Technische Hochschule Rosenheim

Modulhandbuch HT-M
Fakultät für Holztechnik und Bau

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

Gültig ab Wintersemester 2023/24

Technische Hochschule Rosenheim

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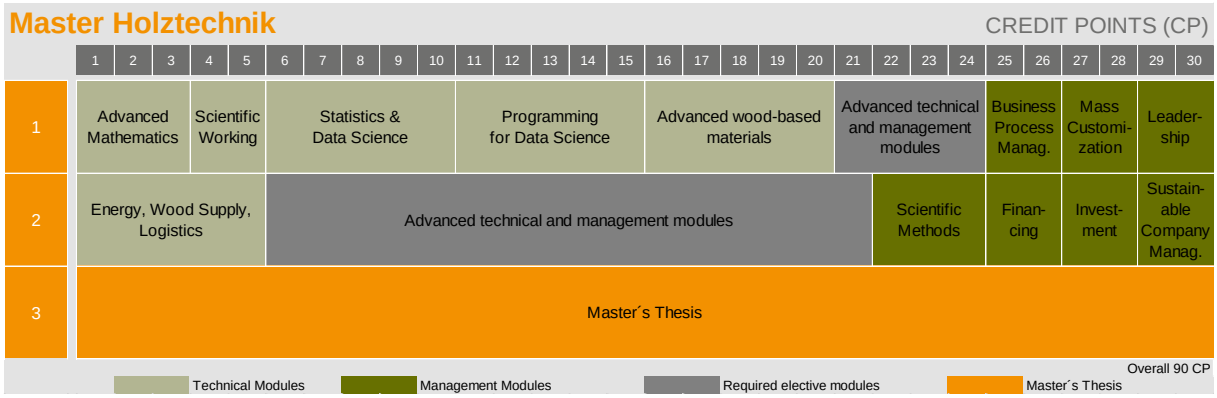
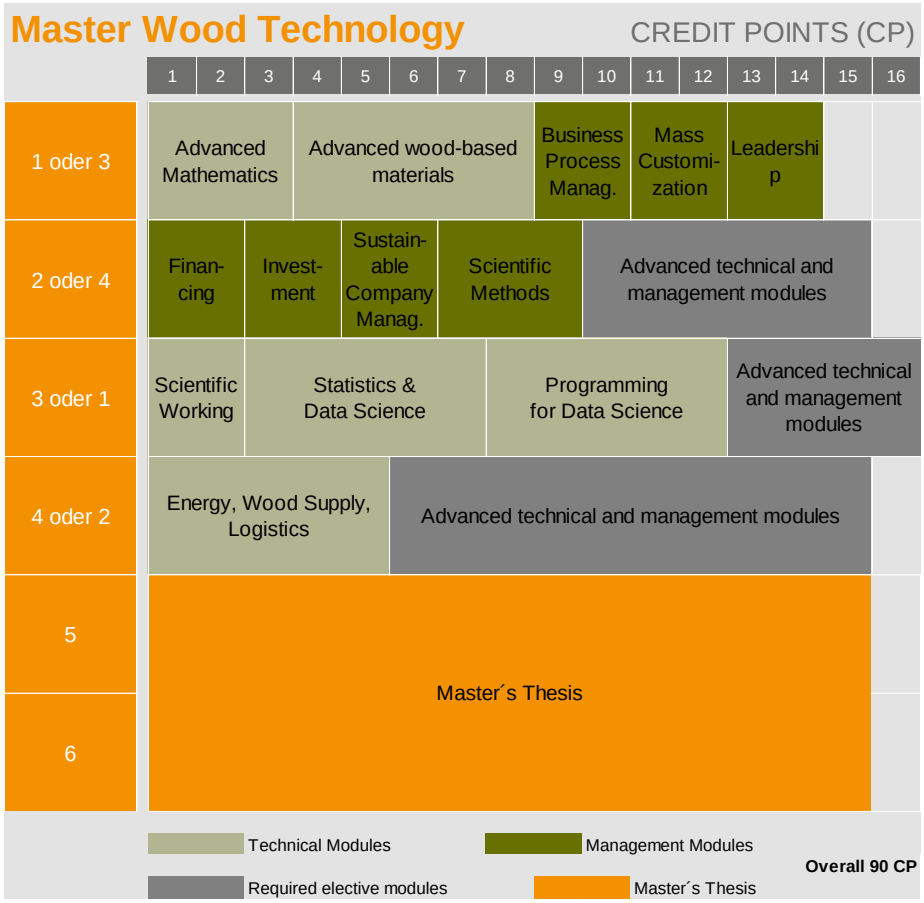
2. Modulplan

Vollzeitstudium



Teilzeitstudium



3. Erklärung der Abkürzungen

MA	=	Masterarbeit
ECTS	=	European Credit Transfer and Accumulation System (Kreditpunkte)
elP	=	elektronische Prüfung
Ex	=	Exkursion
FWPM	=	Fachbezogenes Wahlpflichtmodul
h	=	Stunden
HT-M	=	Studiengang Holztechnik Master
LN	=	Leistungsnachweis
mdlP	=	mündliche Prüfung
P	=	Prüfungen
Pr	=	Praktikum
PStA	=	Prüfungsstudienarbeit
S	=	Seminar
schrP	=	schriftliche Prüfung
SPO	=	Studienprüfungsordnung
SU	=	Seminaristischer Unterricht
SV	=	Seminarvortrag
SWS	=	Semesterwochenstunden
TN	=	Teilnahmenachweis
Ü	=	Übung

4. Häufigkeit und Verwendbarkeit in anderen Studiengängen

Modul-Nr.	Modul-Name	Angeboten im		Gemeinsames Modul mit anderen Studiengängen (Master)
		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		ING-M
MM 03	Financing		x	
MM 04	Investment		x	
MM 05	Sustainable company management		x	
MM 06	Business Process Management	x		
MM 07	Mass Customization	x		
MM 08	Leadership	x		
MM 09	Scientific Methods		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 08	Advanced Wood Processing – Homag		x	
MF 12	Supply Chain Management		x	
MF 13	Quality Management		x	
MF15	Sustainability & Circular Economy		x	ING-M, WI-M
MF 21	Innovation Management and New Product Development	x		
MF 22	Simulation	x		
MF 23	Circular Renovation – Case study	x		

Modul-Nr.	Modul-Name	Angeboten im		Gemeinsames Modul mit anderen Studiengängen (Master)
		WiSe	SoSe	
MW 01	Energy, Wood Supply and Logistics		x	
MW 03	Advanced wood-based materials	x		

5. Übersicht Workload

SPO Nr.	Modul-Nr.	Modul-Name	SWS				Präsenz-zeit in h	Exkursion in h	Häusliche Vor- und Nachbereitung und Prüfungsvorbereitung in h	ECTS
			SU	S	Ü	Pr				
1	MG 04	Advanced Mathematics	2				30		60	3
1	MG 05	Scientific Working		2			30		30	2
1	MG 06	Statistics & Data Science	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 05	Sustainable company management	2				30		30	2
2	MM 06	Business Process Management		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
3	MF 02	Excursion		2				50	10	2
3	MF 03	Project Seminar: Systems 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 industries	2				30		30	2
3	MF 06	Change Management	2				30		30	2
3	MF 08	Advanced Wood Processing – Homag		2						2
3	MF 12	Supply Chain Management	2				30		30	2
3	MF 13	Quality Management	2				30		30	2
3	MF15	Sustainability & Circular Economy		2						3

SPO Nr.	Modul-Nr.	Modul-Name	SWS				Präsenz-zeit in h	Exkursion in h	Häusliche Vor- und Nachbereitung und Prüfungsvorbereitung in h	ECTS
			SU	S	Ü	Pr				
3	MF 21	Innovation Management and New Product Development	2				30		90	4
3	MF 22	Simulation	2				30		30	2
3	MF 23	Circular Renovation – Case study		2			30		90	4
4	MW 01	Energy, Wood Supply and Logistics	5				75		75	5
4	MW 03	Advanced wood-based materials	4				60		90	5
5	MA 01	Master´s Thesis					0		900	30
		Summe	51 - 57				2700			90

6. Modulbeschreibungen

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."

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

HT-MG04 Advanced Mathematics

Modul Nr. MG 04	**Advanced Mathematics**
Courses of the module	(1) Advanced Mathematics
Duration of the module	1 semester
Semester of study	1st 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 online exam (60 min)
Resources during the exam	non-programmable pocket calculator; Open book
Remarks	self-study units with on-line quizzes, peer instruction

HT-MG05 Scientific Working

Modul Nr. MG 05	**Scientific Working**
Courses of the module	(1) Scientific Working
Duration of the module	1 semester
Semester of study	1st semester
Responsible for the module	Prof. Dr. Holly Ott, Dr. Veronika Auer
Lecturer	Prof. Dr. Holly Ott, Dr. Veronika Auer
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) = 60 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:** • 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.

HT-MG06 Statistics & Data Science

Modul Nr. MG 06	**Statistics & Data Science**
Courses of the module	(1) Statistics & Data Science
Duration of the module	1 semester
Semester of study	1st 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) =150 h
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

HT-MG07 Programming for Data Science

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	1st 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) =150 h
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

HT-MM03 Financing

Modul Nr. MM 03	**Financing**
Courses of the module	(1) Financing
Duration of the module	1 semester
Semester of study	2nd 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 = 30 h total (2 ECTS * 30 h/ECTS) = 60 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:** • 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

HT-MM04 Investment

Modul Nr. MM 04	**Investment**
Courses of the module	(1) Investment
Duration of the module	1 semester
Semester of study	2nd 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 = 30 h total (2 ECTS * 30 h/ECTS) = 60 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:** • 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 • Perrridon, L. / Steiner, M. / Rathgeber, A. (2012), Finanzwirtschaft der Unternehmung, München, Vahlen-Verlag • Rollwage, N. (Hrsg.) (2012), Finanzierung, Schinderllegi, 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

HT-MM05 Sustainable company management

Modul Nr. MM 05	**Sustainable company management**
Courses of the module	(1) Sustainable company management
Duration of the module	1 semester
Semester of study	2nd semester
Responsible for the module	Prof. Andreas Heinzmann
Lecturer	Mrs. Susanne Steinhauer
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) = 60 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:** • to know the concept of Circular Economy • of Sustainability Labels for the furniture industry **skills:** • to develop essential fields of action on the basis of the SDG (Sustainable Development Goals) • to define concrete sustainability goals and measures for the company **competences:** • to define and implement a sustainability strategy
Contents (1)	• • defining sustainability • • the drivers for transformation • • how to start • • reporting • • circular economy • • sustainable marketing

Modul Nr. MM 05	**Sustainable company management**
	• • supply chain law
Literature (1)	Will be provided during class.
Examination Attainments & Performance Rating	Case Study including presentation
Resources during the exam	
Remarks	Blocked lectures

HT-MM06 Business Process Management

Modul Nr. MM 06	**Business Process Management**
Courses of the module	(1) Business Process Management
Duration of the module	1 semester
Semester of study	1st 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) = 60 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:** • Conceptualize business operations as processes. • Recognize the interdependencies of business processes within and across organizational boundaries. **skills:** • Model and simulate business processes using a process mapping tool in BPMN with corresponding events, activities, actors, physical and informational objects, the data flow and their dependencies. • Evaluate the process in terms of both qualitative and quantitative measures, utilizing well known concepts and tools from quality management and operations management, e.g. identification of waste, productivity, quality, time and costs. **competences:** • Identify inefficiencies in business processes and propose improvements for process innovation and redesign projects.

Modul Nr. MM 06	**Business Process Management**
	• Identify the role of information systems in business processes and business process improvement; recognize the role of ERP systems
Contents (1)	• Introduction into Business Process Management • Process Identification • Process Discovery • Essential Process Modelling • Qualitative Process Analysis • Quantitative Process Analysis • Process Mining • Process Redesign and Process Simulation • Process Monitoring
Literature (1)	• E. g., Fundamentals of Business Process Management, 2nd Edition, Authors: Dumas / La Rosa / Mendling / Reijers; Springer, ISBN 978-3-662-56509-4 (E-Book) (E-Book available in the university library)
Examination Attainments & Performance Rating	Case study (incl. presentation, team work and written documentation)
Resources during the exam	
Remarks	Group Work

HT-MM07 Mass Customization

Modul Nr. MM 07	**Mass Customization**
Courses of the module	(1) Mass Customization
Duration of the module	1 semester
Semester of study	1st 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) = 60 h
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

HT-MM08 Leadership

Modul Nr. MM 08	**Leadership**
Courses of the module	(1) Leadership & Personality (2) Teambuilding & Leadership
Duration of the module	1 semester
Semester of study	1st semester
Responsible for the module	Prof. Andreas Heinzmann
Lecturer	(1) Prof. Dr. Sonja Unterlechner (2) Mr. Helge Zermen, Mrs. Agnes Kotouc
Teaching Language	English
Credit Points (ECTS)	2 ECTS
Type of Teaching Method	4 SWS (contact hours/week) = seminar
Total workload	Contact hours (15 weeks * 4 SWS) = 60 h preparation and follow-up work at home, exam preparation = 0 h total (2 ECTS * 30 h/ECTS) = 60 h
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 (1) Leadership & Personality	This course imparts the following **knowledge:** • fundamentals in leadership • basics about attitudes and tools related to leadership **skills:** • Introduce the importance of management and leadership skills **competences:** • Identify and practice essential management and leadership skills
Module Objectives / Intended Learning Outcomes (2) Teambuilding & Leadership	This course imparts the following **knowledge:** • teambuilding, roles in teams, dynamics in teams

Modul Nr. MM 08	**Leadership**
	skills: • communication, moderation, conflict management competences: • They develop their individual profile of competences related to leadership in order to be able to fulfill management positions in a motivating, warm and joyful ambiance.
Contents (1) Leadership & Personality	• Developing Self-Awareness • Building Trust • Gaining Power and Influence • Empowering and Delegation • Managing Personal Stress • Wrapping up: Your plans and ambitions
Contents (2) Teambuilding & Leadership	• methods for team building, finding of roles in teams, facts about dynamics in teams • theoretical background about communication, moderation, conflict management
Literature (1) Leadership & Personality	• Whetten/Cameron (2015): Developing Management Skills • Caproni (2012): Management Skills for Everyday Life • Deresky (2016): International Management • Dessler (2017): Human Resource Management • Dessler (2017): A framework for Human Resource Management (ebook) • 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
Literature (2) Teambuilding & Leadership	• Geller, Manfred; Nowak, Claus: Teamwork – Teambuilding – Teamcoaching; A practical guide to working in and with teams; Limmer Verlag Meezen 2004 • Kirz, Willy Christian; Nöbauer Brigitta: Teamkompetenz – Konzepte, Trainingsmethoden, Praxis; Vandenhoeck & Ruprecht Verlag Göttingen 2003 • Hobmair; Altenthan; Betscher-Ott; Dirrigl; Gotthardt; Ott: Psychologie; Stam –Verlag Köln 1997 • Schulz von Thun, Friedemann; Miteinander reden: 1 Störungen und Klärungen, Allgemeine Psychologie der Kommunikation; Rowohlt Verlag Hamburg 2006

Modul Nr. MM 08	**Leadership**
	• Gairing, Fritz: Organisationsentwicklung als Lernprozess von Menschen und Systemen; Deutscher Studien Verlag Weinheim 2008 • Thomas, Konstanze; Habiba Kreszmeier, Astrid: Systemische Erlebnispädagogik- Kreativrituelle Prozessgestaltung in Theorie und Praxis; Ziel Verlag Augsburg 2007 • Renoldner, Christa; Scala, Eva; Rabenstein, Reinhold: Einfach systemisch – systemische Grundlagen und Methoden für ihre pädagogische Arbeit; Ökotopia Verlag Münster 2007
Examination Attainments & Performance Rating	active participation in all sessions
Resources during the exam	none
Remarks	Blocked seminars

HT-MM09 Scientific Methods

Modul Nr. MM 09	**Scientific Methods**
Courses of the module	(1) Scientific Methods
Duration of the module	1 semester
Semester of study	2nd 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 (25%) – Individual Presentation (25%) – Group Final Exam (50%)
Resources during the exam	
Remarks	Group work, Class attendance is compulsory

HT-MF02 Excursion

Modul Nr. MF 02	**Excursion**
Courses of the module	(1) Excursion
Duration of the module	1 semester
Semester of study	2nd 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) = 60 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:** • 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)

HT-MF03 Project Seminar: Systems Engineering

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	2nd 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) =120 h
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 an 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

HT-MF04 Furniture – Product Safety and Testing

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	2nd 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) =120 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:** • 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

HT-MF05 Special Aspects of the Wood Processing Industries

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	2nd 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) = 60 h
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 Torreficaton – 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	

HT-MF06 Change Management

Modul Nr. MF 06	**Change Management**
Courses of the module	(1) Change Management
Duration of the module	1 semester
Semester of study	2nd 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) = 60 h
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

HT-MF08 Advanced Wood Processing - Homag

Modul Nr. MF 08	**Advanced Wood Processing - Homag**
Courses of the module	(1) Advanced Wood Processing - Homag
Duration of the module	1 semester
Semester of study	2nd semester
Responsible for the module	Prof. Dr. Michael Schaal
Lecturer	Different lecturers from the company
Teaching Language	English
Credit Points (ECTS)	2 ECTS
Type of Teaching Method	2 SWS (contact hours/week) = seminar-type teaching
Total workload	Contact hours (one week) = 40 h preparation and follow-up work at home, exam preparation = 20 h total (2 ECTS * 30 h/ECTS) = 60 h
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:** • knowledge of advanced wood processing technologies **skills:** • to understand modern process technologies **competences:** • to analyse of specific problems of machines and processing and to find solutions
Contents (1)	• Virtual commissioning at HOMAG using Digital Twins • New process technology in CNC controlled edge banding • Cells and automated manufacturing lines • The Disruption of the largest industry (house building) and how to manage such a transition & transformation • Sustainable packaging in the woodworking industry • Software solution for furniture industry • Batch size 1 | Requirements , concepts and simulation • Quality and process optimization in panel cutting intelligent, digital, self learning

Modul Nr. MF 08	**Advanced Wood Processing - Homag**
	• function+: New business model for the woodworking industrial , self learning • Digital solutions for small and medium sized enterprises • Factory planning with the help of digital tools (Contents are updated each year to the actual developments)
Literature (1)	• E. Csanady, E. Magoss Mechanics of Wood Machining, University of West Hungary, 2011, ISBN978-963-9883-80-2 • "Mechanical Vibration" von T.L.Schmitz und K.S.Scott • Koch Peter, Wood Machining Processes, Ronald Press, New York, 1964
Examination Attainments & Performance Rating	• written exam 60min (at the end of the seminar week)
Resources during the exam	
Remarks	Seminar at the company site with extra cost for transport and accommodation

HT-MF12 Supply Chain Management

Modul Nr. MF 12	**Supply Chain Management**
Courses of the module	(1) Supply Chain Management
Duration of the module	1 semester
Semester of study	2nd 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) = 60 h
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. MF 12	**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 though 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. MF 12	**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	

HT-MF13 Quality Management

Modul Nr. MF 13	**Quality Management**
Courses of the module	(1) Quality Management
Duration of the module	1 semester
Semester of study	2nd 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) = 60 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 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-MF15 Sustainability & Circular Economy

Modul Nr. MF 15	**Sustainability & Circular Economy**
Courses of the module	(1) Sustainability & Circular Economy
Duration of the module	1 semester
Semester of study	2nd semester
Responsible for the module	Prof. Andreas Heinzmann
Lecturer	Prof. Dr. Sandra Krommes, Dr. Susanne Steinhauer, Dr. Eva Schichl
Teaching Language	English
Credit Points (ECTS)	3 ECTS
Type of Teaching Method	2 SWS (contact hours/week) = seminar-type teaching
Total workload	Contact hours (one week) = 40 h preparation and follow-up work at home, exam preparation = 50 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	• Master Programme in Industrial Engineering • Master Programme in Engineering Sciences
Course prerequisites	
Module Objectives / Intended Learning Outcomes (1)	This course imparts the following **knowledge:** • to understand the meaning of sustainability and circular economy • to understand the global context of sustainability **skills:** • to utilize methods to develop sustainable products, **competences:** • to recognize the future challenges • to develop own ideas for implementation in companies
Contents (1)	The purpose of the workshop is to familiarise students with sustainability and circular economy - two future challenges. The class will enable students to take sustainability into account in product development, to know about the future challenges and encourages them to bring in their own ideas.

Modul Nr. MF 15	**Sustainability & Circular Economy**
	We will start the course with a general introduction, and then move over to the practical aspect how to include sustainability in the process of product development. During our company visit, students will learn how to incorporate the issue into a company's philosophy to offer ecological buildings. We will also look at what has already been achieved in Europe and what the future challenges to solve are. By the end, we will develop and pitch ideas for companies together.
Literature (1)	• Edited by Lerwen Liu, Seeram Ramakrishna (2021): An Introduction to Circular Economy. Singapore, Springer Singapore. ISBN 9789811585104 (available in the university library). • Daizhong Su, editor (2020): Sustainable product development : tools, methods and examples. Cham, Springer, ISBN: 978-3-030-39148-5 (available in the university library).
Examination Attainments & Performance Rating	• written exam 60min (at the end of the seminar week)
Resources during the exam	none
Remarks	This seminar is part of the Master Summer School of the university. Beside students from different master programmes also international students from different countries / universities will participate.

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
Semester of study	1st semester
Responsible for the module	Prof. Martina Zurwehme
Lecturer	Prof. Martina Zurwehme
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) = 120 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:** • The students deal with the challenges in the wood industry • Students understand the design thinking process, are able to apply it themselves and develop solutions for challenges. **skills:** • Students are able to develop and evaluate sustainable innovations or new product concepts. (Concept and Prototyping) • Students design their own innovation workshop and conduct it themselves (facilitation) • Students identify topics, customer needs and market trends and develop their innovations or product concepts based on these (Scientific) Research). • Students learn how to present and communicate their product concepts. (Pitch and Presentation) **competences:**

Modul Nr. MF 21	**Innovation Management and New Product Development**
	• Creativity and innovation skills: Students learn how to develop innovative and sustainable product concepts. • Collaboration and communication: Students learn how to lead and implement the Design Thinking process in teams. • Sustainable thinking and action: Students learn how to develop and evaluate sustainable product concepts in order to contribute to sustainability
Contents (1)	This module gives students an overview of the topic of innovation in the wood industry, looking at products, services and business models. After an introduction to the basics of innovation management, the status quo in the wood sector is shown and challenges are identified and questions formulated on the basis of current studies, reports, etc. The module also provides an overview of the current situation in the wood sector. The module focuses on the application and implementation of innovation processes with the Design Thinking method. Based on a challenge to be solved, the students go through an innovation process in small groups. In a selected phase, the students switch roles to moderation and are put in a position to organise and carry out innovation processes themselves. The module includes theoretical basics as well as practical exercises. A documentation, which includes theoretical contents, practical experiences and reflections, is prepared in the course of the semester and forms the basis for the final thesis in the form of a scientific essay, which refers to what has been learned and experienced. • Innovations in timber industry • Challenges between sustainability and value creation • Application of Design-Thinking to self-selected Questions • Application of relevant tools for the implementation of innovation processes. • Facilitation of innovation processes
Literature (1)	• Aerssen, Benno (2018): Das große Handbuch Innovation. 555 Methoden und Instrumente für mehr Kreativität und Innovation im Unternehmen. Unter Mitarbeit von Nicolas Burkhardt, Ariane Ernst, Jörn Rings, Sabine Rings, Armin Schobloch, Martin Spicker et al. 1. Auflage. München: Vahlen. • Hoffmann, Christian Pieter; Lennerts, Silke; Schmitz, Christian; Stölzle, Wolfgang; Uebernickel, Falk (2016): Business Innovation: Das St. Galler Modell.

Modul Nr. MF 21	**Innovation Management and New Product Development**
	• Lee, Ju Hyun; Ostwald, Michael J.; Gu, Ning (2020): Design Thinking: Creativity, Collaboration and Culture. 1st edition 2020. Cham: Springer International Publishing. • Lewrick, Michael (2018): Design thinking. Radikale Innovationen in einer digitalisierten Welt. München: C. H. Beck (Beck kompakt). • Lewrick, Michael; Langensand, Nadia; Leifer, Larry J.; Link, Patrick (2018): The design thinking playbook. Mindful digital transformation of teams, products, services, businesses and ecosystems; WILEY. • Lewrick, Michael; Link, Patrick; Leifer, Larry; Lewrick, Michael (Hg.) (2020): The Design Thinking Toolbox: A Guide to Mastering the Most Popular and Valuable Innovation Methods. Unter Mitarbeit von Achim Schmidt. Verlag Franz Vahlen. [S.l.]: VERSUS; WILEY. • Meinel, Christoph; Leifer, Larry (Hg.) (2023): Design Thinking Research. Innovation - Insight - Then and Now. 1st edition 2023. Cham: Springer Nature Switzerland • Scharmer, Claus Otto (2018): The essentials of Theory U. Core principles and applications. First edition. Oakland, CA: BK, Berrett-Koehler Publishers, Incorporated, a BK Business Book.
Examination Attainments & Performance Rating	Project Paper (Course Documentation/ Scientific Essay)
Resources during the exam	
Remarks	Group work

HT-MF22 Simulation

Modul Nr. MF 22	**Simulation**
Courses of the module	(1) Simulation
Duration of the module	1 semester
Semester of study	1st 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) = 60 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:** • Basic understanding of the simulation process of complex woodworking machines **skills:** • Basic skills in the usage of an exemplary simulation software system • Understanding of the performance criteria and parameters of machines **competences:** • Ability to simulate a simple example process
Contents (1)	• The importance of simulation for complex manufacturing systems • Explanation of the simulation process with related case studies of the woodworking industry • Introduction of an example software tool • Simulation of a case study with all relevant parameters

Modul Nr. MF 22	**Simulation**
Literature (1)	• Software documentation
Examination Attainments & Performance Rating	Case study (incl. presentation, team work and written documentation)
Resources during the exam	
Remarks	Group work

HT-MF23 Circular Renovation – Case study

Modul Nr. MF 23	**Circular Renovation – Case study**
Courses of the module	(1) Circular Renovation – Case study
Duration of the module	1 semester
Semester of study	1st 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) =120 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:** • construction and serial renovation of buildings **skills:** • Development of skills in the field of renovation and reuse of an existing building to develop living space **competences:** • Development of a clear project structure • Integration of different competences in a group work • Development of a concept in a field where the students had limited knowledge before the project.
Contents (1)	• Development of a circular renovation concept for an existing office building to create living space

Modul Nr. MF 23	**Circular Renovation – Case study**
Literature (1)	• Leitfaden Serielles Sanieren, Informationsdienst Holz
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) Wood Supply (3) Logistics
Duration of the module	1 semester
Semester of study	2nd semester
Responsible for the module	Prof. Dr. Andreas Michanickl
Lecturer	(1) Prof. Dr. Andreas Michanickl (2) Dr. Veronika Auer (3) Prof. Dr. Michael Zehner / Prof. Dr. Harald Krause / Prof. Dr. Frank Buttinger / Prof. Dr. Ulrich Spindler / Prof. Dr. Dominikus Bücker
Teaching Language	English
Credit Points (ECTS)	5 ECTS
Type of Teaching Method	5 SWS (contact hours/week) = seminar-type teaching
Total workload	Contact hours (15 weeks * 5 SWS) = 75 h preparation and follow-up work at home, exam preparation = 75 h total (5 ECTS * 30 h/ECTS) =150 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) 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.

Modul Nr. MW 01	Energy, Wood Supply, Logistics
	• To apply greenhouse gas accounting methodologies to calculate emissions and develop mitigation plans. 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 • CO_2 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) Wood Supply	This course imparts the following knowledge: • of the challenges of wood supply skills: • to describe the method of material flow analysis • to calculate and estimate wood flows competences: • to apply material flow analysis to the study of wood flows • to use the MFA software STAN
Contents (2) Wood Supply	• Introduction to Wood Supply • Material Flow Analysis • Wood Flow Analysis • Material Flow Analysis software STAN • Wood Supply Risks • Wood Supply Security
Literature (2) Wood Supply	1. Auer, Veronika; Rauch, Peter (2021): Wood supply chain risks and risk mitigation strategies: A systematic review focusing on the Northern hemisphere. Biomass and Bioenergy 148 (106001). doi: 10.1016/j.biombioe.2021.106001 2. Bösch, Matthias; Jochem, Dominik; Weimar, Holger; Dieter, Matthias (2015): Physical input-output accounting of the wood

Modul Nr. MW 01	Energy, Wood Supply, Logistics
	and paper flow in Germany. In: Resources, Conservation and Recycling 94, S. 99–109. DOI: 10.1016/j.resconrec.2014.11.014. 3. Mantau, Udo; Gschwantner, Thomas; Paletto, Alessandro; Mayr, Marian L.; Blanke, Christian; Strukova, Evgeniya et al. (2016): From inventory to consumer biomass availability—the ITOC model. In: Annals of Forest Science 73 (4), S.885–894. DOI: 10.1007/s13595-016-0582-1. 4. Kalt, Gerald; Kranzl, Lukas (2012): An assessment of international trade related to bioenergy use in Austria—Methodological aspects, recent developments and the relevance of indirect trade. In: Energy Policy 46, S. 537–549. DOI: 10.1016/j.enpol.2012.04.026. 5. Mantau, Udo (2015): Wood flow analysis: Quantification of resource potentials, cascades and carbon effects. In: Biomass and Bioenergy 79, S. 28–38. DOI: 10.1016/j.biombioe.2014.08.013. 6. Jochem, Dominik; Weimar, Holger; Bösch, Matthias; Mantau, Udo; Dieter, Matthias (2015): Estimation of wood removals and fellings in Germany. A calculation approach based on the amount of used roundwood. In: Eur J Forest Res 134 (5), S. 869–888. DOI: 10.1007/s10342-015-0896-9. 7. Lenglet, Jonathan; Courtonne, Jean-Yves; Caurla, Sylvain (2017): Material flow analysis of the forest-wood supply chain: A consequential approach for log export policies in France. In: Journal of Cleaner Production 165, S. 1296–1305. DOI: 10.1016/j.jclepro.2017.07.177
Module Objectives / Intended Learning Outcomes (3) 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 (3) 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

Modul Nr. MW 01	**Energy, Wood Supply, Logistics**
	• 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
Literature (3) 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 Attainments & Performance Rating	(1) Written exam, 60 min, 40% (2) Project paper (Poster presentation), 20% (3) Written exam, 60 min, 40%
Resources during the exam	
Remarks	

HT-MW03 Advanced wood-based materials

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	1st semester
Responsible for the module	Prof. Dr. Günter Modzel / Prof. Dr. Lars Passauer
Lecturer	(1) Prof. Dr. Günter Modzel (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) = 150 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) 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, biomedicals, …) • 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
Examination Attainments & Performance Rating	Online written exam Processing time 60 min, exam duration 75 min; If more than 50% of the questions are answered correctly, the exam is considered passed with a positive grade. • Part “Wood-based Biomaterials“ (Passauer): Representation of simple chemical/physical relationships with structural formulas, reaction equations, principal schemes etc.
Resources during the exam	All tools are permitted.
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	3rd semester (full-time) / 5th and 6th 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) =900 h
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.