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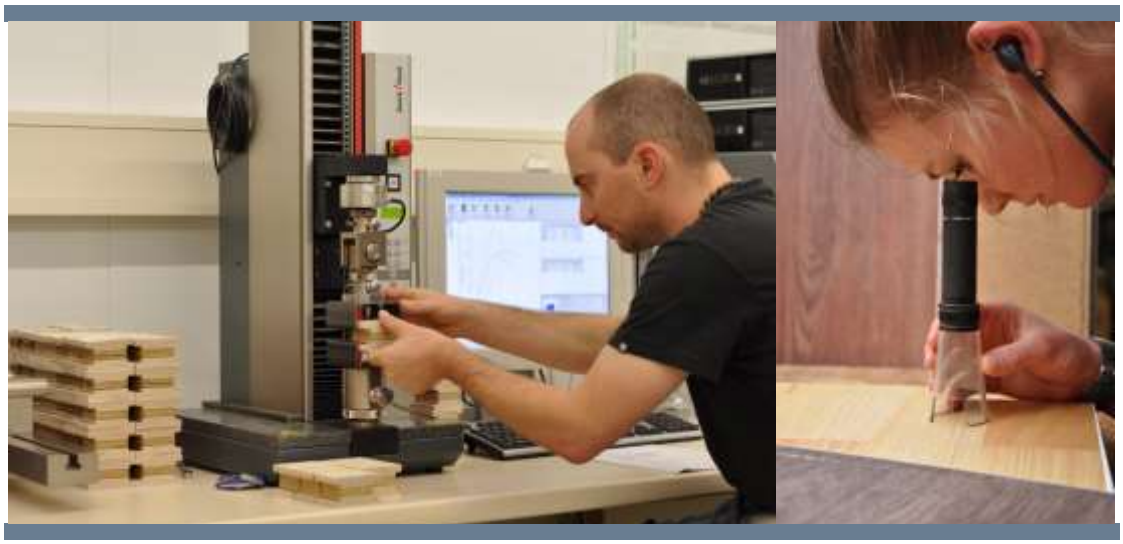
Technische Hochschule Rosenheim



Master
Wood Technology

Curriculum

Winter Term 2022/2023

Offered Jointly by

Technical University of Applied Sciences Rosenheim, Germany

and

Bern University of Applied Sciences, Biel Switzerland

With reference to the Study and Examination Regulations
of Technical University of Applied Sciences Rosenheim dated 12.08.2019
(SPO 20192)

Technische Hochschule Rosenheim

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1 Introductory Remarks

1.1 Foreword

This document is meant to give the reader an overview of the contents and the structure of the Master's Programme Wood Technology. This curriculum of the Master Programme in Wood Technology assists students, professors and advisors in navigating the programme and its requirements, as well as establishes the official foundation for a successful completion of the programme.

The purpose of this curriculum is to communicate information regarding:

- Requirements to achieve the Master of Science in Wood Technology
- The modules offered in the programme, their location and availability
- Whether they are compulsory, the teaching method and language
- General information regarding grading, part-time and work/study
- The legal framework for the Master Thesis
- References to more in-depth information or regulations
- detailed description of each listed module.

1.2 Source and Documents

This curriculum is based upon §6 of the Study and Examination Regulations THR as well as Art.5 of the Study and Examination Regulations of BFH. The Faculty Council (THR) and the Programme Council Master Wood Technology (BFH) are the authorities for this curriculum.

This curriculum references the following documents:

- Study and Examination Regulations Master Wood Technology (THR)
- Rahmenprüfungsordnung (Framework Examination Regulations) of THR

1.3 Guarantees and Exclusions

THR and BFH are committed to provide adequate offerings of modules, so that the programme can be completed in the advised timeframe. There is also no entitlement to the corresponding courses being offered in the event that the number of participants is insufficient, except for the compulsory modules.

Note:
For the examination of each module the regulations of the university offering the module (THR / BFH) are binding!

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2 Cooperation THR and BFH

The Master Wood Technology is offered jointly by Technical University of Applied Sciences Rosenheim (THR) and Bern University of Applied Sciences (BFH).

The cooperation is specifically expressed in the following areas:

1. Students graduating from the Master Wood Technology at either university receive a shared Diploma from both universities.
2. Students can choose to study a semester at the partner university and receive credits for the successfully passed modules. This requires approval of the advisor and the other university needs to be informed by 15 May or 15 November for attendance in the following semester. The first semester cannot be spend at the partner university.
3. THR and BFH offer several modules jointly; for instance “Advanced Wood Processing” and an excursion.

Both universities offer modules in the field of “Management of Processes and Innovation”.
BFH offers in addition modules in the field of “Complex Timber Structures”.

More detailed information regarding the programme of the partner university can be found under the following link: www.ahb.bfh.ch/master-wood

3 Structure of the Programme

3.1 Required Credits

The aim is to acquire an average of 30 credit points (CP) per semester for full-time students or an average of 15 credit points per semester for part-time students. During the entire course of study, 90 credit points (CP) must be achieved.

A Bachelor degree with at least 210 ECTS credits is required for beginning the Master programme. Students who have a primary academic degree qualifying for professional employment with less than 210 credits but at least 180 credits have the possibility of acquiring the missing credits during the Master programme. Details for these regulations can be found in the Study and Examination Regulations of both universities.

The program has a modular structure and comprises three semesters for fulltime students, and four to six semesters if completed part time.

Fig. 1: Schematic representation of Programme structure

3.2 Full-Time Study and Schedule

The following is a representation of the modular course structure for full-time study.

Module Group	Modules	Credits/ Semester 1-3		
		Winter	Summer	Winter
Mathematics and Sciences	Advanced Mathematics	3		
	Scientific Working	2		
	Statistics & Data Science	5		
	Programming Fundamentals	5		
Skills for Management	Project Management		4	
	Leadership	5		
	Economical aspects		6	
Technical Compulsory modules	Innovation Management and New Product Development	4		
	Strategic Management	2		
	Electives		14	
General Compulsory modules	Processes & Simulation	5		
	Energy, Wood Supply, Logistics		5	
Thesis	Master Thesis			30
Minimum Required Total: 90 CP	Suggested number of CP per Semester	31	29	30

3.3 Part-Time Study and Schedule

Part-time study is possible with normal study duration of 6 semesters with an average of 15 credit points each. Part-time study while working differs from full-time study only in the length of one's studies. The course contents, degree, lectures, and examination regulations, prerequisites etc. are the same whether studying full time or part time.

The recommended course load allows for work-study.

In most time the weekly courses take part on 2 to 3 days a week. In the other half of the week the blocked courses are arranged.

The following table shows a representation of the modular course structure for part-time study.

Module Group	Select specific Modules from the following Sections	Credits/ Semester 1-6					
		Winter	Summer	Winter	Summer	Winter	Summer
Mathematics and Sciences	Advanced Mathematics			3			
	Scientific Working	2					
	Statistics & Data Science	5					
	Programming Fundamentals	5					
Skills for Management	Project Management				4		
	Leadership			5			
	Economical aspects				6		
Technical Compulsory modules	Innovation Management and New Product Development	4					
	Mass Customization			2			
	Electives		10		4		
General Compulsory modules	Processes & Simulation			5			
	Energy, Wood Supply, Logistics		5				
Thesis	Master Thesis					30	
Minimum Required Total: 90 CP	Suggested number of CP per Semester	16	15	15	14	30	

4 List of Modules by Module Group

The detailed description of the individual modules and part modules can be found in the appendix. The modules listed in the following are compulsory for all students. Only in the module group Electives choices can be made.

4.1 Mathematics and Sciences

Mathematics and Sciences						
Module N°	**Location**	**Module Title**	**Type**	**Semester Offered**	**CP**	**Language**
MG 04	Ro	Advanced Mathematics	lecture	winter	3	English
MG 05	Ro	Scientific Working	lecture, seminar	winter	2	English
MG 06	Ro	Statistics & Data Science	lecture	winter	5	English
MG 07	Ro	Programming for Data Science	lecture	winter	5	English

4.2 Skills for Management

Skills for Management						
Module N°	**Location**	**Module Title**	**Type**	**Semester Offered**	**CP**	**Language**
MM 01	Ro	Project Management	seminar, workshop	summer	4	English
MM 02	Ro	Leadership > Teambuilding & Leadership > Leadership & Personality > Cross Cultural Training	seminar, workshop	winter	5	English
MM 03 / 04 / 05	Ro	Economical aspects > Financing > Investment > Sustainable company management	seminar, lecture	summer	6	English

4.3 Technical Compulsory Modules

Technical Compulsory Modules						
Module N°	**Location**	**Module Title**	**Type**	**Semester Offered**	**CP**	**Language**
MF 21	Ro	Innovation Management and New Product Development	seminar	winter	4	English
MF 22	Ro	Mass Customization	seminar	winter	2	English
Elective module choice				**In total 14**		
MF 02	Firms	Excursion	seminar	summer	2	English
MF 03	Ro	Project Seminar: Systems Engineering	seminar	summer	4	English
MF 04	Ro	Furniture – Product Safety and Testing	seminar	summer	4	English
MF 05	Ro	Special Aspects of Wood Processing	lecture	summer	2	English
MF 06	Ro	Change Management	seminar	summer	2	English
MF 08	Homag	Advanced Wood Processing – Homag	seminar	summer	2	English
MF 12	Ro	Supply Chain Management	seminar	summer	2	English
MF 13	Ro	Quality Management	seminar	summer	2	English
MF15	Ro	Sustainability & Circular Economy	Seminar	Summer	2	English

4.4 General Compulsory Modules

General Compulsory Modules						
Module N°	**Location**	**Module Title**	**Type**	**Semester Offered**	**CP**	**Language**
MW 01 Energy, Wood Supply and Logistics						
MW 01.1	Ro	Energy	lecture	summer	2	English
MW 01.2	Ro	Wood Supply	lecture	summer	1	English
MW 01.3	Ro	Logistics	lecture	summer	2	English
MW 02 Processes & Simulation						
MW 02.1	Ro	Process Management	lecture	winter	3	English
MW 02.2	Ro	Simulation	seminar	winter	2	English

4.5 Master´s Thesis

The Master´s Thesis (30 CP) represents the conclusion of the programme. Further information regarding master´s thesis is available in section 5.

Master´s Thesis						
Module N°	**Location**	**Module Title**	**Type**	**Semester Offered**	**CP**	**Language**
MA 01	Ro	Master´s Thesis	report, presenta-tion	winter summer	30	English or German

4.6 Additional Modules

Modules taken in addition to the modules indicated in groups 4.1 to 4.5 can be entered as supplementary modules in the transcript of records and do not count toward the 90CP required to complete the master. These additional modules belong to one of the following categories:

- Requirements for students who have a prior Bachelor degree with less than 210 credit points: these credit points need to be completed according to the Study and Examination Regulations
- English language course to improve the English language skills of applicants who are admitted in terms of Section 3 (3) No. 8 of the study and examination regulations (A grade of at least "good" in "Technical English" or a comparable English subject from a previous degree.) or who had to pass a language test.

Additional Modules						
Module N°	**Location**	**Module Title**	**Type**	**Semester Offered**	**CP**	**Language**
PS 01	Firms	Practical Study Semester / Traineeship		winter summer	Max 30	German or English
MS 01	Ro	English	lecture	winter	5	English

4.7 Deviating selection of Modules

Students planning to attend lectures at external universities or an entire semester abroad may apply for a different selection of modules. These students require an advisor (see study regulations §10) whose task is to guarantee a reasonable selection of subjects and supervise the student's achievements abroad. The advisor is responsible that the overall objective of the program is achieved. In order to guarantee the success and document the agreements a personal curriculum for the student replacing the standard curriculum must be established. This personal curriculum has to be signed by the student and his/her advisor and to be approved by the head of programme and the board of examination.

5 Master´s Thesis

5.1 Assignment of topic

5.1.1 Supervisor

The Master´s Thesis is assigned, supervised and assessed by two examiners. The first examiner has to be a professor of the Technical University Rosenheim. The second examiner can also be a lecturer of the Technical University Rosenheim. The candidate has to suggest a topic to the examiners.

5.1.2 Group Project

The Master´s Thesis can also be completed as a group project, if the individual student's contribution that is to be evaluated for CPs can be clearly distinguished from other contributions by indicating the paragraphs, page numbers or other objective criteria allowing for a clear separation, and can thus be evaluated individually.

5.1.3 External Project

The implementation of a project in collaboration with companies as well as government agencies has been a long-standing practice at the Faculty of Wood Technology and Construction. It is appreciated and encouraged for mutual benefits. The company should admit the two examiners onto its premises, so they can gather information on site concerning the status and progress of the project.

5.1.4 Master´s Thesis

In the Master´s Thesis, the students should prove their ability to implement the knowledge and skills acquired during their studies by writing an independent practice-oriented scientific paper dealing with complex problems. The topic should be assigned at the latest at the beginning of the third semester, at the earliest when the student has acquired at least 30 CP during the Master Programme.

5.2 Approval and application

To enrol for the Master´s Thesis, the web application form has to be filled out. The web forms get processed by the central document- and workflow management system of the THR. The completed form will be signed digital by the examiners and thereafter the topic will be approved by the chair of the Board of Examination. The term for completion starts on the date of signature by the chair of the Board of Examination. The topic, scope of work and volume are to be limited so that the deadline can be met. After receiving the approval for submission of your thesis' topic, you can find all application forms of special purpose (filing extension, changing the topic, …) in your „student's cockpit for thesis' application".
In case of an external project first the generated application form has to be signed by the company. This original has to be handed in to the examination´s office – personally or via mail. Afterwards the process will continue as explained above.
The topic can only be rejected once for a serious reason, with the approval of the chair of the Board of Examination. A student repeating the Master´s Thesis and who has already rejected a topic while doing the Master´s Thesis the first time is not authorized to reject the topic again. The deadline starts anew with the assignment of the second topic.

5.3 Duration and timing

The following deadlines apply for the Master´s Thesis:

Duration	Type of study	
	Full-time	Part-time
Master Thesis	9 months	12 months

It is possible to request an extension of the deadline from the Board of Examination, which can grant a suitable extension if the initial deadline cannot be met due to illness or other justifiable reasons. In case of illness, a medical certificate must be presented under all circumstances.

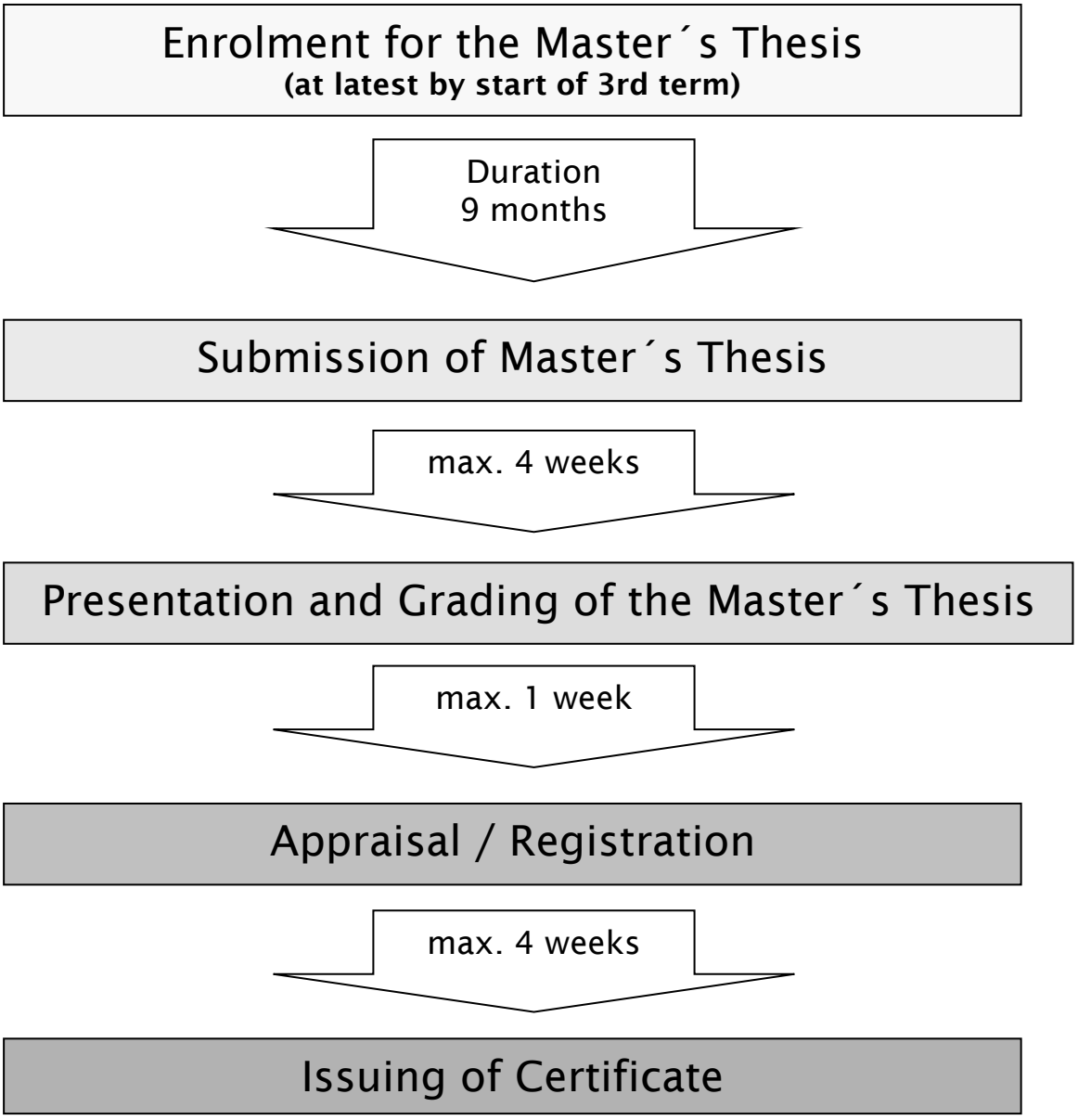

Fig. 3: Progress Master´s Thesis – example

5.4 Structure

The Master´s Thesis must have the following structure as regards its contents:

- Title page (name and matriculation number of the student, name of the first examiner and of the second examiner, name of the University, date)
- Half-page abstract of the thesis in German and in English as well as 3-5 key phrases pertaining to the contents of the paper
- Table of contents (max. up to the third level of outline)
- List of abbreviations (abbreviations relating to sources are not listed, e.g. “ed.” etc.)
- List of figures, tables and appendices
- Numbered pages of text, figures, tables and bibliography. Attached drawings and tables are to be folded in standard fashion and inserted in a glued-in pocket as attachment to the thesis.
- Bibliography, list of references, and
- Declaration under oath (final page)

5.5 Submission

The paper is to be handed in at the examination office in bound form (no spiral binding) in duplicate and as a digital version. All copies remain with the Technical University Rosenheim. One copy needs to include a photocopy of the application form and, if necessary, a confidentiality/restriction notice.
The Master´s Thesis is to be written in German or English and submitted timely, the deadline for submission is to be recorded on file. Other languages for the Master´s Thesis may be accepted upon agreement with the supervisors. If the deadline is not met, Master´s Thesis is “failed” (ECTS grade F) unless the candidate bears no responsibility for failing to meet the deadline.
When handing in the thesis, the candidate must state in writing that he/she has independently written the thesis or his/her clearly marked part of the thesis, in the case of a co-authored work, and has not used any other sources or resources than those indicated, and that all quotes have been properly designated as such. This statement also extends to graphical representations and to software attached or used.

5.6 Presentation

During the presentation, the results of the Master´s Thesis are presented and defended in a discussion with the examiners. The presentation should show that the candidate is able to debate scientific questions and present results clearly.
As a rule, the presentation is to take place within 4 weeks after submission of the Master´s Thesis. Arrangements are made with the examiners and the programme coordinator has to be informed. The presentation lasts 45 minutes. The talk, which should cover all of the most important results of the Master´s Thesis, takes no more than 20 minutes.
Students of the university can attend the presentations, space permitting. For important reasons, or at the candidate’s request, the public may be excluded.
If the written part of the Master´s Thesis (without presentation and defence) is “failed” (ECTS-Grade F), the Master´s Thesis as a whole is deemed failed. In this case, the presentation and the oral exam are dropped.

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5.7 Grading

The examiners determine the grade following the presentation. The Master´s Thesis is assessed by two examiners each. The grade is calculated as the arithmetic average of the grades rounded down to the first decimal point. The grades are published in the „student's cockpit for thesis' application" and in the online service center as soon as it has been determined.
The thesis is considered passed if a grade of at least "sufficient" (ECTS grade E) is awarded. The examination procedure should not exceed four weeks.

A Master´s Thesis that receives the grade "fail" (ECTS grade F) can be repeated once with a new topic. In case of repetition, within the deadline of six month from the date on which the results of the first exam attempt are known, the application for the new topic has to be done in the „student's cockpit for thesis' application". The duration for the second attempt is the same as for the first attempt.

6 Evidence of required English skills

Extract from the Study and Examination Regulations of 12 August 2019:

(3) Other requirements for admission to studies are English language skills.

The following apply as proof of required English language skills:
1. TOEFL revised Paper-delivered Test (PBT) with 66 or more points.
2. TOEFL Internet-based Test (IbT) with 88 or more points
3. IELTS with Band 6.5 or higher.
4. Cambridge ESOL CPE with Grade C or higher.
5. Cambridge ESOL CAE with Grade C/B or higher.
8. A grade of at least "good" in "Technical English" or a comparable English subject from a previous degree.
9. Medium of instruction certificate "English" for the previous academic degree.

Native English speakers are not required to submit proof of adequate English language skills. In cases of doubt or nonsubmission of proof, applicants may be required additionally/alternatively to pass a language test comparable to those listed above at Rosenheim University of Applied Sciences.

Applicants who are admitted in terms of Section 3 (3) No. 8 must provide proof of their English language skills – according to the requirements of Section 3 (3) No. 1-7 - by the end of the degree programme, at the latest. Where applicable, the qualification might be obtained by participating in relevant courses at the university. However, ECTS credits cannot be gained for these additional studies.

7 Evaluation and assessment of examination results

7.1 Master Certificate and academic title

If the application for graduation is accepted, the student will receive within 4 weeks after the presentation a certificate that includes all learning achievements with indication of the respective points. Grades are listed for those results achieved through exams taken in the programme. Furthermore, the certificate will contain the topic and grade of the Master´s Thesis as well as the total grade. The certificate is signed by the chair of the Board of Examination.
Additionally, the student will receive an attestation of equivalence of the certificate in English.
By delivering a diploma and certificate, Technical University of Applied Sciences Rosenheim and Bern University of Applied Sciences confer the title of "Master of Science" (M.Sc.).

7.2 Assessment of examination results

The European Transfer Credit System (ECTS) applies. Consequently, the examination results are to be assessed by awarding differentiating grades. An examination is successfully passed if all course certificates have been given at least the grade "sufficient" (ECTS grade E).

7.2.1 Grade conversion table

Grades (Germany)	ECTS Grade		ECTS Definition	Grades (Switzerland)
1,0 – 1,5	A		excellent	6,0 – 5,8
1,6 – 2,0	B		very good	5,7 – 5,3
2,1 – 3,0	C		good	5,2 – 4,8
3,1 – 3,5	D		satisfactory	4,7 – 4,3
3,6 – 4,0	E		sufficient	4,2 – 4,0
4,1 – 5,0	F		fail	< 4,0

Exam grades are rounded down to the first decimal point.

7.3 Recognition of examination results

The European Transfer Credit System (ECTS) applies. Consequently, the examination results are to be assessed by awarding differentiating grades.

7.3.1 Examination results from a diploma programme or an equivalent programme

Generally, the accrediting of examination results of a diploma programme or another equivalent programme in the Master Programme in Wood Technology can be requested from the Board of Examination after consultation with the advisor. The requested credits need to be assigned to a module.

7.3.2 Examination results from external academic institutions during the Master Programme

During the Master Programme, examinations can be taken at other academic institutions. This is subject to consultation with the advisor and must be included in the curriculum. The details on how the points will be credited are decided by the Board of Examination on a case-by-case basis, upon consultation with the relevant professor or lecturer.

7.4 Enrolment for the examinations

Enrolment for the examinations of all complementary modules is carried out online via the Online Service Center (OSC). Registration dates are listed in the currently valid university calendar. Announcements are also made in the Community. All additional modules have to be registered separately. The Examination office is responsible for the binding announcement of examinations. The type of examination indicated here in the curriculum corresponds to the information status at the time the curriculum is approved by the Faculty Council.

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8 Exchange Semester at BFH

Students can choose to study a semester at the partner university and receive credits for the successfully passed modules. This requires approval of the advisor and the other university needs to be informed by 15 May or 15 November for attendance in the following semester. The first semester cannot be spend at the partner university. For the specialisation Complex Timber Structures a first academic degree in the field of Timber Construction and Redevelopment or Civil Engineering is required.

9 Appendix – Module Descriptions

I. Mathematics and Sciences

Module **Person responsible**	**MG 04 Advanced Mathematics** **Prof. Dr. Birgit Naumer**
Responsible faculty / Course of studies (origin)	Faculty of Applied Natural Sciences and Humanities
Target Semester / Group	1st semester
Competences	• 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. • Ability for further study of numerical analysis and scientific computing based on the foundation of the course. • Having the vocabulary to discuss about the mathematical topics covered in the course.
Lecturer	Prof. Dr. Birgit Naumer
Module period / term	winter term
Credit Points (ECTS)	3
Semester hour per week (SWS)	2 contact hours/week seminar-type teaching
Total workload Partitioning of hours	60 hours, of which • 30 contact hours • 30 hours preparation and follow-up work at home, exam preparation
Course prerequisites	• Admittance to the Master Programme of Wood Technology, • fundamental knowledge of mathematics, especially Calculus

Contents	• floating point numbers and arithmetic, error analysis • polynomial interpolation and splines • numerical integration • numerical solution of ordinary differential equations
Type of Teaching Method	lecture slides, exercises, self-study units with on-line quizzes, peer instruction
Teaching Language	English
Examination Attainments & Performance Rating	participation in the self-study units written exam (60 min)
Listing Requirement	none
Resources during the exam	non-programmable pocket calculator; 2 one-sided pages handwritten or printed
Literature	*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 *Scientific Computing*: W. Gander, M. J. Gander, F. Kwok, Springer

Module **Person responsible**	**MG 05 Scientific Working** **Prof. Dr. Holly Ott, Dr. Veronika Auer**
Responsible faculty / Course of studies (origin)	**Faculty of Wood Technology**
Target Semester / Group	Semester 1
Competences	**Learning Goals and Competences:** After successful completion of this module, students will be able to: - understand the importance and relevance of scientific work in wood technology, including topics such as sustainabilty in xxx, digitalisation, among others. - critically evaluate scientific publications - peform a literature search of peer-reviewed articles in order to place a scientific work within the current state of research - reflect independently on and and examine crtically a scientific problem - define research questions for a scientific work in an area of wood technology - deepen knowledge in this area - engage in scientific discussions - understand the importance of methodological approaches to scientific work - write scientific report and present own research results in a poster format - understand and apply citation rules - analyze and present scientific data **Class attendance is compulsory.**
Lecturer	Prof. Dr. Holly Ott, Dr. Veronika Auer
Module period / term	Winter Semester
Credit Points (ECTS)	2
Semester hour per week (SWS)	2 contact hours/week seminar-type teaching (in winter semester 22/23 two groups, one face-to-face and one online)

Total workload Partitioning of hours	60 hours, of which • 25 contact hours • 35 hours preparation and follow-up work at home, final paper preparation
Course prerequisites	Admittance to the Master Programme of Wood Technology
Contents	Modul 1: Introduction to Scientific Working Modul 2: introduction to the Library Modul 3: Idea Structuring and Literature Search Modul 4: Individual Group Feedback Modul 5: Project Paper Modul 6: Poster Presentations Modul 7: Data Analysis
Type of Teaching Method	Lecture Notes, Recommended Literature, Exercises, Group Work, Presentation
Teaching Language	English
Examination Attainments & Performance Rating	Project Paper (40%) - Group Poster Presentation (25%) - Group Case Study Report (25%) - Individual
Listing Requirement	None
Resources during the exam	-
Literature	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.

Module Person responsible	MG 06 Statistics & Data Science Prof. Dr. Benjamin Tischler
Responsible faculty / Course of studies (origin)	Faculty of Applied Natural Sciences and Humanities
Target Semester / Group	1st semester
Competences	**Learning goal:** 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) Being able to use and programm Statistics and Data Science Methods in Python Inspiration on where and how to use Statistics and Data Science in the real world to solve problems and create value **Competence:** Knowledge of statistical methods for describing and visualizing information 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
Lecturer	Prof. Dr. Benjamin Tischler
Module period / term	winter term
Credit Points (ECTS)	5
Semester hour per week (SWS)	4 contact hours/week seminar-type teaching (in winter semester 22/23 online lecture)
Total workload Partitioning of hours	150 hours, of which • 60 contact hours

	• 90 hours preparation and follow-up work at home, exam preparation
Course prerequisites	• Admittance to the Master Programme of Wood Technology • Basic knowledge of statistics (mean, standard deviation and variance) and good grasp of essentials of calculus and some linear algebra • Participants must bring their own laptop with a camera to the course • 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
Contents	1. Descriptive Statistics & Visualization 2. Data Generation & Design of Experiments 3. Introduction to Probability & Stochastics 4. Statistical Inference 5. Regression 6. Introduction to Data Science, Machine Learning & Artificial Intelligence 7. Supervised Machine Learning 8. Unsupervised Machine Learning 9. Neural Networks & Deep Learning
Type of Teaching Method	lecture notes, exercises, demonstrating results of programmes, interactive teaching tools
Teaching Language	English
Examination Attainments & Performance Rating	online exam (90 min) Important Note: Students have to take the exam without any outside help. Cooperation during the exam is strictly forbidden.
Listing Requirement	none

Resources during the exam	Open book online exam with no restrictions on resources
Literature	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/

Module Person responsible	MG 07 Programming for Data Science Prof. Dr. Noah Klarmann
Responsible faculty / Course of studies (origin)	Faculty of Industrial Engineering
Target Semester / Group	1st semester
Learning Goals	**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 data sets. For this purpose, the commonly used data science libraries are introduced. This includes standard preprocessing 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. **Competence:** 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.
Lecturer	Prof. Dr. Noah Klarmann
Module period / term	winter term
Credit Points (ECTS)	5
Semester hour per week (SWS)	4 contact hours/week seminar-type teaching (in winter semester 22/23 hybrid lecture)
Total workload Partitioning of hours	150 hours, of which • 60 contact hours • 90 hours preparation and follow-up work at home, exam preparation
Course prerequisites	• Admittance to the Master Programme of Wood Technology, • elementary math skills • Participants must bring their own laptop to the course.
Contents	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.
Type of Teaching Method	lecture notes, exercises, demonstrating results of programmes
Teaching Language	English
Examination Attainments & Performance Rating	written exam (75 min)
Listing Requirement	none
Resources during the exam	none

Literature	[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.

II. Skills for Management

Module **Person responsible**	**MM 01 Project Management** **Prof Andreas Heinzmann**
Responsible faculty / Course of studies (origin)	Faculty of Wood Technology and Construction
Target Semester / Group	2nd semester
Competences	The students can describe the current situation of a company and understand the importance of the project as well as its successful implementation. Based on the concept of exemplary learning, the students can apply their knowledge and skills. On the basis of appropriate case studies, the students develop the necessary steps for a successful project implementation independently or in the group. Students can use all the knowledge and skills developed in the course of a lecture on a self-chosen example. The results are documented, presented and discussed.
Lecturer	Dipl. Wirtschaftsing. (FH) Manuela Varsani
Module period / term	summer term
Credit Points (ECTS)	4
Semester hours per week	4
Total workload Partitioning of hours	120 hours • 60 hours contact hours • 60 hours preparation and exam
Course prerequisites	• admittance to the Master Programme Wood Technology
Contents	• Understanding that the successful implementation of projects is a key success factor for companies in their competitive environment. • Structured and phase-oriented approach in project execution, taking into account the concept of "triple constraint". • Application according to management expertise and specific methods.

	• Independent case investigation using all appropriate knowledge and skills. Structured documentation of the approach in the form of a management report as well as presentation of the key findings within a colloquium.
Type of Teaching Method	• interactive seminars + exercises • case studies • seminar-type lessons
Teaching Language	English
Examination Attainments & Performance Rating	presentation and writing of a handbook as result and proof of active participation (100%)
Listing Requirement	none
Resources during the exam	none
Literature	Wysocki, R: Effective Projectmanagement, Wiley, 2009 PMI: A Guide to the Project Management Body of Knowledge, PMI, 2008

Module Person responsible	MM 02 Leadership Prof Andreas Heinzmann
Responsible faculty / Course of studies (origin)	Faculty of Wood Technology and Construction
Target Semester / Group	1st semester
Competences	Students will have knowledge and experience in selected fields, such as • differrences in cultures and their impact on international relationships • own weaknesses and strengths • fundamentals in leadership • basics about attitudes and tools related to leadership • constructivism and system theory • teambuilding, roles in teams, dynamics in teams • communication, moderation, conflict management • resilienz • participants will be able to reflect and apply the theoretical fundamentals in practical situations. 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. Knowledge and mastery of the specific contents and accompanying methods of the specialist field Personality Development & Leadership.
Semester hours per week	• 3-day workshop 'Team-Training and Leadership • 2-day workshop 'Leadership & Personality' • 3-day workshop 'Cross cultural training'
Total workload Partitioning of hours	150 hours • 90 contact hours • 60 hours preparation and exam
Course prerequisite	• willingness to widen your spirit • willingness to self-experience and reflect personal patterns of behaviour • willingness to self-reflect attitudes regarding people
Contents	• fundamentals of leadership: image of humanity, guidance, targets

	• attitudes and styles of leadership • basics of constructivism and system theory • methods for team building, finding of roles in teams, facts about dynamics in teams • theoretical background about communication, moderation, conflict management • theoretical basics for ‚resilience' • individual weaknesses and strengths • what Culture is • why Cross-Cultural Communication is important today • what ones Cultural IQ is • an ideal society: Relationships over rules or vice-versa? • facts or context: what is more important • the influence of history and geography • time and its subtility • time management • the notion of equality in societies • Showing our emotions: Should we smile or not? • kinesthetic behaviours • what Culture Transfer is (how one's feeling is)
Type of Teaching Method	• interactive seminars + exercises • outdoor training • case studies • seminar-type lessons
Teaching Language	English
Examination Attainments & Performance Rating	• active participation in all sessions
Listing Requirement	-
Resources during the exam	none
Literature	Tbd

Module group **Person responsible**	**MM 03 Economical aspects** **Prof Andreas Heinzmann**
Responsible faculty / Course of studies (origin)	Faculty of Wood Technology and Construction
Target Semester / Group	2nd semester
Competences	Knowledge and mastery of the specific contents and accompanying methods in the field of economical aspects.
Module	**MM 03.1 Financing**
Lecturer	Mr. Koecke
Module period / term	summer term
Credit Points (ECTS)	2
Semester hour per week (SWS)	Two 2-days seminars
Total workload Partitioning of hours	60 Hours, • 30 contact hours • 30 hours preparation and exam
Course prerequisites	Admittance to the Master Programme of Wood Technology,
Contents	• methods, instruments and transactions of financing • types of financing (financing from own / foreign resources, hybrid types of financing) • capital structure, debt management • capital markets • fundamentals of accounting according to German commercial code and IFRS • netting of intercompany performances and trades • balance sheet analysis • important key figures, performance evaluation • methods for valuation of enterprises • characteristics of internationally active small and medium enterprises
Type of Teaching Method	seminar

Teaching Language	English
Examination Attainments & Performance Rating	Project paper
Listing Requirement	none
Resources during the exam	-
Literature	Tbd

Module	MM 03.2 Investment
Lecturer	Mr. Eichholz
Module period / term	summer term
Credit Points (ECTS)	2
Semester hour per week (SWS)	one 3-days seminar
Total workload Partitioning of hours	60 hours, • 30 contact hours • 30 hours preparation and exam
Course prerequisites	Admittance to the Master Programme of Wood Technology,
Contents	• economic problems • macroeconomics (economic cycle, behavior of the markets and connections) • microeconomics (behavior of budgets and companies, market balance, market structures, price setting) • globalization and its effect on economies
Type of Teaching Method	seminar
Teaching Language	English
Examination Attainments & Performance Rating	Project Paper
Listing Requirement	none
Resources during the exam	non-programmable pocket calculator
Literature	

Module	MM 03.3 Sustainable Company Management
Lecturer	Dr. Susanne Steinhauer
Module period / term	summer term
Credit Points (ECTS)	2
Semester hour per week (SWS)	2
Total workload Partitioning of hours	60 hours, • 30 contact hours • 30 hours preparation and exam
Course prerequisites	Admittance to the Master Programme of Wood Technology,
Contents	What is to be done when sustainability is not managed in the company, but when the company is managed sustainably? To this end, a common understanding of sustainability will be developed and building blocks will be presented to create a guideline on how to proceed. • Defining sustainability • The drivers for transformation • How to start • Reporting • Circular Economy • Sustainable marketing • Outlook
Type of Teaching Method	1,5 days seminar, 2 online units
Teaching Language	English
Examination Attainments & Performance Rating	Project Paper incl. presentation
Listing Requirement	none
Resources during the exam	-
Literature	tbd

III. Compulsory Modules

Module **Person responsible**	**MF 21 Innovation Management and New Product Development** **Prof. Martina Zurwehme**
Responsible faculty / Course of studies (origin)	Faculty of Wood Technology and Construction
Target Semester / Group	1st semester
Competences	Acquisition and consolidation of systematic planning and controlling of innovations as the basis of successful product development in the furniture industry. The students improve and expand their knowledge about management of industrial product development processes. Therefore, the methods and tools of related fields of expertise are adjusted and/or newly developed. Knowledge and mastery of the specific contents and accompanying methods of the specialist field *Product Development of Furniture*.
Lecturer	Prof Martina Zurwehme
Module period / term	winter term
Credit Points (ECTS)	4
Semester hour per week (SWS)	2
Total workload Partitioning of hours	180 hours: • 30 contact hours • 150 h assisted self-studies, module paper (in winter semester 22/23 two groups, one face-to-face and one online)
Course prerequisite	basic knowledge of furniture production, production processes and of product development
Contents	Process modelling, project and process management of innovations and product development processes Development and implementation of methods and tools for:

	• brainstorming, generation of ideas / solutions and their assessment • product development / product evaluation • product marketing and sales
Type of Teaching Method	assisted self-studying, module paper
Teaching Language	English
Examination Attainments & Performance Rating	oral examination, module paper
Listing Requirement	Admittance to the Master Programme of Wood Technology
Resources during the exam	none
Literature	• Cooper, Robert G.: Winning at New Products: Accelerating the Process from Idea to Launch. 3. Aufl., New York: Boos Group, 2001 • Ehrlenspiel, Klaus: Integrierte Produktentwicklung: Methoden für Prozessorganisation, Produkterstellung und Konstruktion. 2. Aufl., München; Wien: Hanser, 2003 • Hofbauer, Günther; Schweidler, Anita: Professionelles Produkt-management: Der prozessorientierte Ansatz, Rahmenbedingungen und Strategien. Erlangen: Publicis Corporate Publishing, 2006 • Koppelmann, Udo: Produktmarketing: Entscheidungsgrundlage für Produktmanager. Berlin; Heidelberg; New York: Springer, 2001. • Matys, Erwin: Praxishandbuch Produktmanagement. Grundlagen und Instrumente. Frankfurt, New York: Campus, 2008 • Müller-Prothmann, Tobias; Dörr, Nora: Innovationsmanagement: Strategien, Methoden und Werkzeuge für systematische Innovationsprozesse. München: Hanser, 2009 • Pahl Beitz: Konstruktionslehre: Grundlagen erfolgreicher Produktentwicklung. Methoden und Anwendung. 7. Aufl., Springer: 2006 • Schori, Kurt; Roch, Andrea; u.a.: Innovationsmanagement für KMU. Bern; Stuttgart, Wien: Haupt, 2006

	• Schwarz, Erich; Kraiger, Ines, u.a.: Innovationskompass für klein- und mittelständische Unternehmen: Neue Ideen finden und entwickeln. Wien: Linde, 2006 • Schuh, Günther: Produktkomplexität managen: Strategien, Methoden, Tools. 2. Aufl. München; Wien: Hanser, 2005. • VDI 2221: Methodik zum Entwickeln und Konstruieren techni-scher Systeme und Produkte. Berlin: Beuth, 1993 • Witt, Jürgen: Produktinnovation. Entwicklung und Vermarktung neuer Produkte. München: Franz Vahlen, 1996

Module Person responsible	MF 22 Mass Customization Prof Andreas Heinzmann
Responsible faculty / Course of studies (origin)	Faculty of Wood Technology and Construction
Target Semester / Group	1st semester
Competences	• Development of skills in the field of management, leadership and change management • Being able to develop creative solutions for implementation of mass customization and batch size one production as management system
Lecturer	Mr. Frank Wiegmann
Module period / term	winter term
Credit Points (ECTS)	2
Semester hour per week (SWS)	2 two-days seminars
Total workload Partitioning of hours	60 Hours, • 30 contact hours, presentation, discussion • 30 hours preparation, case study, exam preparation
Course prerequisites	Admittance to the Master Programme of Wood Technology, • Bascis/Fundamental Knowledge of Automation • Bascis/Fundamental Knowledge of Leadership • Bascis/Fundamental Knowledge of Project Management
Contents	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

Type of Teaching Method	Seminar, lecture, case study
Teaching Language	English
Examination Attainments & Performance Rating	written exam (60 min)
Listing Requirement	none
Resources during the exam	none
Literature	• *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

Module Person responsible	MW 01 Energy, Wood Supply, Logistics Prof Dr Andreas Michanickl
Responsible faculty / Course of studies (origin)	Faculty of Wood Technology and Construction
Target Semester / Group	2nd semester
Competences	Key knowledge and skills with regard to energy conversion methods and efficiencies, raw material supply and logistics. Understanding the contexts between energy use and environmental impacts. Knowledge and mastery of the specific contents and accompanying methods of the field *Energy, Supply and Logistics*.
Lecturer	Prof. Dr. Michanickl, M.Eng. V. Auer, Martin Kintscher
Module period / term	summer term
Credit Points (ECTS)	5
Semester hour per week (SWS)	5
Total workload Partitioning of hours	150 hours, • 90 hours seminars at universities and industry • 60 hours preparation and exam
Course prerequisites	Admittance to the Master Programme of Wood Technology
Contents	**Part I Energy** • energy conversation law + practical applications • performing balances • energy carriers and characterization • wet air and its properties • heat exchange and devices • fluid dynamics, incl. friction; ventilators + pumps • suction in wood industry • fire & explosion prevention • dust separation and its devices • technical combustion; theory and realization • flue gas heat transfer • Clausius Rankine cycle + ORC process

	• energetic optimizations of boilers **Part II Wood Supply** • raw material availability and utilization (Focus on wood) • wood balances for Germany and Europe • players on the market • market dynamics • future developments **Part III Logistics** • introduction (definition of logistics, importance etc.) • wood industry today • production chain from the forest to the customer (forest, wood processing industry, woodworking industry, trading companies, end consumer; related industries) • logistics and costs (focus on current assets), • logistics as integral part of a company, logistics and 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 • fixed in-plant-conveying systems, mobile in-plant transport systems
Type of Teaching Method	seminar
Teaching Language	English
Examination Attainments & Performance Rating	Written exam 60 min (part Energy 40%) Seminar paper (part Wood Supply 20%) Seminar paper (part Logistics 40%)
Listing Requirement	
Resources during the exam	Non-programmable pocket calculator
Literature	• Book “Energy-Technology” (lecture notes on energy technology of the course Wood Technology Rosenheim) • Logistics (lecture notes)

Module Group **Person responsible**	**MW 04 Processes & Simulation** **Prof Andreas Heinzmann**
Responsible faculty / Course of studies (origin)	Faculty of Wood Technology and Construction
Target Semester / Group	1st semester
Credit Points (ECTS)	5
Examination Attainments & Performance Rating	Case study
Listing Requirement	
Resources during the exam	Case study, all resources allowed
Module	**MW 04.1 Business Process Management**
Competences	• Conceptualize business operations as processes. • Recognize the interdependencies of business processes within and across organizational boundaries. • 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. • Identify inefficiencies in business processes and propose improvements for process innovation and redesign projects. • Identify the role of information systems in business processes and business process improvement; recognize the role of ERP systems Knowledge and mastery of the specific contents and accompanying methods of the specialist field Process Management.
Lecturer	Prof. Dr. Holly Ott

Module period / term	winter term
Credit Points (ECTS)	2 CP
Semester hour per week (SWS)	2
Total workload Partitioning of hours	60 hours • 30 contact hours • 30 hours preparing, presenting, discussing case study,
Course prerequisites	Admittance to the Master Programme of Wood Technology
Contents	• 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
Type of Teaching Method	Seminar, lecture, case study (group project)
Teaching Language	English
Examination Attainments & Performance Rating	Case study (incl. presentation, team work and written documentation)
Listing Requirement	None
Resources during exam	None
Literature	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)*

Module	MW 04.2 Simulation
Competences	• Basic understanding of the simulation process of complex woodworking machines • Basic skills in the usage of an exemplary simulation software system • Understanding of the performance criteria and parameters of machines • Ability to simulate a simple example process
Lecturer	Michael Kratzert
Module period / term	winter term
Credit Points (ECTS)	3 CP
Semester hour per week (SWS)	two 2-days seminars
Total workload Partitioning of hours	90 hours • 40 contact hours • 50 hours preparing, presenting, discussing case study,
Course prerequisites	Admittance to the Master Programme of Wood Technology
Contents	• 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
Type of Teaching Method	Seminar, lecture, case study
Teaching Language	English
Examination Attainments & Performance Rating	Case study (incl. presentation, team work and written documentation)
Listing Requirement	None
Resources during exam	None
Literature	Lecture notes

IV. Elective Modules

Module **Person responsible**	**MF 02 Excursion** **Prof Andreas Heinzmann**
Responsible faculty / Course of studies (origin)	Faculty of Wood Technology and Construction
Target Semester / Group	2nd semester
Competences	Students have experienced 8-10 different enterprises in the wood industry in Germany or other countries. They have a broad knowledge regarding the variety in the wood industry and are exposed to different types of enterprises, business models, manufacturing types and products in an international context.
Lecturer	Prof. Andreas Heinzmann Prof. Dr. Heiko Thömen
Module period / term	summer term Departure from the respective university, joined excursion through Europe
Credit Points (ECTS)	2
Semester hour per week (SWS)	5 day excursion, participation compulsory
Total workload Partitioning of hours	60 hours • 5 day excursion • Preparation of short paper and presentation
Course prerequisites	Admittance to the Master Programme of Wood Technology,
Contents	• Joined excursion of students from Rosenheim and Biel • Experiencing and studying enterprises in the wood industry in Central Europe
Type of Teaching Method	Touring of manufacturing companies in the wood industry, independent research of one enterprise or other related topics per team, written report

Teaching Language	English
Examination Attainments & Performance Rating	Participation, written report
Listing Requirement	none
Resources during the exam	none
Literature	To be determined depending on companies to be visited
Observations	Estimated costs: 400 – 600 € (depending on the destination)

Module Person responsible	MF 03 Project Seminar: Systems Engineering Prof Andreas Heinzmann
Responsible faculty / Course of studies (origin)	Faculty of Wood Technology and Construction
Target Semester / Group	2nd semester
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. • Development of skills in the field of robotics and special equipment. • Target cost and calculation of machine cost • Being able to develop creative solutions for real automation topics in an manufacturing environment
Lecturer	Prof. Andreas Heinzmann
Module period / term	summer term
Credit Points (ECTS)	4
Semester hour per week (SWS)	4
Total workload Partitioning of hours	120 Hours, • 60 contact hours, presentation, discussion • 60 hours preparation, case study, exam preparation
Course prerequisites	Admittance to the Master Programme of Wood Technology, • Bascis/Fundamental Knowledge of Automation • Bascis/Fundamental Knowledge of Simulation • Basics/Fundamental Knowledge of Economics

Contents	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, 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
Type of Teaching Method	Seminar, lecture, case study
Teaching Language	English
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.
Listing Requirement	none
Resources during the exam	none
Literature	• 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

Module Person responsible	MF 04 Furniture – Product Safety and Testing Prof. Thorsten Ober
Competences	Knowledge and mastery of the specific contents and accompanying methods of the specialist field *Product Safety and Testing of Furniture*.
Lecturer	Prof Thorsten Ober, LB Richard Heym
Module period / term	summer term
Credit Points (ECTS)	4
Semester hour per week (SWS)	4
Total workload Partitioning of hours	120 hours: • 40 contact hours • 80 h assisted self-studies, module paper
Course prerequisite	Admittance to the Master Programme of Wood Technology
Contents	• Testing of furniture (safety, quality) • Norms and standards • Testing Methods • Development accompanying tests of new constructions
Type of Teaching Method	assisted self-studying, module paper
Teaching Language	English or German
Examination Attainments & Performance Rating	oral examination, module paper
Listing Requirement	none
Resources during the exam	none
Literature	• DIN Deutsches Institut für Normung e. V.: DIN Taschenbuch 66: Möbel • 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 • LGA-Möbelprüfinstitut: Möbelprüfung: Methoden, Kenndaten, Qualitäts-merkmale. Nürnberg: Eigenverlag, 1986

Module Person responsible	MF 05 Special Aspects of the Wood Processing Industries Prof Dr A. Michanickl
Responsible faculty / Course of studies (origin)	Faculty of Wood Technology and Construction
Target Semester / Group	2nd semester
Competences	Provided regular and active participation as well as basic logical and analytical skills, the students learn to identify, analyse and understand important developments that influence the wood processing industry. These developments are partly caused by society, the wood and other industries. The students get a better understanding of possible consequences of such developments and acquire basic knowledge how to react on these developments.
Lecturer	Prof Dr Michanickl
Module period / term	summer term
Credit Points (ECTS)	2
Semester hours per week (SWS)	2
Total workload Partitioning of hours	60 hours • 30 contact hours, presentation, discussion • 30 hours preparation, project paper
Course prerequisites	• Admittance to the Master Programme of Wood Technology • basic subjects of wood and wood-based materials, machine tools for wood-processing, production technology
Contents	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

	• 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

	• Flooring products – From parquet via laminate flooring to multi laminar flooring – What is the future? – Consequences for the producers of HDF for laminate flooring
Type of Teaching Method	Seminar, Lab
Teaching Language	English
Examination Attainments & Performance Rating	project paper
Listing Requirement	none
Resources during the exam	-
Literature	• Koch Peter, Wood Machining Processes, Ronald Press, New York, 1964

Module Person responsible	MF 06 Change Management Prof Andreas Heinzmann
Responsible faculty / Course of studies (origin)	Faculty of Wood Technology and Construction
Target Semester / Group	2nd semester
Competences	• Development of skills in the field of management, leadership and change management • Being able to develop creative solutions for implementation of mass customization and batch size one production as management system
Lecturer	Mr. Wiegmann
Module period / term	summer term
Credit Points (ECTS)	2
Semester hour per week (SWS)	2 two-days seminars
Total workload Partitioning of hours	60 Hours, • 30 contact hours, presentation, discussion • 30 hours preparation, case study, exam preparation
Course prerequisites	Admittance to the Master Programme of Wood Technology, • Bascis/Fundamental Knowledge of Automation • Bascis/Fundamental Knowledge of Leadership • Bascis/Fundamental Knowledge of Project Management
Contents	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
Type of Teaching Method	Seminar, lecture, case study

Teaching Language	English
Examination Attainments & Performance Rating	Written exam 60 min
Listing Requirement	none
Resources during the exam	none
Literature	• …

Module Person responsible	MF 08 Advanced Wood Processing - Homag Prof Dr M. Schaal
Responsible faculty / Course of studies (origin)	Faculty of Wood Technology and Construction
Target Semester / Group	2nd semester
Competences	**Main Objective**: Production quality • key issues of advanced wood processing (cutting and tooling, surface assessment, dynamic behaviour of tools and machines, vibration problems, dust exhaustion) • selected chapters of production technology and tools • advanced knowledge of plant layout, maintenance and optimization of plants • analysis and solution of specific problems of machines and processing Knowledge and mastery of the specific contents and accompanying methods of the specialist field Advanced Wood Processing.
Lecturer	Lecturers of the Industry Partner
Module period / term	summer term
Credit Points (ECTS)	2
Semester hours per week (SWS)	One week seminar at the industry (KW 23)
Total workload Partitioning of hours	60 hours • 40 hours seminar • 20 hours preparation, exam
Course prerequisites	• Admittance to the Master Programme of Wood Technology • basic subjects of wood and wood-based materials, machine tools for wood-processing, production technology

Contents	**Digitalization (Homag)** • Digitalization strategy • tapio – the open wood industry ecosystem • Vertical and horizontal software networking • Virtual commissioning • Digital workshop: Solutions for small and medium-sized enterprises • OEE optimization and digital training • Automation of a machine with a robot
Type of Teaching Method	Seminar, Lab The seminars at the industry partner are composed of theoretical and hands on training at up to date machines and research parts about features and problems of those machines and components to be done by the students.
Teaching Language	English
Examination Attainments & Performance Rating	• written exam (at the end of the seminar week)
Listing Requirement	none
Resources during the exam	Non-programmable pocket calculator
Literature	• 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

Module Person responsible	MF 12 Supply Chain Management Prof Dr H. Ott
Responsible faculty / Course of studies (origin)	Faculty of Wood Technology and Construction
Target Semester / Group	2nd semester
Competences	▪ 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. ▪ Understand and measure the key performance indicators for measuring supply chain performance. ▪ 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. ▪ Develop strategies for handling uncertain demand as well as calculate optimal safety stock levels for given supply uncertainty to reach a service-level target. ▪ 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. ▪ 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.
Lecturer	Prof Dr Holly Ott
Module period / term	summer term
Credit Points (ECTS)	2
Semester hour per week (SWS)	2
Total workload Partitioning of hours	60 Hours, • 30 contact hours

	• 30 hours preparation, exam preparation
Course prerequisites	Admittance to the Master Programme of Wood Technology, • Bascis/Fundamental Knowledge of Distribution functions
Contents	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.
Type of Teaching Method	Seminar, lecture
Teaching Language	English
Examination Attainments & Performance Rating	Written Exam, 60 Minutes (70%) Project work (30%)
Listing Requirement	none
Resources during the exam	Calculator, 2-page formula and notes sheet
Literature	• Articles and readings to be provided during the class.

Module Person responsible	MF 13 Quality Management Prof Dr H. Ott
Responsible faculty / Course of studies (origin)	Faculty of Wood Technology and Construction
Target Semester / Group	2nd semester
Competences	By the end of this course, students will be able to: • 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. • Calculate process yield for multi-step processes. • Calculate yield and process capability for normally distributed Critical-to-Quality parameters. • 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. • Understand methods of Root Cause Analysis. Discuss the issues involved in managing for quality at different operational levels.
Lecturer	Prof Dr Holly Ott
Module period / term	summer term
Credit Points (ECTS)	2
Semester hour per week (SWS)	2
Total workload Partitioning of hours	60 Hours, • 30 contact hours • 30 hours preparation, exam preparation
Course prerequisites	Admittance to the Master Programme of Wood Technology

Contents	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 of the design of experiments and product and process control (SPC).
Type of Teaching Method	Seminar, lecture
Teaching Language	English
Examination Attainments & Performance Rating	Written Exam, 60 Minutes (70%) Project work (30%)
Listing Requirement	none
Resources during the exam	Calculator, 2 page formula sheet
Literature	

Module **Person responsible**	**MF 15 Sustainability & Circular Economy** **Prof Andreas Heinzmann**
Responsible faculty / Course of studies (origin)	Faculty of Wood Technology and Construction
Target Semester / Group	2nd semester
Competences	At the end of the course students should be able to • understand the meaning of sustainability and circular economy, • utilize methods to develop sustainable products, • understand the global context of sustainability, • recognize the future challenges, • develop own ideas for implementation in companies.
Lecturer	Prof. Dr. Sandra Krommes, Dr. Susanne Steinhauer, Dr. Eva Schichl, Marietta Meier
Module period / term	summer term
Credit Points (ECTS)	3
Semester hour per week (SWS)	One blocked week as part of the Master Summer School
Total workload Partitioning of hours	60 Hours, • 30 contact hours including company visit • 30 hours preparation, exam preparation
Course prerequisites	Admittance to the Master Programme of Wood Technology
Contents	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. 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.
Type of Teaching Method	Seminar

Teaching Language	English
Examination Attainments & Performance Rating	Written Exam, 60 Minutes
Listing Requirement	none
Resources during the exam	none
Literature	• 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).