qualities by leading teams towards achieving organizational goals.
Contents (1)	- Definition of terms - Productivity limit - Strategy Development - Effect of Trends, environment and competition on a company - Taylor principles - Interactive value creation - System of the working customer - Generation of applicable knowledge - Individualization of the product by Mass Customization - Economic effects of Mass Customization - Innovation Systems
Literature (1)	- Industrie 4.0 in Produktion, Automatisierung und Logistik: Anwendung · Technologien · Migration von Thomas Bauernhansl (Herausgeber), Michael ten Hompel (Herausgeber), Birgit Vogel-Heuser (Herausgeber) - The Second Machine Age von Erik Brynjolfsson und Andrew McAfee - Integrales Logistikmanagement von Paul Schönsleben
Examination Attainments & Performance Rating	Written exam (60 min)
Resources during the exam	none
Remarks	Blocked lectures

Modul Nr. MM 08	Leadership
Courses of the module	Leadership, Personality & Teambuilding
Duration of the module	1 semester
Semester of study	1 st semester
Responsible for the module	Prof. Dr. Sonja Unterlechner
Lecturer	Prof. Dr. Sonja Unterlechner
Teaching Language	English
Credit Points (ECTS)	2 ECTS
Type of Teaching Method	2 SWS (contact hours/week) = seminar
Total workload	Contact hours (15 weeks * 2 SWS) = 30 h preparation and follow-up work at home, exam preparation = 30 h total (2 ECTS * 30 h/ECTS) = <u>60 h</u>
Assignment to the curriculum	HT-M SPO 20192 HT-M SPO 20232
Applicability in other degree programmes	
Course prerequisites	• willingness to widen your spirit • willingness to self-experience and reflect personal patterns of behaviour • willingness to self-reflect attitudes regarding people
Module Objectives / Intended Learning Outcomes	Knowledge: During the first half of the course the students are taught basic leadership and management principles. They learn why developing self-awareness and the ability to create trust are crucial for successful leaders. The students study the four key phases of team development as well as roles and dynamics in teams. The second half of the course focuses on communication, methods of gaining power and how to delegate in an effective way. The students also study fundamental differences in leadership styles across the globe. At the end of the course the students learn about stress as well as stress coping and stress management strategies. Skills: The students can differentiate between leadership and management skills

Modul Nr. MM 08	Leadership
	They have the ability to distinguish between formal power and real power. They got to experience the upsides of empowerment and know how to apply it to their future employees. They have reflected on their own behavior and their traits via exercises on developing self-awareness. Additionally, the students have obtained the skill to speak and write about management and leadership topics in a foreign language (i.e. English). Competences: After having completed the course and its combination of theoretical sessions as well as intense practice sessions the students have developed first leadership and management skills. They know how to handle various challenging situations such as low team performance, mistrust in an organization or high absentee rates. The course enables future leaders to have a clear view on required skills as well as their own areas for development and ambitions.
Contents	• What are leadership and management skills? What does it take to be a successful manager and leader? • Developing self-awareness • Building trust • How to create effective teams • Communicating effectively and supportively • Gaining power and influence • Empowering and delegation • Managing personal stress • Motivating and leading internationally • Wrapping up: Your plans and ambitions • Additionally, recent topics coming up in the press will be covered.
Literature	Key Lit: • Whetten/Cameron (2015): Developing Management Skills • Caproni (2012): Management Skills for Everyday Life Additional Lit: • Deresky (2016): International Management • Dessler (2017): Human Resource Management • Dessler (2017): A framework for Human Resource Management (ebook)

Modul Nr. MM 08	Leadership
	• Ferguson (2018): Ferguson Ferguson's Formular in HBR's 10 Must Reads on Leadership Lessons from Sports • Frawley (2020): Case study in: Sports and Leadership: Improving Performance and the Enterprise • Gomez-Meija (2016): Managing Human Resources • Littlefield/Wise (2021): How to make virtual engagement easy • Mondy (2015): Human Resource Management • Noe (2021): Human Resource Management – Gaining a competitive advantage • Robbins/Hunsaker (2014): Training on Interpersonal Skills: TIPS for Managing People at Work
Examination Attainments & Performance Rating	active participation in all sessions; submission of required pieces of homework (group homework as well as individual assignments)
Resources during the exam	none
Remarks	Blocked seminars

Modul Nr. MM 09	Scientific Methods
Courses of the module	(1) Scientific Methods
Duration of the module	1 semester
Semester of study	2 nd semester
Responsible for the module	Prof. Dr. Holly Ott
Lecturer	Prof. Dr. Holly Ott
Teaching Language	English
Credit Points (ECTS)	3 ECTS
Type of Teaching Method	2 SWS (contact hours/week) = seminar-type teaching
Total workload	Contact hours (15 weeks * 2 SWS) = 30 h preparation and follow-up work at home, exam preparation = 60 h total (3 ECTS * 30 h/ECTS) = 90 h
Assignment to the curriculum	HT-M SPO 20192 HT-M SPO 20232
Applicability in other degree programmes	
Course prerequisites	
Module Objectives / Intended Learning Outcomes (1)	This course imparts the following knowledge: - understand the importance and techniques to present professionally to management (data presentation, argumentation, financial impact, main messages) - understand the importance of data throughout a product's lifecycle (PLM) skills: - apply data evaluation methods and draw conclusions from the results. - design and perform statistical experiments (DoE) - perform data collection and analysis using statistical software competences: - identify appropriate methods for evaluating scientific data - present results clearly to present data concisely and effectively for customer and management communication

Modul Nr. MM 09	Scientific Methods
Contents (1)	This course focusses on the analysis and presentation of data by reviewing techniques for managing data in the context of Product Lifecycle Management (PLM). In particular, the course will support students to understand how to apply evaluation techniques and how to present the quantitative results effectively to management. At the end of this course, students should feel confident to use and present data in order to make engineering and operational decisions with a clear picture of the required investment, project timeline and ROI. This course will use data from areas of wood research in the area of wood technology, including sustainability, the circular economy, bioeconomy, wood product production, depending on each students individual research interests.
Literature (1)	Required reading and papers will be provided during the lecture.
Examination Attainments & Performance Rating	Case Study Report (40%) – Group Final Exam (60%)
Resources during the exam	1-page (1-side) notes and formula sheet, non-programmable calculator
Remarks	Group work, Class attendance is compulsory

Modul Nr. MM 10	Supply Chain Management
Courses of the module	(1) Supply Chain Management
Duration of the module	1 semester
Semester of study	1 st semester
Responsible for the module	Prof. Dr. Holly Ott
Lecturer	Prof. Dr. Holly Ott
Teaching Language	English
Credit Points (ECTS)	2 ECTS
Type of Teaching Method	2 SWS (contact hours/week) = seminar-type teaching
Total workload	Contact hours (15 weeks * 2 SWS) = 30 h preparation and follow-up work at home, exam preparation = 30 h total (2 ECTS * 30 h/ECTS) = <u>60 h</u>
Assignment to the curriculum	HT-M SPO 20192 HT-M SPO 20232
Applicability in other degree programmes	
Course prerequisites	Basics/Fundamental knowledge of probability density functions
Module Objectives / Intended Learning Outcomes (1)	This course imparts the following knowledge: - Discuss the importance of the supply chain function today and how supply chain strategies differ in terms of efficiency and responsiveness for different industries. - Explain the logistical and cross-functional drivers of the supply chain and these affect a firm's competitive strategy. - Explain the planning phases in SCM and understand which decisions need to be made and when according to the planning decision matrix. skills: - Understand and measure the key performance indicators for measuring supply chain performance. - Develop strategies for handling uncertain demand as well as calculate optimal safety stock levels for given supply uncertainty to reach a service-level target.

Modul Nr. MM 10	Supply Chain Management
	- Analyse and explain how the behaviours and strategic decisions of individual entities of the supply chain impact the performance of the firm as well as the entire supply chain. competences: - Make optimal inventory and flexibility decisions for supporting the competitive strategy to minimize costs / meet service levels using theoretical models for single period demand and continuous demand. - Formulate integrated supply chain strategy, so that all components are not only internally synchronized but also tuned to fit corporate strategy, competitive realities and market needs. - Think analytically in order to successfully apply their knowledge and technical expertise learned during the course to solve a variety of real business problems.
Contents (1)	The supply chain function has evolved from the traditional focus on distribution and warehousing to a strategic function, enabling a critical competitive advantage for companies in today's global market and production environments. A supply chain must support a company's competitive strategy through management of the flows of products, information and funds in order to maximize the value for the entire chain. Supply chain management requires distinct strategies to manage supply and demand, increase the transparency between partners, and optimize the incentives along the entire value chain. In this course we will first consider the strategic fit between the supply chain's capabilities and the company's competitive strategy and see how financial figures give a clear measure of supply chain performance. We will move through the supply chain, beginning with the demand planning, and understand the importance of accurate forecasts. Inventory is a key lever for matching supply and demand and we will learn strategies to optimize inventory stocking decisions to maximize profit and support customer service level requirements. We will study supply chain coordination and the impact of poor communication. While quantitative models and decisions are part of this course, the emphasis is on the qualitative insights needed by general managers or management consultants. Using case studies and simulations, we will demonstrate that companies can use (and have used) the principles from this course to significantly enhance their competitiveness.
Literature	Articles and readings to be provided during the class.

Modul Nr. MM 10	Supply Chain Management
(1)	
Examination Attainments & Performance Rating	Written Exam, 60 Minutes (70%) Project work (30%)
Resources during the exam	Calculator, 2-page formula and notes sheet
Remarks	

Modul Nr. MM 11	Ethics of Sustainability
Courses of the module	(1) Ethics of Sustainability
Duration of the module	1 semester
Semester of study	1 st semester
Responsible for the module	Prof. Dr. Dr. Michael Kuhn
Lecturer	Prof. Dr. Dr. Michael Kuhn
Teaching Language	English
Credit Points (ECTS)	2 ECTS
Type of Teaching Method	2 SWS (contact hours/week) = seminar-type teaching
Total workload	Contact hours (15 weeks * 2 SWS) = 30 h preparation and follow-up work at home, exam preparation = 30 h total (2 ECTS * 30 h/ECTS) = <u>60 h</u>
Assignment to the curriculum	HT-M SPO 20192 HT-M SPO 20232
Applicability in other degree programmes	
Course prerequisites	None
Module Objectives / Intended Learning Outcomes (1)	This course imparts the following knowledge: • Explain different concepts of sustainability and their core elements • Describe the historical background of the current understanding of sustainability • Explain the basic notions of morality, ethics, and metaethics as well as descriptive and normative ethics • Describe typical fallacies in ethical arguments • Explain the relationship between ethics of sustainability on the one hand and social, economic, and environmental ethics on the other hand skills: • Analyse arguments and fallacies • Develop structured and rational arguments competences: • Formulate theses and defend them suitably • Think critically

Modul Nr. MM 11	Ethics of Sustainability
Contents (1)	• Concepts of sustainability: weak vs. strong, dimensions and their interaction • History of sustainability • Theoretical background: morals, ethics, metaethics; descriptive and normative ethics; ethical arguments and fallacies • Social, economic, and environmental ethics: core ideas as well as their interaction in the ethics of sustainability
Literature (1)	• Jeremy L. Caradonna: <i>Sustainability. A History</i>. Oxford, New York: Oxford University Press 2014. • Andrew Light, Holmes Rolston III (Eds.): <i>Environmental Ethics. An Anthology</i>. Maiden: Blackwell 2003. • Angelika Krebs: <i>Naturethik</i>. Frankfurt a.M.: Suhrkamp 1991. • Christoph S. Widdau: <i>Einführung in die Umweltethik</i>. Ditzingen: Reclam 2021.
Examination Attainments & Performance Rating	Written exam, 60 min
Resources during the exam	None
Remarks	

Modul Nr. MF 02	Excursion
Courses of the module	(1) Excursion
Duration of the module	1 semester
Semester of study	2 nd semester
Responsible for the module	Prof. Andreas Heinzmann
Lecturer	Prof. Andreas Heinzmann, Prof. Dr. Heiko Thömen
Teaching Language	English
Credit Points (ECTS)	2 ECTS
Type of Teaching Method	2 SWS (contact hours/week) = one week excursion
Total workload	Contact hours (one week) = 50 h preparation and follow-up work at home, exam preparation = 10 h total (2 ECTS * 30 h/ECTS) = <u>60 h</u>
Assignment to the curriculum	HT-M SPO 20192 HT-M SPO 20232
Applicability in other degree programmes	
Course prerequisites	
Module Objectives / Intended Learning Outcomes (1)	This course imparts the following knowledge: - Students will acquire a comprehensive understanding of the wood industry, including its diverse range of enterprises, business models, manufacturing techniques, and products. - Students will develop a global mindset, gaining exposure to enterprises in Germany and other countries, and comparing international practices and trends in the wood industry. skills: - Students will develop the ability to interact with professionals in the wood industry, cultivating professional relationships and seeking opportunities for collaboration. - Students will be able to identify challenges faced by various enterprises in the wood industry and propose practical solutions based on their knowledge and understanding. competences:

Modul Nr. MF 02	Excursion
	• Students will cultivate an entrepreneurial mindset by exploring various business models in the wood industry and understanding the factors contributing to the success of different enterprises. • Students will develop an appreciation for cultural differences and their influence on enterprise operations in the wood industry, as they gain exposure to enterprises in different countries.
Contents (1)	• Joined excursion of students from the two partner universities Rosenheim Technical University and Bern University of Applied Sciences • Experiencing and studying enterprises in the wood industry in Central Europe
Literature (1)	To be determined depending on companies to be visited
Examination Attainments & Performance Rating	Participation, written report
Resources during the exam	
Remarks	Estimated costs: 400 – 600 € (depending on the destination)

Modul Nr. MF 03	Project Seminar: Systems Engineering
Courses of the module	(1) Project Seminar: Systems Engineering
Duration of the module	1 semester
Semester of study	2 nd semester
Responsible for the module	Prof. Andreas Heinzmann
Lecturer	Prof. Andreas Heinzmann
Teaching Language	English
Credit Points (ECTS)	4 ECTS
Type of Teaching Method	2 SWS (contact hours/week) = seminar-type teaching
Total workload	Contact hours (15 weeks * 2 SWS) = 30 h preparation and follow-up work at home, exam preparation = 90 h total (4 ECTS * 30 h/ECTS) = <u>120 h</u>
Assignment to the curriculum	HT-M SPO 20192 HT-M SPO 20232
Applicability in other degree programmes	
Course prerequisites	- Basics/Fundamental Knowledge of Automation - Basics/Fundamental Knowledge of Simulation - Basics/Fundamental Knowledge of Economics
Module Objectives / Intended Learning Outcomes (1)	This course imparts the following knowledge: - Target cost and calculation of machine cost skills: - Development of skills in the field of robotics and special equipment. competences: - The target is to be able to define requirements for a special purpose machine manufacturer or the R&D department of a standard equipment producer for new manufacturing ideas. - Being able to develop creative solutions for real automation topics in an manufacturing environment
Contents (1)	Development of independent machine concepts based on an industrial manufacturing task (e.g. fully automated drawer assembly line with robots, vertical wooden house element assembly line,

Modul Nr. MF 03	Project Seminar: Systems Engineering
	stacking and sorting system for beams...) Technical concept description • Development of a general machine control concept • Security system • Description of the required data and data base interface • Economical evaluation
Literature (1)	• Kevin M. Lynch (Author), Frank C. Park (Author), Modern Robotics: Mechanics, Planning, and Control • Gunter Meier (Author) Prozessintegration des Target Costings in der Fertigungsindustrie am Beispiel Sondermaschinenbau (German Edition) (German) Paperback – April 12, 2012
Examination Attainments & Performance Rating	Case study (incl. presentation, team work and written documentation) In the beginning of the course, every group of 3-4 Students will chose one task/topic. The group will work out based on the task a list of requirements and will systematically develop a complex machining solution. In the end, the concept will be verified with simulation and an economical evaluation and verification will be made. The groups need to present every week the results.
Resources during the exam	
Remarks	Group work

Modul Nr. MF 04	Furniture – Product Safety and Testing
Courses of the module	(1) Furniture – Product Safety and Testing
Duration of the module	1 semester
Semester of study	2 nd semester
Responsible for the module	Prof. Thorsten Ober
Lecturer	Prof. Thorsten Ober, M.Sc. Michael Auernheimer
Teaching Language	English
Credit Points (ECTS)	4 ECTS
Type of Teaching Method	2 SWS (contact hours/week) = seminar-type teaching
Total workload	Contact hours (15 weeks * 2 SWS) = 30 h preparation and follow-up work at home, exam preparation = 90 h total (4 ECTS * 30 h/ECTS) = <u>120 h</u>
Assignment to the curriculum	HT-M SPO 20192 HT-M SPO 20232
Applicability in other degree programmes	
Course prerequisites	
Module Objectives / Intended Learning Outcomes (1)	This course imparts the following knowledge: • of regulations and standards • of different testing methods skills: • to identify, rate and evaluate the risks • to design a testing method for a specific product competences: • Development of independent and complex testing concepts based on actual standards.
Contents (1)	• Quality assurance • Regulations and standards • Research exercise • Risk analysis • Furniture testing exercise
Literature	• DIN Deutsches Institut für Normung e. V.: DIN Taschenbuch 66: Möbel

Modul Nr. MF 04	Furniture – Product Safety and Testing
(1)	• DIN Deutsches Institut für Normung e. V.: DIN Taschenbuch 467: Büro-, Schul- und Objektmöbel. Berlin: Beuth, 2008 • Klappmann, Wilhelm: Taschenbuch Versuchsplanung: Produkte und Prozesse optimieren. 4. Aufl. München, Wien : Hanser, 2006
Examination Attainments & Performance Rating	Project paper including presentation
Resources during the exam	
Remarks	Group work

Modul Nr. MF 05	Special Aspects of the Wood Processing Industries
Courses of the module	(1) Special Aspects of the Wood Processing Industries
Duration of the module	1 semester
Semester of study	2 nd semester
Responsible for the module	Prof. Dr. Andreas Michanickl
Lecturer	Prof. Dr. Andreas Michanickl
Teaching Language	English
Credit Points (ECTS)	2 ECTS
Type of Teaching Method	2 SWS (contact hours/week) = seminar-type teaching
Total workload	Contact hours (15 weeks * 2 SWS) = 30 h preparation and follow-up work at home, exam preparation = 30 h total (2 ECTS * 30 h/ECTS) = <u>60 h</u>
Assignment to the curriculum	HT-M SPO 20192 HT-M SPO 20232
Applicability in other degree programmes	
Course prerequisites	• basic subjects of wood and wood-based materials, machine tools for wood-processing, production technology
Module Objectives / Intended Learning Outcomes (1)	This course imparts the following knowledge: • The students get a better understanding of possible consequences of influencing developments skills: • The students learn how to react on these developments. competences: • The students learn to identify, analyse and understand important developments that influence the wood processing industry.
Contents (1)	Possible topics for the project paper: • Thermal utilization of wood – Current situation and future perspectives in the EU • European Green Deal – Consequences for society, industry and end consumer • European Forest Policy

Modul Nr. MF 05	Special Aspects of the Wood Processing Industries
	• Globalisation in the furniture industry - Consequences for the wood industry • Global players in the wood industry • Non - tariff trade barriers for the wood industry – Some examples • The sawmilling industry in Germany and Austria – Actual situation and perspectives for the future (incl. main challenges) • Non-wood plants in the production of boards and other composite materials – Potential and problems • Availability of wood today and in the future – Influencing factors – Changes • Production of pellets from wood – Main producers worldwide- Trade flows – Main consumers – Developments Torrefication – State of the art, challenges and perspectives for the future • Raw material competition on the wood market – Players and dynamics • Competition in the wood industry - Competitors of the wood industry • Wood Polymer Composites – Development in EU, NA and Asia – Growth perspectives • Production of pulp– links to the production of wood based panels • Production paper and cardboard – links to the production of wood based panels • Production and importance of animal bedding made from wood • Production of horticultural substrates • Utilisation of wood in other/new industries • New materials made from wood – Ongoing developments and restrictions • Restrictions to capacity growth in the wood industry - The time after capacity growth – Which are the challenges? • Horizontal and vertical integration in the wood industry • VOCs and formaldehyde – Most important regulations worldwide – Future trends • Monocultures – Consequences and responsibilities of the wood industry • Decorative veneer production – state of the art and future perspectives • Eco trends in Europe – How these might be used to increase the consumption of products made from wood • The traditional wood industry – Bioeconomy • Cross laminated timber – State of the art and future potential

Modul Nr. MF 05	Special Aspects of the Wood Processing Industries
	Flooring products – From parquet via laminate flooring to multi laminar flooring – What is the future? – Consequences for the producers of HDF for laminate flooring
Literature (1)	Koch Peter, Wood Machining Processes, Ronald Press, New York, 1964
Examination Attainments & Performance Rating	Project Paper including presentation
Resources during the exam	
Remarks	

Modul Nr. MF 06	Change Management
Courses of the module	(1) Change Management
Duration of the module	1 semester
Semester of study	2 nd semester
Responsible for the module	Prof. Andreas Heinzmann
Lecturer	Mr. Frank Wiegmann
Teaching Language	English
Credit Points (ECTS)	2 ECTS
Type of Teaching Method	2 SWS (contact hours/week) = seminar-type teaching
Total workload	Contact hours (15 weeks * 2 SWS) = 30 h preparation and follow-up work at home, exam preparation = 30 h total (2 ECTS * 30 h/ECTS) = <u>60 h</u>
Assignment to the curriculum	HT-M SPO 20192 HT-M SPO 20232
Applicability in other degree programmes	
Course prerequisites	- Basics/Fundamental Knowledge of Automation - Basics/Fundamental Knowledge of Leadership - Basics/Fundamental Knowledge of Project Management
Module Objectives / Intended Learning Outcomes (1)	This course imparts the following knowledge: - Understand the requirements for management and leadership in mass customization and batch size one manufacturing - Acquire knowledge on methods for implementing new structures and change management skills: - Development of skills in the field of management, leadership and change management competences: - Being able to develop creative solutions for implementation of mass customization and batch size one production as management system - To Implement continuous improvement strategies to enhance manufacturing processes

Modul Nr. MF 06	Change Management
Contents (1)	Requirements for Management and Leadership for the successful implementation of mass customization and batch size one manufacturing. • Continuous Improvement • Mass customization as management system • Methods for the implementation of new structures and change management • Methods for developing leadership skills and self-leadership
Literature (1)	• Industrie 4.0 in Produktion, Automatisierung und Logistik: Anwendung · Technologien · Migration von Thomas Bauernhansl (Herausgeber), Michael ten Hompel (Herausgeber), Birgit Vogel-Heuser (Herausgeber) • The Second Machine Age von Erik Brynjolfsson und Andrew McAfee • Integrales Logistikmanagement von Paul Schönsleben
Examination Attainments & Performance Rating	Written exam (60 min)
Resources during the exam	none
Remarks	Blocked lectures

Modul Nr. MF 13	Quality Management
Courses of the module	(1) Quality Management
Duration of the module	1 semester
Semester of study	2 nd semester
Responsible for the module	Prof. Dr. Holly Ott
Lecturer	Prof. Dr. Holly Ott
Teaching Language	English
Credit Points (ECTS)	2 ECTS
Type of Teaching Method	2 SWS (contact hours/week) = seminar-type teaching
Total workload	Contact hours (15 weeks * 2 SWS) = 30 h preparation and follow-up work at home, exam preparation = 30 h total (2 ECTS * 30 h/ECTS) = <u>60 h</u>
Assignment to the curriculum	HT-M SPO 20192 HT-M SPO 20232
Applicability in other degree programmes	
Course prerequisites	
Module Objectives / Intended Learning Outcomes (1)	This course imparts the following knowledge: • Understand the concept of quality in products and processes and how quality has become a key part of a company's competitive strategy. • Explain quality characteristics I terms of Voice of the Customer (VOC), the Kano Model and Critical-to-Quality parameters. • Understand methods of Root Cause Analysis. • Understand how the Six Sigma methodology is used to effect process improvement. skills: • Calculate process yield for multi-step processes. • Calculate yield and process capability for normally distributed Critical-to-Quality parameters. • Perform a Six Sigma project following the DMAIC process improvement cycle. competences:

Modul Nr. MF 13	Quality Management
	• Design process and product experiments and assess the effect of possible process failures on the product quality using the Failure Modes and Effects Analysis. • Determine appropriate control limits in order to measure the capability of a process and understand how control charts are used in industry to monitor and improve quality. • Discuss the issues involved in managing for quality at different operational levels. • Present results of a Six Sigma project to a Green Belt level.
Contents (1)	Since the introduction of mass production, the concept of “quality” has evolved from simple assembly line inspections to a broad philosophy of production and management involving an entire corporation. More recently, as markets have become more competitive, quality has become a critical driver for long-term success through continuous process improvement and customer satisfaction. This course balances the quantitative elements of quality engineering with the managerial approach to quality in an organization and explores the implications of using quality to effect change. Quality assurance is examined, from the viewpoint of quality incorporated into product design, maintaining quality in production, using both quantitative problems and case studies. Specifically, this course covers the statistical basis for the Six Sigma methodology and the DMAIC process improvement cycle.
Literature (1)	Articles and readings to be provided during the class.
Examination Attainments & Performance Rating	Written Exam, 60 Minutes (70%) Project work (30%)
Resources during the exam	Calculator, 2-page formula sheet
Remarks	

HT-MF21 Innovation Management and New Product Development

Modul Nr. MF 21	Innovation Management and New Product Development
Courses of the module	(1) Innovation Management and New Product Development
Duration of the module	1 semester

Modul Nr. MF 21	Innovation Management and New Product Development
Semester of study	2 nd semester
Responsible for the module	Prof. Martina Zurwehme
Lecturer	Prof. Martina Zurwehme
Teaching Language	English
Credit Points (ECTS)	3 ECTS
Type of Teaching Method	2 SWS (contact hours/week) = seminar-type teaching, supported by collaborative digital tools and guided self-study
Total workload	Contact hours (15 weeks * 2 SWS) = 30 h Guided and independent self-study, = 60 h total (3 ECTS * 30 h/ECTS) = <u>90 h</u>
Assignment to the curriculum	HT-M SPO 20192 HT-M SPO 20232
Applicability in other degree programmes	
Course prerequisites	
Module Objectives / Intended Learning Outcomes (1)	The course enables students to systematically develop innovation concepts for current and future challenges in the wood and timber sector by applying a human-centred and evidence-based innovation process. Knowledge Students: • Understand fundamental concepts of innovation management and their relevance to the wood and timber sector; • Understand Design Thinking as an iterative and human-centred approach to innovation; • Understand the relevance of user needs, stakeholder perspectives, research evidence and experimentation in innovation processes; • Understand the role of sustainability, resource use and changing societal and technological conditions in the development of innovations. Skills Students are able to: • Identify and frame relevant innovation challenges in the context of wood, timber products, construction, manufacturing, services or related value chains.

Modul Nr. MF 21	Innovation Management and New Product Development
	• Conduct targeted desk research and exploratory user, expert and stakeholder research; • Distinguish evidence from assumption and translate research findings into a clearly defined problem statement • Generate, structure and select alternative solution concepts using appropriate creativity methods; • Develop suitable prototypes of other representations of an innovation concept • Plan and conduct concept tests and use feedback to iteratively improve a concept • Document and communicate an innovation concept in a clear and convincing manner Competences Students are able to: • Independently structure and manage an open-ended innovation process • Work collaboratively in small teams and contribute individual expertise and research • Critically reflect on assumptions, uncertainties and methodological decisions • Integrate technical, user-related and sustainability-related perspectives • Critically reflect on the suitability and limitations of Design Thinking for innovation challenges in the wood and timber sector.
Contents (1)	The module combines theoretical foundations of innovation management with the practical application of an innovation process. Students work on a self-selected or predefined challenge related to the wood and timber sector and develop an evidence-based innovation concept throughout the semester. The main contents are: • Innovation and current challenges in the wood and timber sector • Fundamentals and mindset of Design Thinking • Problem exploration and challenge framing • Desk research and stakeholder analysis • exploratory user, expert and stakeholder research; • synthesis of research findings and formulation of user needs; • Point of View and How-Might-We questions; • creativity and ideation methods; • concept development and concept selection; • prototyping as a tool for learning and concept development;

Modul Nr. MF 21	Innovation Management and New Product Development
	• testing, feedback and iterative improvement; • sustainability and wood-related relevance of innovation concepts; • visualisation, documentation and communication of innovation concepts; • reflection on the innovation process and the methodological application of Design Thinking.
Literature (1)	• Tidd, J.; Bessant, J. R. (2024): Managing Innovation: Integrating Technological, Market and Organizational Change. 8th ed. Wiley. • Lewrick, M.; Link, P.; Leifer, L. (2020): The Design Thinking Toolbox: A Guide to Mastering the Most Popular and Valuable Innovation Methods. Wiley. • Meinel, C.; Leifer, L. (eds.) (2023): Design Thinking Research: Innovation – Insight – Then and Now. Springer Nature Switzerland. • Portigal, S. (2023): Interviewing Users: How to Uncover Compelling Insights. 2nd ed. Rosenfeld Media. • Ceschin, F.; Gaziulusoy, İ. (2020): Design for Sustainability: A Multi-level Framework from Products to Socio-technical Systems. Routledge. Current scientific publications, industry reports, market studies and policy documents related to the wood and timber sector and to the specific innovation challenges are provided or independently researched during the course.
Examination Attainments & Performance Rating	Project Paper (Documentation of the innovation project and the developed concept (Innovation Dossier); and individual scientific reflection on the innovation process and the application, strengths and limitations of the methods used).
Resources during the exam	
Remarks	Group work

Modul Nr. MF 24	Machine Learning & Artificial Intelligence
Courses of the module	(1) Machine Learning
Duration of the module	1 semester
Semester of study	1 st semester
Responsible for the module	Prof. Dr. Benjamin Tischler
Lecturer	Prof. Dr. Benjamin Tischler
Teaching Language	English
Credit Points (ECTS)	5 ECTS
Type of Teaching Method	4 SWS (contact hours/week) = seminar-type teaching
Total workload	Contact hours (15 weeks * 4 SWS) = 60 h preparation and follow-up work at home, exam preparation = 90 h total (5 ECTS * 30 h/ECTS) = <u>150 h</u>
Assignment to the curriculum	HT-M SPO 20192 HT-M SPO 20232
Applicability in other degree programmes	Bachelor's programme "Wirtschaftsmathematik" Master's programme "Gebäudephysik"
Course prerequisites	Basic Python Programming (or 10-15 hours additional workload for acquiring Python fundamentals), Basics of Linear Algebra & Calculus
Module Objectives / Intended Learning Outcomes (1)	This course imparts the following knowledge: • Use Cases of Machine Learning and Artificial Intelligence • Mathematical core concepts of Machine Learning and Deep Learning • A set of Machine Learning techniques to address many important real world use cases including computer vision and sequence modelling (e.g. Language, Time Series,...) • Basics of programming Machine Learning in Python skills: • Ability to program fundamental Machine Learning and Deep Learning algorithms in Python from scratch and/or using the most important Python libraries • Ability to evaluate the quality of trained machine learning models, analyse the training process and come up with ways to improve the models competences:

Modul Nr. MF 24	Machine Learning & Artificial Intelligence
	• Understand the value and use cases of Machine Learning/Deep Learning/AI • Understand when and how to use various Machine Learning Algorithms • Select and apply the adequate methods of Machine Learning and Deep Learning in many important use cases • Solid understanding of the mathematical fundamentals of Machine Learning • Students understand challenges when applying Machine Learning techniques to real world problems • Students have a comprehensive understanding of the terminology & concepts as well as prerequisites, opportunities and challenges of Machine Learning in real life and are hence enabled to work effectively in interdisciplinary Machine Learning projects
Contents (1)	• Introduction, Overview, Use Cases • Regression • Classification • Best practices • Deep Learning: Neural Networks • Deep Learning: Computer Vision and Convolutional Neural Networks • Deep Learning: Language Models, Time Series and Recurrent Neural Networks • Machine Learning Operations
Literature (1)	Ian Goodfellow and Yoshua Bengio and Aaron Courville 2016, Deep Learning, MIT Press
Examination Attainments & Performance Rating	Oral examination (Duration: 15min)
Resources during the exam	none
Remarks	

Modul Nr. MF 25	Data driven production design
Courses of the module	(1) Data driven production design
Duration of the module	1 semester
Semester of study	2 nd semester
Responsible for the module	Prof. Andreas Heinzmann
Lecturer	Mr. Michael Kratzert
Teaching Language	English
Credit Points (ECTS)	2 ECTS
Type of Teaching Method	2 SWS (contact hours/week) = seminar-type teaching
Total workload	Contact hours (15 weeks * 2 SWS) = 30 h preparation and follow-up work at home, exam preparation = 30 h total (2 ECTS * 30 h/ECTS) = <u>60 h</u>
Assignment to the curriculum	HT-M SPO 20192 HT-M SPO 20232
Applicability in other degree programmes	
Course prerequisites	Basic understanding of complex woodworking machines and production processes.
Module Objectives / Intended Learning Outcomes (1)	This course imparts the following knowledge: - To identify essential components of a production concept - To interpret real manufacturing data (e.g., cycle times, material yields, machinery performance, cost data) skills: - To be able to analyse real production data to derive insights for process optimization, resource allocation, and equipment selection. - To design a production concept with an effective and coherent process flow competences: - To be able to make informed decisions about production strategies based on data evidence, constraints and project objectives - To solve complex problems with ambiguous production data

Modul Nr. MF 25	Data driven production design
Contents (1)	• Understanding and Interpreting Production Data • Data Analysis for Process Optimization bottleneck analysis, capacity calculation, throughput estimation, resource usage analysis • Designing an Effective Production Concept process flows, material flows, layout alternatives • Problem-Solving with Ambiguous or Incomplete Data
Literature (1)	• ...
Examination Attainments & Performance Rating	Case study (incl. presentation, team work and written documentation)
Resources during the exam	
Remarks	Group work

HT-MW01 Energy, Wood Supply, Logistics

Modul Nr. MW 01	Energy, Wood Supply, Logistics			
Courses of the module	(1) Energy (2) Logistics			
Duration of the module	1 semester			
Semester of study	2 nd semester			
Responsible for the module	Prof. Dr. Andreas Michanickl			
Lecturer	(1) Prof. Dr. Andreas Michanickl (2) Prof. Dr. Michael Zehner / Prof. Dr. Frank Buttinger / Prof. Dr. Ulrich Spindler / Prof. Dr. Dominikus Bucker			
Teaching Language	English			
Credit Points (ECTS)	5 ECTS			
Type of Teaching Method	4 SWS (contact hours/week) = seminar-type teaching			
Total workload	Contact hours (15 weeks * 4 SWS) = 60 h preparation and follow-up work at home, exam preparation = <u>90 h</u> total (5 ECTS * 30 h/ECTS) = <u>150 h</u>			
Assignment to the curriculum	HT-M SPO 20192 HT-M SPO 20232			
Applicability in other degree programmes				
Course prerequisites				
Module Objectives / Intended Learning Outcomes (1) Energy	This course imparts the following knowledge: - students will gain a comprehensive understanding of various aspects related to renewable energy sources such as solar, wind, biomass, and hydrogen fuel cells. - To understand the concept of CO₂ neutral buildings and their importance in reducing greenhouse gas emissions. skills: - To develop critical thinking skills to evaluate the effectiveness of different energy sources. - Analyse building designs and operations to determine their carbon footprint and potential for achieving CO₂ neutrality. - To apply greenhouse gas accounting methodologies to calculate emissions and develop mitigation plans.			

Modul Nr. MW 01	Energy, Wood Supply, Logistics
	competences: • To demonstrate critical thinking skills by identifying opportunities for reducing greenhouse gas emissions in building design, construction, and operation. • to develop a sense of responsibility towards environmental sustainability.
Contents (1) Energy	• Energy Transition • Energy Meteorology, Photovoltaic • PV systems and Storage • Biomass and Biogas Combustion • Combined Heat and Power and Hydrogen • Solar Thermal and PVT • CO₂ Neutral Buildings • Greenhouse Gas Accounting and Neutrality
Literature (1) Energy	• Regenerative Energiesysteme, Hanser Verlag, 8. Aktualisierte und erweiterte Auflage, Quaschnigg, Volker • Erneuerbare Energien und Klimaschutz, Hanser Verlag, 3. Aktualisierte und erweiterte Auflage, Quaschnigg, Volker
Module Objectives / Intended Learning Outcomes (2) Logistics	This course imparts the following knowledge: • of different types of transportation • of the essential aspects of the logistics of the wood industry skills: • to consider, analyse and optimize logistical processes competences: • to improve logistical processes for the long-term success of a company • to understand the economic connections between efficiency and costs through logistic management
Contents (2) Logistics	• introduction (definition of logistics, importance etc.) • wood industry today • Production Chain, Logistics and Costs • Process Management • product design and development with regard to logistical aspects • transport systems in the supply chain of the wood processing industry • transport by truck • transport by train • transport by ship • container transport • combined transport • loading protection • incoterms • Some aspects of production logistics

Modul Nr. MW 01	Energy, Wood Supply, Logistics
Literature (2) Logistics	- Handbuch Logistik, Springer Verlag, 3. Aufl. 2008, XXXIV, 1137 Seiten, ISBN 978-3-540-72929-7, Arnold, D.; Isermann, H.; Kuhn, A.; Tempelmeier, H.; Furmans, K. (Hrsg.) http://www.springer.com/engineering/production+engineering/book/978-3-540-72928-0 - Further actual information are provided in the course
Examination Attain- ments & Performance Rating	(1) Written exam, 60 min, 50% (2) Written exam, 60 min, 50%
Resources during the exam	
Remarks	

Modul Nr. MW03	Advanced wood-based materials
Courses of the module	(1) Wood-based materials (2) Wood-based Biomaterials
Duration of the module	1 semester
Semester of study	1 st semester
Responsible for the module	Mr Konrad Olbrig / Prof. Dr. Lars Passauer
Lecturer	(1) Mr Konrad Solbrig (2) Prof. Dr. Lars Passauer
Teaching Language	English
Credit Points (ECTS)	5 ECTS
Type of Teaching Method	4 SWS = SU
Total workload	Contact hours (15 weeks * 4 SWS) = 60 h preparation and follow-up work at home, exam preparation = 90 h total (5 ECTS * 30 h/ECTS) = <u>150 h</u>
Assignment to the curriculum	HT-M SPO 20192 HT-M SPO 20232
Applicability in other degree programmes	
Course prerequisites	
Module Objectives / Intended Learning Outcomes (1) Wood-based materials	This course imparts the following knowledge: - To differentiate between different wood-based materials, understanding their specific manufacturing processes, properties, and applications. - To comprehend the concepts of adhesion in wood structures, including the types of adhesives used, factors influencing adhesion, and the principles of bonding wood with adhesives. skills: - To analyse different types of wood-based materials competences: - to apply knowledge and skills to troubleshoot and solve problems related to the production and adhesion of wood-based materials, demonstrating adaptability in addressing challenges.

Modul Nr. MW03	Advanced wood-based materials
	To demonstrate competence in implementing and maintaining quality management systems for wood composites, ensuring adherence to industry standards and continuous improvement
Contents (1) Wood-based materials	- Production of wood based materials - Adhesion of wood and adhesives - Adhesive chemistry - Adhesive manufacturing - Analysis of adhesive bondline - Fiberboard - Particle board - OSB board - Other wood based composites - HPL and compact board - Quality control in wood composites - Quality management in wood composites
Module Objectives / Intended Learning Outcomes (2) Wood-based Biomaterials	This course imparts the following knowledge: - Interest and enjoyment in current developments in the field of novel wood-based materials and the importance of wood as a renewable resource and chemical feedstock. - Knowledge of the structure and ultrastructure of wood and its chemical constituents. skills: - Acquisition of application-ready knowledge for the isolation of wood polymers and extractives, their properties and further processing to biobased pre-cursors, products and functional materials. competences: - Students are familiar with the possibilities of specific applications of the respective materials and their properties.
Contents (2) Wood-based Biomaterials	- Introduction in wood and forest biomaterials - Terms of definition: „Biobased materials“, „biomaterials“, „biomimetic materials“, „biocompatible materials“, „biodegradable materials“ - Key biopolymers – isolation, structure, properties - Cellulose and cellulose-based biomaterials - Hemicellulose-, pectin-, and glucan-based biomaterials - Lignin and lignin-based biomaterials - Wood and bark extractives – Isolation, structure, applications - Special applications I: hydrogels, xerogels, aerogels

Modul Nr. MW03	Advanced wood-based materials
	• Special applications II: fibers, films, adhesives • Special applications III: nanomaterials • Special applications IV: functional additives (flame retardants, light stabilizers, pigments and colorants, antioxidants, wood preservatives, biocides, ...) • Agricultural applications (soil melioration and rehabilitation) • Biomedical applications (wound healing, biomedical, ...) • Ageing and (bio)degradation of wood biopolymers and biomaterials • Repetition, summary, conclusion, outlook
Literature	• Niemz, P., Teischinger, A., Sandberg, N. Springer Handbook of Wood Science and Technology. Springer 2023 • Ek, M., Gellerstedt, G. Pulp and Paper Chemistry and Technology, Vol.1 Wood Chemistry and Wood Biotechnology. De Gruyter 2010 • Evtl ergänzen
Examination Attainments & Performance Rating	written exam 60min • Part "Wood-based Biomaterials" (Passauer): Representation of simple chemical/physical relationships with structural formulas, reaction equations, principal schemes etc.
Resources during the exam	none
Remarks	

HT-MA01 Master's Thesis

Modul Nr. MA 01	Master's Thesis
Courses of the module	none
Duration of the module	max. 6 months (full-time) / max. 12 months (part-time)
Semester of study	3 rd semester (full-time) / 5 th and 6 th semester (part-time)
Responsible for the module	Prof. Andreas Heinzmann
Lecturer	Examiner of the Master's Thesis
Teaching Language	English or German In consultation with the examiners, a different language can also be agreed upon. A summary in English must always be included.
Credit Points (ECTS)	30 ECTS
Type of Teaching Method	MA
Total workload	total (30 ECTS * 30 h/ECTS) <u>= 900 h</u>
Assignment to the curriculum	HT-M SPO 20192 HT-M SPO 20232
Applicability in other degree programmes	
Course prerequisites	A student may apply for the topic for his/her Master's thesis to be issued at the earliest after achieving 30 ECTS credit points.
Module Objectives / Intended Learning Outcomes (1)	This course imparts the following knowledge: - Depending on the task at hand, students may work their way into individual technical, economic and integrative topics. - The students know how to define a thesis topic and how to set up the research questions as well as the used methodology. skills: - The students are able to conduct a literature review. - Depending on the topic the students know how to set up experimental work. - Students repeatedly apply their methodological and subject-specific knowledge as well as the principles of scientific work. Thus, they deepen the skills in scientific precision and strategically creative solution finding. competences:

Modul Nr. MA 01	Master's Thesis
	• Independent, problem-oriented and structured analysis of comprehensive issues from the field of wood technology and its application in neighboring disciplines. • Reflecting on the entire problem in the context of the multi-layered mutual influence of diverse factors and situations. • Critical reflection of the problem against the necessary and topic-related scientific state of the art as well as the corresponding documentation. • Developing solution approaches and implementation recommendations of the given problem definition as well as the corresponding proofs or plausibility. • Recording and presenting the problem and the results within the framework of a scientific paper and within a given deadline
Contents (1)	Depending on the topic
Literature (1)	Depending on the topic
Examination Attainments & Performance Rating	Master's Thesis Oral Exam / Defence (45 min)
Resources during the exam	all
Remarks	For further information see regulations in the study plan.