WEIHENSTEPHAN · TRIESDORF
University of Applied Sciences

MODULHANDBUCH
Climate Change Management PO WS 2020/21

INHALTSVERZEICHNIS

WEIHENSTEPHAN · TRIESDORF
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CLIMATE CHANGE (356201010)

Fakultät	Landschaftsarchitektur		
Studiengang	Climate Change Management		
Semester	1	EC	5.0
Häufigkeit des Angebots	jährlich im Wintersemester		
Prüfungsordnung	WS 2020/21	Gewicht für Gesamtnote	1.0
Verantwortlicher Professor	Prof. Dr. Matthias Drösler		
Beteiligte Dozenten	Prof. Dr. Peter Höppe und N. N.		
Teilnahmebedingungen	No conditions for participation. This module imparts specialist knowledge for the "Project 1" module. It is recommended to complete both modules in the same semester. Moreover, this module represents the scientific background information about climate change, which is the basis for the whole master's programme. This module can also be used as an elective module for students from other disciplines.		

KOMPETENZZIELE

MODULE CONTENT

The contents are oriented on the IPCC-structure of the climate reports with (1) physical basis (2) mitigation (3) adaptation. Major sources of Information are the IPCC-assessment reports with the underlying peer reviewed papers. Special emphasis is given to the global picture and the regional representation of Climate Change as well as to the identification of mitigation and adaptation options.

LEARNING OUTCOMES AND COMPETENCES

- Ability to understand climate change processes and drivers
- Knowledge about key findings and dynamics of climate change: observation
- Ability to differentiate between global and regional climate change dynamics and effects: scaling
- Knowledge about databases and models of climate change: scenarios and prognostics
- Ability to differentiate between trends and extremes
- Ability to critically read and assess original literature about climate change

ASSESSMENT OF LEARNING OUTCOME

Written exam (90 minutes), covering all aspects of the module.

PRÜFUNGEN / LEISTUNGSNACHWEISE

Prüfungsnummer	Prüfungsart	Dauer	Zeitraum	Zulassungs-voraussetzungen	Anteil Endnote
356201010 Climate Change	schriftliche Prüfung	90 Min.	Prüfungszeit		1.0

STUDENTISCHER GESAMT-ARBEITSAUFWAND

Lehrveranstaltung	Lehrform	Kontaktzeit SWS	Kontaktzeit Std.	Selbststudium Std.	Gesamt Arbeitsaufwand Std.
35620101A	Seminaristischer Unterricht	2.0	30.0	50.0	80.0

Lehrveranstaltung	Lehrform	Kontaktzeit SWS	Kontaktzeit Std.	Selbststudium Std.	Gesamt Arbeitsaufwand Std.
35620101B	Seminar	2.0	30.0	40.0	70.0
Summen		4.0	60.0	90.0	150.0

LEHRVERANSTALTUNGEN

CLIMATE CHANGE (35620101A)

Dozent(en)	Prof. Dr. Matthias Drösler und Prof. Dr. Peter Höppe
Lehrform	Seminaristischer Unterricht
Erforderliche Rahmenbedingungen	Teaching room
Literatur und Materialien	IPCC, 2012 – Field, C.B., V. Barros, T.F. Stocker, D. Qin, D.J. Dokken, K.L. Ebi, M.D. Mastrandrea, K.J. Mach, G.-K. Plattner, S.K. Allen, M. Tignor, and P.M. Midgley (Eds.) Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation. Available from Cambridge University Press, The Edinburgh Building, Shaftesbury Road, Cambridge CB2 8RU ENGLAND, 582 pp. IPCC, 2013: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp. IPCC, 2018: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty.

INHALTE
COURSE CONTENT

- Overall: comparison between global and regional approaches and findings
- Observations: atmosphere and surface
- Observations: ocean
- Observations: cryosphere
- Carbon and other biogeochemical cycles
- Clouds and aerosols
- Anthropogenic and natural radiative forcing
- Evaluation of climate models
- Detection and attribution of climate change: from global to regional
- Short-term climate change: projections and predictability
- Long-term climate change: projections, commitments and irreversibility
- Sea-level change
- Climate phenomena and their relevance for future regional climate change
- Land–climate interactions
- Fire and climate change
- Interlinkages between desertification, land degradation, food security and greenhouse gas fluxes: synergies, trade-offs and integrated response options
- Impacts of 1.5°C global warming on natural and human systems
- Extreme events

CLIMATE TALKS (35620101B)

Dozent(en)	Prof. Dr. Matthias Drösler und N. N.
Lehrform	Seminar
Erforderliche Rahmenbedingungen	Teaching room with media equipment
Literatur und Materialien	Scientific publications by the guest lecturers

INHALTE
COURSE CONTENT

Weekly lectures by invited specialists (either in person or via Zoom) on up-to-date topics of climate change. This interdisciplinary

approach complements the classical lecture programme.

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DIGITAL TOOLS (356201020)

Fakultät	Landschaftsarchitektur		
Studiengang	Climate Change Management		
Semester	1	EC	5.0
Häufigkeit des Angebots	jährlich im Wintersemester		
Prüfungsordnung	WS 2020/21	Gewicht für Gesamtnote	1.0
Verantwortlicher Professor	Prof. Dr. Olaf Gerhard Schroth		
Beteiligte Dozenten	Dr. Allan Buras		
Teilnahmebedingungen	The module is aimed at beginners and has no pre-requirements. This module imparts specialist knowledge for the “Project 1” module. It is recommended to complete both modules in the same semester.		

KOMPETENZZIELE

MODULE CONTENT

The "Digital Tools" module is providing an introduction to geodata, Geographic Information Systems (GIS) and remote sensing. Students will gather knowledge about geodata and remote sensing data and how to analyse these data with various tools, in particular QGIS and R. In GIS, students also learn how to collect, manage and present data.

LEARNING OUTCOMES AND COMPETENCES

- Knowledge of geographic data processing
- Knowledge about the capacity and functionality of GIS
- The ability to carry out fundamental GIS management and analysis functions
- GIS-based visualisation

ASSESSMENT OF LEARNING OUTCOME

The module has one student assignment at the end. For this assignment, students have to submit a poster with geodata-based maps and remote sensing imagery related to a climate change-related topic.

PRÜFUNGEN / LEISTUNGSNACHWEISE

Prüfungsnummer	Prüfungsart	Dauer	Zeitraum	Zulassungs-voraussetzungen	Anteil Endnote
356201020 Digital Tools	Studienarbeit	14 Wochen			1.0

STUDENTISCHER GESAMT-ARBEITSAUFWAND

Lehrveranstaltung	Lehrform	Kontaktzeit SWS	Kontaktzeit Std.	Selbststudium Std.	Gesamt Arbeitsaufwand Std.
35620102A	Übung	3.0	45.0	60.0	105.0
35620102B	Seminaristischer Unterricht	1.0	15.0	30.0	45.0
Summen		4.0	60.0	90.0	150.0

LEHRVERANSTALTUNGEN

GIS (35620102A)

Dozent(en)	Prof. Dr. Olaf Gerhard Schroth
Lehrform	Übung
Erforderliche Rahmenbedingungen	IT room
Literatur und Materialien	Demers, M. N., 2011: Fundamentals of Geographical Information Systems (4th Edition). Wiley. Longley, P., Goodchild, M. F., Maguire, D. J., & Rhind, D. W. (2015). Geographic Information Science and Systems (4th Edition). Wiley. Sheppard, S.R.J. (2012). Visualizing Climate Change: A Guide to Visual Communication of Climate Change and Developing Local Solutions. Earthscan/Routledge. Details of further literature will be provided via the virtual campus at the start of the course.

INHALTE
COURSE CONTENT

- Overview of GIS and its role in analysing and modelling changes in land use and climate-relevant processes, development histories, current trends and emerging future areas of application.
- Visualisation of the impacts of climate change and of geodata-based measures for adapting to and mitigating climate change

REMOTE SENSING (35620102B)

Dozent(en)	Dr. Allan Buras
Lehrform	Seminaristischer Unterricht
Erforderliche Rahmenbedingungen	IT room
Literatur und Materialien	S. Khorram, C. F. van der Wiele, F. H. Koch, S. A. C. Nelson & M. D. Potts Principles of Applied Remote Sensing, Springer International Publishing, 2016 J. R. Jensen, Remote Sensing of the Environment: An Earth Resource Perspective 2/e, Pearson Education, 2009 R. A. Schowengerdt, Remote Sensing: Models and Methods for Image Processing 3ed, Academic Press, 2007

INHALTE
COURSE CONTENT

- Knowledge of remote sensing systems and data
- Knowledge about the application of remote sensing data
- The ability to conduct fundamental analyses of remote sensing data
- The ability to critically evaluate the application of remote sensing data and its quality

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NATURAL RESOURCES & LANDUSE SYSTEMS (356201030)

Fakultät	Landschaftsarchitektur		
Studiengang	Climate Change Management		
Semester	1	EC	5.0
Häufigkeit des Angebots	jährlich im Wintersemester		
Prüfungsordnung	WS 2020/21	Gewicht für Gesamtnote	1.0
Verantwortlicher Professor	Prof. Dr. Carsten Lorz		
Beteiligte Dozenten	Prof. Dr. Martin Volk		
Teilnahmebedingungen	Basic knowledge of soil science. Pregnant students should consult the lecturers before participating in order to avoid potential risks. This module imparts specialist knowledge for the "Project 1" module. It is recommended to complete both modules in the same semester.		

KOMPETENZZIELE

MODULE CONTENT

The module Natural Resources & Landuse Systems aims at the understanding of the complex systems soil and water in context of land use and climate change.

LEARNING OUTCOMES AND COMPETENCES

Successful students will have a deeper understanding and knowledge of the processes and mechanism soil and water systems. They will be able to assess the effects of land use change and climate change on the management of soil and water systems and the complex interaction between soil and water systems.

Competency goals:
- Understanding the basics of the soil system and consequences of climate change on the soil system (Lorz)
- Understanding the basics of hydrology and consequences of climate change on the hydrologic system (Lorz und Prof. Martin Volk)

ASSESSMENT OF LEARNING OUTCOME

Aim of the oral and written presentation is the synthesis of theory and basic knowledge based on experiences from the field, discussion during lectures and one scientific paper. The presentation will be prepared and presented by small groups. The final mark will be the sum of oral (50 %) and written (50 %) presentation. Details will be given in the first meeting.

In the winter semester 2021/22, the presentation will replace the written exam of the course.

PRÜFUNGEN / LEISTUNGSNACHWEISE

Prüfungsnummer	Prüfungsart	Dauer	Zeitraum	Zulassungs-voraussetzungen	Anteil Endnote
356201030 Natural Resources & Landuse Systems	schriftliche Prüfung	90 Min.			1.0

STUDENTISCHER GESAMT-ARBEITSAUFWAND

Lehrveranstaltung	Lehrform	Kontaktzeit SWS	Kontaktzeit Std.	Selbststudium Std.	Gesamt Arbeitsaufwand Std.
35620103A	Seminaristischer Unterricht	2.0	30.0	45.0	75.0

Lehrveranstaltung	Lehrform	Kontaktzeit SWS	Kontaktzeit Std.	Selbststudium Std.	Gesamt Arbeitsaufwand Std.
35620103B	Seminaristischer Unterricht	2.0	30.0	45.0	75.0
Summen		4.0	60.0	90.0	150.0

LEHRVERANSTALTUNGEN

SOIL SYSTEMS AND CLIMATE CHANGE (35620103A)

Dozent(en)	Prof. Dr. Carsten Lorz
Lehrform	Seminaristischer Unterricht
Erforderliche Rahmenbedingungen	Teaching room.
Literatur und Materialien	General Brady & Weil , Nature and Properties of Soils, The, 15th Edition, 2017 Pearson Marschner, P., Rengel, Z. (2012): Chapter 12 - Nutrient Availability in Soils. In: Marschner, P. (ed.): Marschner's Mineral Nutrition of Higher Plants. Academic Press, Amsterdam, Boston, Heidelberg, London, New York, Oxford, Paris, San Diego, San Francisco, Singapore, Sydney, Tokyo, 315-330. R R Weil & N C Brady The Nature and Properties of Soils (2017) 15th Edition, ISBN: 978-0133254488 Rattan Lal, B. A. Stewart (2018) Soil and Climate, 1st edition ISBN 9781498783651 M. N. V. Prasad & M. Pietrzykowski (2020) Climate Change and Soil Interactions 1st Edition ISBN: 9780128180327/eBook ISBN: 9780128180334 IPCC (2020) Special Report: Climate Change and Land, An IPCC Special Report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems; https://www.ipcc.ch/srccl/ Moodle course

INHALTE
COURSE CONTENT

The course 'Natural resources – soil systems and climate change' aims to discuss the basics for an understanding of the effects of climate change on soil systems for three thematic complexes.

Successful students of the course will have a deeper understanding of the mechanisms and vulnerabilities of soil systems and will be able to use selected approaches to assess effects of climate change on soil systems.

Basics – mechanism, vulnerability and assessment

Soil erosion
- What are the main controlling factors for soil erosion?
- How will climate change affect soil erosion?
- What are the major tools to assess the risk of soil erosion?

Soil hydrology and regional hydrology
- What are the main controlling factors for water capacity, water retention, seepage and groundwater recharge?
- How will climate change affect water balance?
- What are the major tools to assess the effects of climate change on soil hydrology?

Soil organic matter
- What are the main controlling factors for soil organic matter dynamics?
- How will climate change affect soil organic matter dynamics?
- What are the major tools to assess the effects of climate change on soil organic matter?

Field training

The aim of the field training is to understand non-complex methods for the field-based assessment of effects of climate change on soil systems.
- Erosivity, erosion risk, seepage and groundwater recharge (forestry/agriculture)
- Water capacity and water retention (forestry/agriculture)
- Soil organic matter (forestry/agriculture)

FORESTRY SYSTEMS, NATURE CONSERVATION & CLIMATE CHANGE (35620103B)

Dozent(en)	Prof. Dr. Carsten Lorz und Prof. Dr. Martin Volk
Lehrform	Seminaristischer Unterricht
Erforderliche Rahmenbedingungen	Teaching room.
Literatur und Materialien	

INHALTE
COURSE CONTENT

The course aims at the changes in the water cycle due to climate change and it consequences for water management. Students attending the course will gain a deep understanding of mechanisms and vulnerabilities in water systems and water management.

Block 1:
Basics - mechanism, vulnerabilty and assessment
- Basics in hydrology
- Main elements of the hydrological cycle
- Main processes of the hydrological cycle
- Parameters in hydrology

Block 2:
Hydrology and climate change
- What are the main processe in hydrology affected by climate change?
- What are the main consequences of climate change on the water cycle?

Block 3:
Experts from practice and applied research project
- Water management and climate change around the globe (experts from water authorities)
- Presentation of reseach project on water and climate change

Block 4:
Field trip: water management and climate change – the real world

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STATISTICS & DENDROECOLOGY (356201040)

Fakultät	Landschaftsarchitektur		
Studiengang	Climate Change Management		
Semester	1	EC	4.0
Häufigkeit des Angebots	jährlich im Wintersemester		
Prüfungsordnung	WS 2020/21	Gewicht für Gesamtnote	1.0
Verantwortlicher Professor	Prof. Dr. Christian Zang		
Teilnahmebedingungen	Pregnant students should consult the responsible professor before participating in order to avoid potential risks. This module imparts specialist knowledge for the "Project 1" module. It is recommended to complete both modules in the same semester.		

KOMPETENZZIELE

MODULE CONTENT

This module teaches the principles of dendroecology together with introductory statistics. Dendroecology, the science of tree-rings and their application in environmental research, is not only a key discipline in the field of forest adaptation to climate change, but additionally provides the opportunity to combine data collection, data analysis and interpretation of results with the introduction to an array of statistical concepts and methods which are also directly applicable for other data in the context of land-use and climate change. For maximal empowerment of the students as well as optimal sustainability of the training platform, statistics is taught with the powerful free and open-source programming language R.

LEARNING OUTCOMES AND COMPETENCES

- Ability to read scientific literature on time series, trend analysis and dendrology
- Ability to carry out dendrological measurements on tree rings
- Ability to apply basic descriptive and inferential statistics to climate data, tree ring data and other environmental data sets
- Ability to assign biological responses in tree growth to climatological causes and to interprete these responses in the context of climate change impacts on forests

ASSESSMENT OF LEARNING OUTCOME

Submission of a seminar paper.

PRÜFUNGEN / LEISTUNGSNACHWEISE

Prüfungsnummer	Prüfungsart	Dauer	Zeitraum	Zulassungs-voraussetzungen	Anteil Endnote
356201040 Statistics & Dendroecology	Studienarbeit	14 Wochen			1.0

STUDENTISCHER GESAMT-ARBEITSAUFWAND

Lehrveranstaltung	Lehrform	Kontaktzeit SWS	Kontaktzeit Std.	Selbststudium Std.	Gesamt Arbeitsaufwand Std.
35620104A	Übung	2.0	30.0	45.0	75.0
35620104B	(Labor-) Praktikum	2.0	30.0	15.0	45.0
Summen		4.0	60.0	60.0	120.0

LEHRVERANSTALTUNGEN

ELEMENTARY STATISTICS WITH R (35620104A)

Dozent(en)	Prof. Dr. Christian Zang
Lehrform	Übung
Erforderliche Rahmenbedingungen	IT room
Literatur und Materialien	McKillup, S. (2005): Statistics Explained: An Introductory Guide for Life Scientists. Cambridge University Press Davies, T.M. (2016): The Book of R: A First Course in Programming and Statistics. No Starch Press Matloff, N. (2012): The Art of R Programming: A Tour of Statistical Software Design. No Starch Press

INHALTE
COURSE CONTENT

- Data types and distributions
- Numerical measures
- Group comparison
- Correlation, linear regression
- Significance testing
- Partial correlation, multiple linear regression
- Ordination, principal component analysis
- Time series analysis
- R software environment
- Data preparation
- Elementary data analysis
- Creating elegant graphics

DENDROECOLOGY (35620104B)

Dozent(en)	Prof. Dr. Christian Zang
Lehrform	(Labor-) Praktikum
Erforderliche Rahmenbedingungen	Tree ring laboratory Pregnant students should consult the lecturer before participating in order to avoid potential risks. Field work requires surefootedness.
Literatur und Materialien	Speer, J.H. (2012): Fundamentals of Tree Ring Research. University of Arizona Press.

INHALTE
COURSE CONTENT

- Wood anatomy
- Sampling and preparation of tree-ring cores
- Measurement of tree rings
- Development of cross-dated chronologies
- Statistical pre-processing and computation of ring width indices
- Correlation of ring width indices with climate
- Identification of pointer years

PROJECT 1 - VULNERABILITY ANALYSIS (356201050)

Fakultät	Landschaftsarchitektur		
Studiengang	Climate Change Management		
Semester	1	EC	5.0
Häufigkeit des Angebots	jährlich im Wintersemester		
Prüfungsordnung	WS 2020/21	Gewicht für Gesamtnote	1.0
Verantwortlicher Professor	Prof. Dr. Jörg Ewald		
Beteiligte Dozenten	Prof. Dr. Matthias Drösler, Prof. Dr. Carsten Lorz, Prof. Dr. Christoph Moning, Prof. Dr. Bernhard Schauberger, Prof. Dr. Olaf Gerhard Schroth und Prof. Dr. Christian Zang		
Teilnahmebedingungen	Pregnant students should consult the responsible professor before participating in order to avoid potential risks. In "Project 1", the basics taught in the other modules of the first semester are combined while working on a practical project.		

KOMPETENZZIELE

MODULE CONTENT

Students examine the relevance of climate change for land-use in a model area. They discuss land-use with stakeholders and experts, acquire, process and analyze relevant data and present their results in a public presentation and written report.

LEARNING OUTCOMES AND COMPETENCES

- Ability to define the specific vulnerability of land-use systems
- Ability to acquire data on climate, climate change and its impacts on ecosystem services in a model region
- Ability to prepare a regional report on climate vulnerability
- Ability to communicate climate vulnerability to target groups and stakeholders

ASSESSMENT OF LEARNING OUTCOME

The final grade is based on the presentation (10 min), written report (3 pages) and uploaded (meta)data (45/45/10).

PRÜFUNGEN / LEISTUNGSNACHWEISE

Prüfungsnummer	Prüfungsart	Dauer	Zeitraum	Zulassungs-voraussetzungen	Anteil Endnote
356201050 Project 1 - Vulnerability Analysis	Studienarbeit	14 Wochen			1.0

STUDENTISCHER GESAMT-ARBEITSAUFWAND

Lehrveranstaltung	Lehrform	Kontaktzeit SWS	Kontaktzeit Std.	Selbststudium Std.	Gesamt Arbeitsaufwand Std.
35620105A	Projektstudium	2.5	37.0	113.0	150.0
Summen		2.5	37.0	113.0	150.0

LEHRVERANSTALTUNGEN

REGIONAL CASE STUDY ON CLIMATE VULNERABILITY (35620105A)

Dozent(en)	Prof. Dr. Olaf Gerhard Schroth, Prof. Dr. Jörg Ewald, Prof. Dr. Matthias Drösler, Prof. Dr. Christian Zang, Prof. Dr. Bernhard Schauberger, Prof. Dr. Christoph Moning und Prof. Dr. Carsten Lorz
Lehrform	Projektstudium
Erforderliche Rahmenbedingungen	Seminar room, IT room, GIS workstations
Literatur und Materialien	Warren, R., Arnell, N., Nicholls, R., Levy, P., Price, J. (2006): Understanding the regional impacts of climate change. Tyndall Centre for Climate Change Research. Norwich. Available online at http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.737.6215&rep=rep1&type=pdf, last checked on 3 May 2022.

INHALTE
COURSE CONTENT

- Data research and acquisition
- Stakeholder interviews and workshops
- Visualisation in GIS
- Regional report on climate change impacts on land use
- Presentation for target groups and stakeholders

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MITIGATION AND ADAPTATION IN FORESTS AND AGRICULTURE (356202010)

Fakultät	Landschaftsarchitektur		
Studiengang	Climate Change Management		
Semester	2	EC	5.0
Häufigkeit des Angebots	jährlich im Sommersemester		
Prüfungsordnung	WS 2020/21	Gewicht für Gesamtnote	1.0
Verantwortlicher Professor	Prof. Dr. Christian Zang		
Beteiligte Dozenten	N. N., Prof. Dr. Bernhard Schauberger und Prof. Dr. Stefan Wittkopf		
Teilnahmebedingungen	No conditions for participation.		

KOMPETENZZIELE

This module imparts specialist knowledge for the "Project 2" module. It is recommended to complete both modules in the same semester.

Before the background of climate change impacts on forests and agriculture, this module focuses on strategies for adapting forests and agricultural systems to climate change conditions and for optimizing their mitigation potential. Regarding adaptation, important management options are discussed, including tree species selection, and stand management (forestry), as well as selection of crop species, cultivation measures or water status improvements (agriculture). Mitigation is discussed within the frameworks of climate-smart forestry and climate-smart agriculture, focusing on the potential of soils to sequester carbon. The module is designed as a combination of lectures, excursions and practical case studies.

By the end of the module
- students will understand that the management of agricultural and forestry systems needs to be adapted to take account of climate change
- students will be aware of the significance of location and management to the potential for carbon sequestration and nutrient/water use efficiency as well as the resilience of forest, agroforestry and agricultural systems
- students will have knowledge of suitable methods and techniques for securing agricultural and forestry production even in changing environmental conditions
- students will be able to calculate greenhouse gas emissions and sinks in agricultural and forestry systems, including special usage concepts within bioeconomics and bioenergy
- students will possess the necessary theoretical foundations to design scientifically valid land use concepts for a specific region, taking into account impacts of climate change and optimising the potential for sequestering carbon

PRÜFUNGEN / LEISTUNGSNACHWEISE

Prüfungsnummer	Prüfungsart	Dauer	Zeitraum	Zulassungs-voraussetzungen	Anteil Endnote
356202010 Mitigation and Adaptation in Forests and Agriculture	schriftliche Prüfung	90 Min.	Prüfungszeit		1.0

STUDENTISCHER GESAMT-ARBEITSAUFWAND

Lehrveranstaltung	Lehrform	Kontaktzeit SWS	Kontaktzeit Std.	Selbststudium Std.	Gesamt Arbeitsaufwand Std.
35620201A	Seminaristischer Unterricht	2.0	30.0	45.0	75.0
35620201B	Seminaristischer Unterricht	2.0	30.0	45.0	75.0
Summen		4.0	60.0	90.0	150.0

LEHRVERANSTALTUNGEN

MITIGATION AND ADAPTATION IN FORESTS (35620201A)

Dozent(en)	Prof. Dr. Stefan Wittkopf und Prof. Dr. Christian Zang
Lehrform	Seminaristischer Unterricht
Erforderliche Rahmenbedingungen	Teaching room
Literatur und Materialien	Pluess A, Augustin S, Brang P 2016 Der Wald im Klimawandel, Grundlagen für Adaptionsstrategien. Haupt Verlag, Bern, ISBN 978-3-258-07995-0 Bravo F, LeMay V, Jandl R (ed.) 2017 Managing Forest Ecosystems: The Challenge of Climate Change. Springer, ISBN 978-3-319-28248-0 Schulze ED, Sierra CA, Egenolf V, et al. 2020 The climate change mitigation effect of bioenergy from sustainably managed forests in Central Europe. GCB Bioenergy. 2020;00:1–12. https ://doi.org/10.1111/gcbb.12672 Bayer. Landesanstalt für Wald und Forstwirtschaft 2011 Kohlenstoffspeicherung von Bäumen. LWF-Merkblatt 27 Bayer. Landesanstalt für Wald und Forstwirtschaft 2015 Treibhausgasvermeidung durch Wärme aus Holz. LWF-Merkblatt 34

INHALTE

Key contents:
- Impacts of climate change on woodland and forest management
- Role of forests in the climate system
- Carbon balance of woodland, forest and agroforestry systems
- Usage concepts for preventing greenhouse gas emissions (mitigation)
- Adapting forestry management to climate-related changes (selecting tree types, thinning/regeneration strategies, forest protection, adaptation)
- Field trips to learn about adaptation and mitigation in forests/agroforestry systems with practical exercises

MITIGATION AND ADAPTATION IN AGRICULTURE (35620201B)

Dozent(en)	N. N. und Prof. Dr. Bernhard Schauberger
Lehrform	Seminaristischer Unterricht
Erforderliche Rahmenbedingungen	Teaching room
Literatur und Materialien	Chapter 7, Food Security and Food Production Systems, In: Climate Change 2014, Impacts, Adaptation, and Vulnerability Part A: Global and Sectoral Aspects https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-PartA_FINAL.pdf Chapter 11, Agriculture, Forestry and Other Land Use (AFOLU), In: Climate Change 2014, Mitigation of Climate Change, https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_full.pdf Colomb et al. (2012), Review of GHG calculators in agriculture and forestry sectors, http://www.fao.org/fileadmin/templates/ex_act/pdf/ADEME/Review_existingGHGtool_VF_UK4.pdf Lorenz & Lal (2018), Carbon Sequestration in Agricultural Ecosystems, Springer Climate change adaptation in the agriculture sector in Europe, EEA Report No 4/2019, https://www.eea.europa.eu/publications/cc-adaptation-agriculture Review of existing information on the interrelations between soil and climate change, Technical Report - 2008 - 048, https://ec.europa.eu/environment/archives/soil/pdf/climsoil_report_dec_2008.pdf Greenhouse gas abatement cost curves, https://www.mckinsey.com/business-functions/sustainability/our-insights/greenhouse-gas-abatement-cost-curves Agriculture at crossroads (2008). https://www.weltagrarbericht.de/original-berichte.html The Future of Food and Farming (2011). https://webarchive.nationalarchives.gov.uk/20121204181833/http://bis.gov.uk/assets/foresight/docs/food-and-farming/11-546-future-of-food-and-farming-report.pdf

INHALTE

Key contents:

- The relevance of climate change in agriculture

- Management options for adapting to climate change (soil condition, water use/irrigation, cultivation measures, selection of species and varieties, adaptation, improved animal husbandry)

- Climate-smart agriculture (mitigation): Potential for reducing greenhouse gas emissions and sequestering carbon in agricultural systems (CO2 footprint of production systems, the significance of location, soil-based measures); Key figures for calculating the greenhouse gas levels of production systems; The significance of production intensity for product greenhouse gas levels (area-specific/product-specific evaluation); Derivation of location-specific climate-smart land usage concepts

- Practical exercises in adaptation and mitigation in agriculture

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BIOLOGICAL SINKS & TECHNICAL SOLUTIONS (356202020)

Fakultät	Landschaftsarchitektur		
Studiengang	Climate Change Management		
Semester	2	EC	5.0
Häufigkeit des Angebots	jährlich im Sommersemester		
Prüfungsordnung	WS 2020/21	Gewicht für Gesamtnote	1.0
Verantwortlicher Professor	Prof. Dr. Matthias Drösler		
Beteiligte Dozenten	Prof. Dr. Oliver Falk, Prof. Dr. Anne Kress und Christian Nolte		
Teilnahmebedingungen	Pregnant students should consult the lecturer before participating in the Peatlands course in order to avoid potential risks.		

KOMPETENZZIELE

This module imparts specialist knowledge for the "Project 2" module. It is recommended to complete both modules in the same semester.

The module gives (1) deep insight in the use of Peatland management for mitigation options as well as a (2) broad overview over technical solutions in the energy sector. For the first topic, a combination of lectures and field work helps the students to understand both the theoretical background of biological sinks and the application of the concept under test area conditions. For the second topic, the students get an overview over the spectrum of renewable energy production solutions and are able to differentiate the characteristics in view of applicability within landscape development strategies.

Competency goals:
- Ability to understand and assess the role of peatlands in climate change
- Knowledge about biological solutions for mitigation with peatland management
- Ability to carry out GHG exchange measurements for the assessment of the GHG balance
- Knowledge and understanding of the basic technologies of renewable energies and other carbon-neutral technologies
- Ability to communicate with the stakeholders in the mentioned sectors
- Presentation of a technical topic
- Leadership of a discussion

Students will have to complete a written exam, covering the “Peatlands GHG exchange and carbon sequestration” lecture. Additionally, they have to submit a seminar paper, covering a topic which can be chosen from a list of subjects provided by the lecturers of “Technical Solutions”.

PRÜFUNGEN / LEISTUNGSNACHWEISE

Prüfungsnummer	Prüfungsart	Dauer	Zeitraum	Zulassungs-voraussetzungen	Anteil Endnote
356202021 Biological Sinks & Technical Solutions (schriftliche Prüfung)	schriftliche Prüfung	90 Min.	Prüfungszeit		0.5
356202022 Biological Sinks & Technical Solutions (Studienarbeit)	Studienarbeit	14 Wochen			0.5

STUDENTISCHER GESAMT-ARBEITSAUFWAND

Lehrveranstaltung	Lehrform	Kontaktzeit SWS	Kontaktzeit Std.	Selbststudium Std.	Gesamt Arbeitsaufwand Std.
35620202A	Seminaristischer Unterricht	2.0	30.0	45.0	75.0

Lehrveranstaltung	Lehrform	Kontaktzeit SWS	Kontaktzeit Std.	Selbststudium Std.	Gesamt Arbeitsaufwand Std.
35620202B	Seminar	2.0	30.0	45.0	75.0
Summen		4.0	60.0	90.0	150.0

LEHRVERANSTALTUNGEN

PEATLANDS GHG EXCHANGE AND CARBON SEQUESTRATION (35620202A)

Dozent(en)	Prof. Dr. Matthias Drösler
Lehrform	Seminaristischer Unterricht
Erforderliche Rahmenbedingungen	Teaching room and site access
Literatur und Materialien	Drösler, M. (2005): Trace gas exchange of bog ecosystems, Southern Germany. Dissertation an der Technischen Universität München, Wissenschaftszentrum Weihenstephan. J. Leifeld & L. Menichetti (2018) The underappreciated potential of peatlands in global climate change mitigation strategies. Nature Communications volume 9, Article number: 1071. Bärbel Tiemeyer, Annette Freibauer, … & Matthias Drösler (2020): A new methodology for organic soils in national greenhouse gas inventories: Data synthesis, derivation and application. Ecological Indicators 109, 105838.

INHALTE

- Peatlands – function, occurrence, land use (SU; external course)
- GHG exchange of peatlands – state of the art (SU)
- Landuse options for GHG mitigation in peatlands (SU; external course)
- GHG inventories and CO2 certificates (e.g. moorbenefits) for GHG mitigation (SU)
- Measurement and calculation of GHG exchange in experimental sites (e.g. Freisinger Moos) (P)

TECHNICAL SOLUTIONS (35620202B)

Dozent(en)	Prof. Dr. Oliver Falk, Prof. Dr. Anne Kress und Christian Nolte
Lehrform	Seminar
Erforderliche Rahmenbedingungen	Teaching room
Literatur und Materialien	

INHALTE

- Renewable energies: wind, solar, hydropower, biomass, geothermal energy
- CCS and CCU
- Sector coupling: PtH, PtX, E-Mobility, storage systems
- Energy efficiency

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LANDSCAPE & LANDUSE PLANNING, GOVERNANCE & ECONOMICS (356202030)

Fakultät	Landschaftsarchitektur		
Studiengang	Climate Change Management		
Semester	2	EC	4.0
Häufigkeit des Angebots	jährlich im Sommersemester		
Prüfungsordnung	WS 2020/21	Gewicht für Gesamtnote	1.0
Verantwortlicher Professor	Prof. Dr. Markus Reinke		
Beteiligte Dozenten	Prof. Dr. Tanja Barton, Prof. Dr. Matthias Drösler, Prof. Dr. Cristina Lenz und N. N.		
Teilnahmebedingungen	Pregnant students should consult the lecturer before participating in the "Landscape and Landuse Planning" course in order to avoid potential risks.		

KOMPETENZZIELE

This module imparts specialist knowledge for the "Project 2" module. It is recommended to complete both modules in the same semester.

Key contents:
National governments have different tools and approaches at their disposal for bringing down greenhouse gas emissions and/or influencing the scope of these emissions. This module aims to provide an overview of these tools and approaches, highlight practical examples of their use by specific countries, and reflect on the national understanding that is associated with this. Countries can use strict rules (laws, ordinances, decrees) and associated sanctions (punishments) to effect desired behaviour within their society. With regard to climate matters, this has been done e.g. through the ban of coolants containing CFCs. However, such bans normally require there to be an alternative option that can be used instead. Also, when evaluating the underlying premises, it must be considered whether such bans or strict requirements are enforceable within the society. At the international level, the effectiveness and applicability of such strict legal requirements are limited. A different governance approach involves the adoption of fiscal policies that, for instance, tax emissions of climate-damaging greenhouse gases or subsidise energy-saving technologies. Examples of this include the trade in CO2 certificates, subsidies for renewable energy, and so on. This module will discuss the governance approaches that are available for managing climate change at the national level, with regulatory, fiscal or persuasive tools (such as awards), and analyse their prospects of success.
In addition to these governance principles, which can be used anywhere regardless of the land type present, national governments also have options for influencing climate change through the control of land usage systems. The protection of CO2 sinks in the landscape (ancient woodland, moorland), control of usage intensity and usage models e.g. in agriculture (livestock farming systems etc.) are also used as examples in this module. The three types of government action (legal, fiscal and persuasive tools) are also applied here within sustainable land usage management. Using practical examples from an international context, this module aims to illustrate how these governance concepts have a limiting or amplifying effect on climate change when used to influence decisions on how space is used and how land is managed.

Competency goals:
- Gaining knowledge about landscape and landuse planning approaches for climate change management
- Ability to apply the planning tools as input to the 'Project 2'
- Gaining knowledge about international laws for governance of climate change
- Ability to compare economic drivers for climate change adaptation and mitigation

The module has two different parts:
1st: Landscape & landuse planning
2nd: Governance & economics

As an assessed assignment, students have to submit a seminar paper. The topic of the paper can be chosen from a list of subjects provided by the lecturers of the module. The choice needs to be verified by the respective lecturer.

PRÜFUNGEN / LEISTUNGSNACHWEISE

Prüfungsnummer	Prüfungsart	Dauer	Zeitraum	Zulassungs-voraussetzungen	Anteil Endnote
356202030 Landscape & Landuse Planning, Governance & Economics	Studienarbeit	14 Wochen			1.0

STUDENTISCHER GESAMT-ARBEITSAUFWAND

Lehrveranstaltung	Lehrform	Kontaktzeit SWS	Kontaktzeit Std.	Selbststudium Std.	Gesamt Arbeitsaufwand Std.
35620203A	Seminaristischer Unterricht	2.0	30.0	30.0	60.0
35620203B	Seminaristischer Unterricht	1.0	15.0	15.0	30.0
35620203C	Seminaristischer Unterricht	1.0	15.0	15.0	30.0
Summen		4.0	60.0	60.0	120.0

LEHRVERANSTALTUNGEN

LANDSCAPE & LANDUSE PLANNING (35620203A)

Dozent(en)	Prof. Dr. Markus Reinke, Prof. Dr. Cristina Lenz und Prof. Dr. Matthias Drösler
Lehrform	Seminaristischer Unterricht
Erforderliche Rahmenbedingungen	Teaching room
Literatur und Materialien	Literature and other materials will be made available in the Moodle classroom for this course.

INHALTE

The course 'Landscape & Landuse Planning' will give an overview of the planning tools in landscape planning, spatial planning and environmental impact assessments, and their relevance concerning climate change.

The students will develop a deeper knowledge of planning approaches, effects on greenhouse gas emissions out of land usage, and how to generate environment and climate-friendly land-use management.

The course will combine lectures about the basics of planning tools, analysis and reflection of key studies and field trips with realised plans and projects relevant to climate change.

Landscape planning:
- What are the overall aims of landscape planning and detailed content concerning climate change?
- Planning strategies and approaches on different scales (regional and local)
- Measures to reduce or adopt climate change and also to increase the effectiveness of carbon sinks in the landscape related to planning tools

Spatial planning:
- Overall aims of spatial planning and land-use planning and content of these plans that affects the amount of greenhouse gas emissions or urban heat islands
- Relationship of landscape planning and spatial planning and the binding force of these plans

Environmental impact assessments:
- Assessments of environmental effects of projects in general and in detail in the field of greenhouse gas emissions
- Possibilities for planners to reduce the carbon footprint of projects

GOVERNANCE AND LEGAL FRAMEWORK (35620203B)

Dozent(en)	Prof. Dr. Tanja Barton
Lehrform	Seminaristischer Unterricht
Erforderliche Rahmenbedingungen	Teaching room Parts of this course can take place together with students of the master's programme "Business Management and Renewable Energy Entrepreneurship".
Literatur und Materialien	

INHALTE

A. International Climate Protection Law

I. Short history of United Nations (UN) Climate Protection Law negotiations

II. UN law-making process

III. Milestones of UN Climate Protection Law

1. UN Framework Convention on Climate Change (UNFCCC)
2. Kyoto Protocol
3. Paris Agreement
4. Post-Paris process

IV. Evaluation and perspectives

B. European Climate Protection Law

I. Overview of European Union (EU) Climate Protection Law
II. EU law-making process
III. Milestones of EU Climate Protection Law
IV. European Green Deal
V. Evaluation and perspectives

CLIMATE CHANGE ECONOMICS (35620203C)

Dozent(en)	Prof. Dr. Matthias Drösler und N. N.
Lehrform	Seminaristischer Unterricht
Erforderliche Rahmenbedingungen	Teaching room
Literatur und Materialien	

INHALTE
Taxes, Dept for Nature Swaps, REDD + +, Certificates, etc.

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PROJECT 2 - PLANNING SOLUTIONS (356202040)

Fakultät	Landschaftsarchitektur		
Studiengang	Climate Change Management		
Semester	2	EC	10.0
Häufigkeit des Angebots	jährlich im Sommersemester		
Prüfungsordnung	WS 2020/21	Gewicht für Gesamtnote	2.0
Verantwortlicher Professor	Prof. Dr. Matthias Drösler		
Beteiligte Dozenten	Prof. Dr. Oliver Falk, Prof. Dr. Anne Kress, Prof. Dr. Christoph Moning, N. N., Christian Nolte, Prof. Dr. Bernhard Schauberger, Prof. Dr. Olaf Gerhard Schroth und Prof. Dr. Christian Zang		
Teilnahmebedingungen	Pregnant students should consult the responsible professor before participating in order to avoid potential risks.		

KOMPETENZZIELE

In "Project 2", the basics taught in the other modules of study in the first and second semester are combined while working on a practical project. The Project 2 also build upon the results of "Project 1".

The "Project 2" is the core module of the second semester. In that module, the information of all other modules is used for
(1) analysing the up to date situation of a landscape in view of climate change and the status of the different resources, like soils, forests, agricultural systems, peatlands etc. (2) designing management options for adaptation and mitigation like erosion prevention measures, afforestation, reforestation and species shifts etc. and
(3) evaluation of the efficiency of the measures in terms of climate change related indicators, like the overall GHG-balance of the landuse types.
The overall goals are to get familiar with a mutltidisciplinary planning process, to learn the tools for developing management options, to develop routines how to use available data sources and analyse them for deriving the measures. All these techniques are applied in a specific environment of a training area, but at the end, the students will be able to use the approach elsewhere for designing solutions towards mitigation and adaptation at the landscape level.

Competency goals:
- Ability to analyse adaptation needs of landscapes and land-use systems
- Ability to analyse mitigation potential of landscapes and land-use systems
- Ability to plan spatially explicit solutions for adaptation
- Ability to plan spatially explicit solutions for mitigation
- Ability to communicate climate change solutions to target groups and stakeholders

The students work in a group on the given tasks. A presentation of the results of the project work is relevant for passing the module, but not for the final grade. The seminar paper submitted is decisive for the grade.

PRÜFUNGEN / LEISTUNGSNACHWEISE

Prüfungsnummer	Prüfungsart	Dauer	Zeitraum	Zulassungs-voraussetzungen	Anteil Endnote
356202040 Project 2 - Planning Solutions	Studienarbeit	14 Wochen	vorlesungsfreie Zeit		1.0

STUDENTISCHER GESAMT-ARBEITSAUFWAND

Lehrveranstaltung	Lehrform	Kontaktzeit SWS	Kontaktzeit Std.	Selbststudium Std.	Gesamt Arbeitsaufwand Std.
35620204A	Projektstudium	5.0	74.0	226.0	300.0

Lehrveranstaltung	Lehrform	Kontaktzeit SWS	Kontaktzeit Std.	Selbststudium Std.	Gesamt Arbeitsaufwand Std.
Summen		5.0	74.0	226.0	300.0

LEHRVERANSTALTUNGEN

DEVELOPMENT OF PLANNING SOLUTIONS FOR MITIGATION AND ADAPTATION (35620204A)

Dozent(en)	Prof. Dr. Christoph Moning, Prof. Dr. Olaf Gerhard Schroth, Prof. Dr. Christian Zang, Prof. Dr. Bernhard Schauberger, Prof. Dr. Matthias Drösler, N. N., Christian Nolte, Prof. Dr. Anne Kress und Prof. Dr. Oliver Falk
Lehrform	Projektstudium
Erforderliche Rahmenbedingungen	Seminar room, IT room, GIS workstations
Literatur und Materialien	Duguma, L.A, Minang, P.A. & van Noordwijk, V. 2014a. Climate Change Mitigation and Adaptation in the Land Use Sector: From Complementarity to Synergy. Environmental Management, 54 (3): 420–432. Duguma, L.A, Minang, P.A., Wambugu, S.W. & van Noordwijk, V. 2014b. A systematic analysis of enabling conditions for synergy between climate change mitigation and adaptation measures in developing countries. Environmental science & policy, 42 138–148. FAO. 2017b. Sustainable Land Management (SLM) in Practice in the Kagera Basin: Lessons Learned for Scaling up at Landscape Level. Rome. Harvey, C.A., Chacón, M., Donatti, C.I., Garen, E., Hannah, L., Andrade, A., Bede, L., Brown, D., Calle, A., Chará, J., Clement, C., Gray, E., Hoang, M.H., Minang, P., Rodríguez, A.M., Seeberg-Elverfeldt, C., Semroc, B., Shames, S., Smukler, S., Somarriba, E., Torquebiau, E., van Etten, J. & Wollenberg, E. 2014. Climate-Smart Landscapes: Opportunities and Challenges for Integrating Adaptation and Mitigation in Tropical Agriculture. Conservation Letters, 7: 77–90. Van Oosterzee, P., Dale, A., Preece, N.D., 2013. Integrating agriculture and climate change mitigation at landscape scale: Implications from an Australian case study. Available online at: https://doi.org/10.1016/j.gloenvcha.2013.10.003, last checked on 9 June 2022.

INHALTE

- Data research and acquisition for a selected landscape area, based mainly on Project 1
- Integration of knowledge gained from all semester 1 and 2 modules for planning climate-smart landscapes
- Evaluation of adaptation needs of land use and ecosystems using, among others, the results of Project 1
- Evaluation of mitigation potential in the landscape using, among others, the results of Project 1
- Planning process for spatially explicit mitigation and adaptation solutions using scenario techniques to identify options and restrictions
- Assessment of the effects of the planning solutions on adaptation and mitigation indicators, e.g. soil loss reduction, carbon storage enhancement, biodiversity stabilisation, etc.
- Assessment of landscape potential for the promotion of regional climate neutrality as an ecological service
- Visualisation in GIS – development of climate-smart landscapes
- Regional report on climate change mitigation and adaptation solutions from farm to landscape level
- Presentation for target groups and stakeholders based on trained techniques of communication, presentation, facilitation, moderation and participation

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MASTER THESIS (356203000)

Fakultät	Landschaftsarchitektur		
Studiengang	Climate Change Management		
Semester	3	EC	30.0
Häufigkeit des Angebots	jedes Semester		
Prüfungsordnung	WS 2020/21	Gewicht für Gesamtnote	5.0
Verantwortlicher Professor	N. N.		
Teilnahmebedingungen	In order to be permitted to commence work on a master's thesis, students must have obtained a total of 30 EC from the semesters of theoretical study. Any EC that are missing on account of students not having the required entry qualifications must also have been obtained at this point.		

KOMPETENZZIELE

Students prove their ability to develop solutions for specific problems within the scope of Climate Change Management and its related disciplines within a limited period, independently and according to scientific standards.

Content:
Topic and scope of the thesis are defined together with the professor or lecturer who is going to do the supervision. After submission of the thesis in writing, it has to be presented to the thesis committee during the defence colloquium and questions from the examiners regarding the master's thesis have to be answered.

PRÜFUNGEN / LEISTUNGSNACHWEISE

Prüfungsnummer	Prüfungsart	Dauer	Zeitraum	Zulassungs-voraussetzungen	Anteil Endnote
356203001 Master Thesis	Masterarbeit			At least 30 EC from the semesters of theoretical study + EC that are missing on account of students not having the required entry qualifications	0.9
356203002 Defence colloquium	Kolloquium	45 Min.		Submission of the master's thesis	0.1

STUDENTISCHER GESAMT-ARBEITSAUFWAND

Lehrveranstaltung	Lehrform	Kontaktzeit SWS	Kontaktzeit Std.	Selbststudium Std.	Gesamt Arbeitsaufwand Std.
35620300A	Projektstudium	1.0	15.0	795.0	810.0
35620300B	Projektstudium	1.0	15.0	75.0	90.0
Summen		2.0	30.0	870.0	900.0

LEHRVERANSTALTUNGEN

MASTER'S THESIS (35620300A)

Dozent(en)	
Lehrform	Projektstudium
Erforderliche Rahmenbedingungen	The Master's thesis must be written in English. It may be produced in a different language with the approval of the examiner and the second examiner. Any professor or lecturer at HSWT can supervise the thesis. The first examiner needs to be contracted by HSWT. The second examiner might be external. For external supervision written consent of the examination committee is required. He or she must be qualified on Master's level or higher.
Literatur und Materialien	Master's thesis guidelines and registration forms are available in the M-CCM moodle course.

INHALTE

Topic and scope of the thesis are defined together with the professor or lecturer who is going to do the supervision. It is recommended to start with the definition of the topic as early as possible.

DEFENCE COLLOQUIUM (35620300B)

Dozent(en)	
Lehrform	Projektstudium
Erforderliche Rahmenbedingungen	The thesis defence can be via zoom or face-to-face in a seminar room. It is conceived as a public event.
Literatur und Materialien	

INHALTE

Students have to defend their thesis in front of the thesis committee, consisting of the two examiners. The thesis defence has a total duration of 45 minutes and is conceived as a public event. Students have 25 minutes for presenting their thesis plus 20 minutes for answering questions.