Fakultät für Umwelt und natürliche Ressourcen
Faculty of Environment and Natural Ressources

Module description handbook

Master of Science (M.Sc.) Forest Sciences
(Examination regulations version 2023 = PO 2023)

universität freiburg

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Prolog

Content/Aim

The MSc Forest Sciences provides an in-depth education in the field of forest sciences. The course content ranges from fundamental aspects of forest ecosystems to forest utilization forms and techniques as well as the diversity and management of animal and plant populations through to the energetic and material utilization of wood. In addition to ecological contexts, the program focuses on economic and political aspects as well as applied questions of nature conservation, utilization techniques and operational controls. Particular importance is attached to the principle of sustainability in dealing with forests and other near-natural landscapes.
The basic knowledge acquired can be applied and further developed within the framework of application-orientated modules to solve forest and woodland problems at regional, national and international level.
The aim is to familiarize students with theoretical knowledge and practical skills in order to train them to become competent forest and woodland experts who are able to deal with current challenges and issues in a national and international environment.

Language

The core modules are offered in English for all students.
Depending on the chosen major, the teaching language in the major modules is predominantly English or German.
For a German major, the English language level B2 of the Common European Framework of Reference for Languages is required.
For the English majors, proof of English language level C1 of the Common European Framework of Reference for Languages must be submitted with the application.
Native speakers are exempt from this requirement.
Individual electives are offered in either German or English.

Structure of the program

The modules in the winter semester are always semester-long. In the summer semester, the modules are organized in consecutive 3-week block courses. All modules have a scope of 5 ECTS, which corresponds to a workload of 150 hours/module (contact time plus self-study and examination time).

1. semester (winter semester): 2 core modules, 4 major modules (semester-wise structure)
2. semester (summer semester): 4 major modules, optionally 1 individual elective (block-structure)
3. semester (winter semester): 1 core module, 2 major modules, a total of 3 individual electives (semester-wise structure)
4. semester (summer semester): Master's thesis (6 months)

mandatory internship (min 7 weeks, recommended between 2nd and 3rd semester)

Explanation of the module types and examinations mentioned:

1. Basic/Core modules: The three core modules (15 ECTS) are compulsory for all students of the MSc Forest Sciences. They are offered in the first and third semesters.
2. Major modules:When you apply, you choose one of the three majors. Ten modules totaling 50 ECTS are then taken in the first three semesters.
3. Individual electives: Three individual electives totaling 15 ECTS must be taken during the course of the program. Students can choose from a variable offer of modules for the two Master's program in Forest Sciences and Environmental Sciences or modules from other Master's degree programs of the faculty, the university or outside the university, as long as there is a subject-related connection.

- Internship:

An internship (10 ECTS) of at least 7 weeks (full-time) is required for the successful completion of the MSc Forest Sciences. It is usually completed during the lecture-free period between the second and third semesters, but can also be completed flexibly at another time if required. The internship enables students to gain practical experience and is also a good opportunity to explore possible professional fields and career opportunities. It can be completed in Germany or abroad, either as one internship or split into two practical phases of at least three weeks. Internships must be found and organized by the students themselves, but all lecturers are happy to provide tips and contacts from their networks on request.

- Master's thesis:

The Master's thesis is worth 30 ECTS credits and is an examination paper in which the candidate should demonstrate that he/she is able to work on a topic from his/her field of study within the specified period (6 months) using scientific methods and present the results adequately. The topic and the supervisors are organized and agreed by the students themselves. Students with a minimum of 60 ECTS credits on their transcript of records can register for the Master's thesis.

Remark:
This module handbook only lists the mandatory major and core modules that are offered in the corresponding semester. Compulsory elective modules are listed in a separate document.

---------- Deutsche Version ----------

Inhalt/Ziel
Der Masterstudiengang Forstwissenschaften/Forest Sciences vermittelt eine vertiefte Ausbildung im Bereich der Forstwissenschaften. Das Spektrum der Lehrinhalte reicht dabei von grundlegenden Aspekten von Waldökosystemen über Waldnutzungsformen und -techniken sowie die Diversität und das Management von Tier- und Pflanzenpopulationen bis hin zur energetischen und stofflichen Verwertung von Holz. Im Mittelpunkt des Studiums stehen neben den ökologischen Zusammenhängen ökonomische und politische Aspekte sowie angewandte Fragen von Naturschutz, Nutzungstechniken und betrieblichen Steuerungen. Besondere Bedeutung kommt dabei dem Leitbild der Nachhaltigkeit im Umgang mit Wäldern und anderen naturnahen Landschaften zu.
Das erlangte Grundlagenwissen kann im Rahmen von anwendungsorientierten Modulen zur Lösung von Wald- und Forstproblemen auf regionaler, nationaler und internationaler Ebene angewendet und weiterentwickelt werden.
Ziel ist es, die Studierenden auf diese Weise mit den theoretischen Kenntnissen und praktischen Fähigkeiten vertraut zu machen um sie zu kompetenten Wald- und Forstexperten auszubilden, die sich im nationalen und internationalen Umfeld den aktuellen Herausforderungen und Fragen stellen können.

Sprache
Die Grundlagenmodule werden für alle Studierenden gemeinsam auf Englisch angeboten.
Je nach gewählter Profillinie ist die Lehrsprache in den Profillinienmodulen überwiegend Englisch oder Deutsch.
Für eine deutsche Profillinie wird das englische Sprachniveau B2 des Gemeinsamen Europäischen Referenzrahmens gefordert.
Für die englischen Profillinien muss ein Nachweis über das englische Sprachniveau C1 des Gemeinsamen Europäischen Referenzrahmens bei der Bewerbung vorliegen.
Muttersprachler sind von der Nachweispflicht ausgenommen.
Wahlpflichtmodule werden entweder auf Deutsch oder Englisch angeboten.

Aufbau des Studiums

Die Module im Wintersemester sind immer semesterbegleitend. Im Sommersemester sind die Module in aufeinanderfolgende 3-wöchigen-Blockveranstaltungen organisiert. Alle Module haben einen Umfang von 5 ECTS, was einem Workload von 150h/Modul (Kontaktzeit plus Selbststudium und Prüfungszeit) entspricht.

1. Fachsemester (Wintersemester): 2 Grundlagenmodule, 4 Profillinienmodule (semesterbegleitend)
2. Fachsemester (Sommersemester): 4 Profillinienmodule, optional 1 Wahlpflichtmodul aus dem Angebot (geblockt)
3. Fachsemester (Wintersemester): 1 Grundlagenmodul, 2 Profillinienmodule, insg. 3 Wahlpflichtmodule (semesterbegleitend)
4. Fachsemester (Sommersemester): Masterarbeit (6 Monate)

Pflichtpraktikum (min. 7 Wochen), empfohlen in der Veranstaltungsfreien Zeit zwischen 2. und 3. Semester

Erläuterung zu den genannten Modultypen und Prüfungsleistungen:

1. Grundlagenmodule/Kernmodule: Die drei Grundlagenmodule (15 ECTS) sind für alle Studierenden des M.Sc. Forstwissenschaften verpflichtend. Sie werden im ersten und dritten Semester angeboten.
2. Profillinienmodule: Mit der Bewerbung legt man sich auf eine der drei Profillinien fest. In dieser werden dann in den ersten drei Semestern zehn Module im Umfang von 50 ECTS belegt.
3. Wahlpflichtmodule:Im Laufe des Studiums müssen drei Wahlpflichtmodule im Umfang von 15 ECTS belegt werden. Die Studierenden können hier aus einem variablem Modulangebot für die beiden Masterstudiengänge Forstwissenschaften und Umweltwissenschaften oder Module anderer Masterstudiengänge der Fakultät, der Universität oder außerhalb der Universität wählen, solange ein fachlicher Zusammenhang besteht.

- Praktikum:

Für den erfolgreichen Abschluss des M.Sc. Forstwissenschaften ist ein Praktikum (10 ECTS) von mindestens 7 Wochen (Vollzeit) erforderlich. Es wird in der Regel in der vorlesungsfreien Zeit zwischen dem zweiten und dritten Fachsemester absolviert, kann aber bei Bedarf auch flexibel zu einem anderen Zeitpunkt durchgeführt werden. Das Praktikum ermöglicht den Studierenden Praxiserfahrung zu sammeln und ist außerdem eine gute Gelegenheit mögliche Berufsfelder und Karrieremöglichkeiten zu erkunden. Es kann in Deutschland oder im Ausland entweder zusammenhängend oder aufgeteilt, auf zwei mindestens dreiwöchige Praxisphasen, abgeleistet werden. Praktika müssen von den Studierenden selbstständig gesucht und organisiert werden, aber alle Lehrenden sind auf Anfrage gerne bereit, Ihnen Tipps und Kontakte aus ihren Netzwerken zu geben.

- Masterarbeit:

Die Masterarbeit hat einen Leistungsumfang von 30 ECTS-Punkten und ist eine Prüfungsarbeit, in der der Kandidat/die Kandidatin zeigen soll, dass er/sie in der Lage ist, innerhalb der vorgegebenen Frist (6 Monate) ein Thema aus seinem/ihrem Studienfach nach wissenschaftlichen Methoden zu bearbeiten und die Ergebnisse adäquat darzustellen. Das Thema und die Betreuer werden hierbei durch die Studierenden selbst organisiert und abgesprochen. Ab einer Mindestanzahl von 60 verbuchten ECTS auf der Leistungsübersicht, kann die Masterarbeit angemeldet werden.

Anmerkung:

Dieses Modulhandbuch listet nur die verpflichtenden Profillinien- und Grundlagenmodule auf, die im entsprechenden Semester angeboten werden. Wahlpflichtmodule werden in einem weiteren Dokument aufgeführt.

Name of node	Number of node
Core Area	10LE07KT-GLBF-2023-21100
Faculty	
Fakultät für Umwelt und natürliche Ressourcen	

Mandatory or Elective	Mandatory

↑

Name of module	**Number of module**
Applied Environmental Statistics	10LE07MO-M.21101
Responsible	
Prof. Dr. Carsten Dormann	
Faculty	
Fakultät für Umwelt und natürliche Ressourcen	

ECTS-Points	5.0
Workload	150h
Hours of week	4.0
Attendance	60 h
Independent study	90 h
Recommended semester	1
Duration	1 Semester
Mandatory or Elective (M/E)	Mandatory
Frequency	in every Wintersemester

Compulsory requirement
None

Assigned Courses					
Name	Type	M/E	ECTS	HoW	Workload
Applied Environmental Statistics	Course	Mandatory	5.0	4.0	150 h

Contents
This module builds on and extends statistical knowledge and its application: ■ Generalised Additive Models ■ Classification & Regression Trees (incl. randomForest and BRT) ■ non-parametric statistic (resampling approaches) ■ model selection incl. cross-validation ■ spatial statistics (correlogram, variogram) ■ extreme value statistics ■ time-series analysis (autocorrelation, decomposition) All topics will be taught in the free software R.
Qualification
Students will ■ extend their statistical knowledge ■ solve complex statistical tasks ■ advance the use of R
Examination achievement
none

Course achievement
10 out of 12 weekly homework assignments passed with over 60% of the points
Teaching method
Lectures, tutored exercises, group work
Literature
■ Crawley (2007) The R Book. Wiley. ■ *Helsel & Hirsch (1992) Statistical Methods in Water Resources. (www.epa.gov/region9/qa/pdfs/statguide.pdf) ■ Schönwiese (2006) Praktische Statistik für Meteorologen und Geowissenschaftler, 4. Aufl., Bornträger ■ *R-documentation under http://cran.r-project.org/other-docs.html, like http://cran.r-project.org/doc/contrib/Dormann+Kuehn_AngewandteStatistik.pdf ■ * indicates an open resource

↑

Name of module	Number of module
Applied Environmental Statistics	10LE07MO-M.21101
Event	
Applied Environmental Statistics	
Event type	Number
Course	10LE07S-M.21101

ECTS-Points	5.0
Workload	150 h
Attendance	60 h
Independent study	90 h
Hours of week	4.0
Recommended semester	1
Frequency	every winter semester
Mandatory or Elective (M/E)	Mandatory

Contents

This module builds on and extends statistical knowledge and its application:
- Generalised Additive Models
- Classification & Regression Trees (incl. randomForest and BRT)
- non-parametric statistic (resampling approaches)
- model selection incl. cross-validation
- spatial statistics (correlogram, variogram)
- extreme value statistics
- time-series analysis (autocorrelation, decomposition)

All topics will be taught in the free software R.

Qualification

Students will
- extend their statistical knowledge
- solve complex statistical tasks
- advance the use of R

Examination achievement

none

Course achievement

10 out of 12 weekly homework assignments passed with over 60% of the points

Literature

- Crawley (2007) The R Book. Wiley.
- *Helsel & Hirsch (1992) Statistical Methods in Water Resources. (www.epa.gov/region9/qa/pdfs/statguide.pdf)
- Schönwiese (2006) Praktische Statistik für Meteorologen und Geowissenschaftler, 4. Aufl., Bornträger
- *R-documentation under http://cran.r-project.org/other-docs.html, like http://cran.r-project.org/doc/contrib/Dormann+Kuehn_AngewandteStatistik.pdf

* indicates an open resource

Compulsory requirement
none
Recommended requirement
■ Basic statistical knowledge: distributions, maximum likelihood, regressions; ANOVA, GLM, PCA ■ Data import und simple statistical analyses in R (www.r-project.org) ■ Knowledge of all content of “R for Beginners” (https://cran.r-project.org/doc/contrib/Paradis-rdebuts_en.pdf)
Teaching method
Lectures, tutored exercises, group work

↑

Name of module	**Number of module**
Forests and Global Change	10LE07MO-M.21102
Responsible	
Prof. Dr. Markus Hauck	
Faculty	
Fakultät für Umwelt und natürliche Ressourcen	

ECTS-Points	5.0
Workload	150h
Hours of week	4.0
Attendance	60 h
Independent study	90 h
Recommended semester	1
Duration	1 Semester
Mandatory or Elective (M/E)	Mandatory
Frequency	every winter semester

Compulsory requirement
None

Assigned Courses					
Name	Type	M/E	ECTS	HoW	Workload
Forests and Global Change	Course	Mandatory	5.0	4.0	150h

Contents
The students will know natural science and social science perspectives of the condition of global forests and forest use. They will have deepened knowledge of climate change effects on forests in different biomes and on potential adaptations of forestry. Furthermore, they will have knowledge of threats by deforestation and options for afforestation. This will be supplemented by knowledge of digitalization in forest management.
Qualification
The students ■ will know natural science and social science perspectives of the condition of global forests and forest use ■ will have deepened knowledge of climate change effects on forests in different biomes and on potential adaptations of forestry ■ will have knowledge of threats by deforestation and options for afforestation. This will be supplemented by knowledge of digitalization in forest management.
Examination achievement
Written exam (90min)
Course achievement
none

Teaching method
Lecture, Group work

↑

Name of module	Number of module
Forests and Global Change	10LE07MO-M.21102
Event	
Forests and Global Change	
Event type	Number
Course	10LE07V-M.21102

ECTS-Points	5.0
Workload	150h
Attendance	60
Independent study	90
Hours of week	4.0
Recommended semester	1
Frequency	every winter semester
Mandatory or Elective (M/E)	Mandatory

Contents
Forests under global pressure and as a source of ecosystem services. Deforestation and afforestation. Ecological aspects of forest use. Forests and global climate change. Resilience and adaptive capacity of forests in the face of global change. Forests in the pyrocene – fire impacts. Forest health in the Anthropocene. Climate change and forest insect pests. Forest insect invasions and their management. Management options to adapt forests to global change. Forest management and forest operations under changing climate conditions. Digitalization in forest management and forest operations. Responsibility of forest management and forest operations for a bioeconomy. Policy options to adapt forests and forestry to global change. Policy and legal drivers of forest change (deforestation, forest degradation, afforestation): a global overview. Socio-economic and trade drivers of forest change (deforestation, forest degradation, afforestation): a global overview. Policy and legal drivers of forest change (deforestation and forest degradation): case examples from selected countries.
Qualification
The students ■ will know natural science and social science perspectives of the condition of global forests and forest use ■ will have deepened knowledge of climate change effects on forests in different biomes and on potential adaptations of forestry ■ will have knowledge of threats by deforestation and options for afforestation. This will be supplemented by knowledge of digitalization in forest management.
Examination achievement
Written exam (90min)
Course achievement
none
Compulsory requirement
none

Teaching method
Lecture, Group work

↑

Name of module	Number of module
Forest Sciences: Professional and Research Approaches	10LE07MO-M.21103
Responsible	
Dr. Metodi Georgiev Sotirov	
Faculty	
Fakultät für Umwelt und natürliche Ressourcen	

ECTS-Points	5.0
Workload	150 h
Hours of week	4.0
Recommended semester	3
Duration	1 Semester
Mandatory or Elective (M/E)	Mandatory
Frequency	Every winter semester

Compulsory requirement
None

Assigned Courses					
Name	Type	M/E	ECTS	HoW	Workload
Forest Sciences: Professional and Research Approaches	Course	Mandatory	5.0	4.0	150 h

Contents
The module deals with forest sciences as an academic discipline and distinct scientific approach which forms also the basis for a variety of forest-related applied professions.
Qualification
Students ■ know the main principles and professional applications of forest sciences ■ can assess the main opportunities and risks of forest sciences with reference to the history, the present practice and future developments of science-based forest management ■ are able to successfully apply natural science research skills to collect and analyse forest related data, and assess these from a social science perspective ■ can communicate scientific issues in form of oral presentations, posters and short texts ■ have acquired competences in project and time management
Examination achievement
Oral presentation
Course achievement
None
Teaching method
Lectures, group work, exercises, professional exchange with forestry practitioners, peer feedback

Literature
■ Creswell, J. W. (2005): Research design: qualitative, quantitative, and mixed methods approaches. Thousand oaks, California: Sage. 2. Edition ■ Duerr, W. A. & Duerr, J. B. (1975): The Role of Faith in Forest Resource Management. In Social Sciences in Forestry: A Book of Readings, Eds. F. Rumsey & W. Duerr, pp. 30-41. W. B. Saunders Company: Philadelphia, London, Toronto. ■ Glück, P. (1987): Das Wertesystem der Forstleute. Centralblatt für das gesamte Forstwesen: 44-51. ■ Glück, P. (2001): Modelle rationaler Wahlhandlungen in der Forstpolitikwissenschaft. Forst und Holz 56 (6): 171-178. ■ McCool, S. & Stankey, G. (2004): Indicators of Sustainability: Challenges and Opportunities at the Interface of Science and Policy. Environmental Management 33 (3): 294–305 ■ Schanz, H. (1997): Sustainable forest management – on the meanings and functions of a central term in forestry. XI. World Forest Congress, Antalya: http://www.ulb.ac.be/assoc/iff/section1/otherlinks/sfm.PDF

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Name of module	Number of module
Forest Sciences: Professional and Research Approaches	10LE07MO-M.21103
Event	
Forest Sciences: Professional and Research Approaches	
Event type	Number
Course	10LE07V-M.21103

ECTS-Points	5.0
Workload	150 h
Hours of week	4.0
Recommended semester	3
Frequency	every winter semester
Mandatory or Elective (M/E)	Mandatory

Contents

The module deals with forest sciences as an academic discipline and distinct scientific approach which forms also the basis for a variety of forest-related applied professions. Following a general introduction, the module will be structured in two interlinked parts. From a systemic perspective, Part I will introduce the students to forest sciences as an academic discipline that aims to understand forest development in the context of global change to provide different forest ecosystem goods and services to society. We will trace the historical developments of forest sciences and forest-related professions to learn how the discipline and the profession of forestry have responded to environmental and societal developments over time. Based on this, the main value systems, principles and communication topics (e.g., sustainability, future-oriented long-term thinking, timber primacy) in forest sciences and professional approaches will be assessed from a social science perspective to show that “forestry is not about trees, it’s about people.” To complement part I, a diversity of forestry professionals representing different employment contexts and practices (e.g., state forest service, private forestry/forest industry, international forestry cooperation, ecological forest management) will provide students with an overview of professional ethics, challenges, opportunities and risks.
Part II will introduce and train the students in key research methods and techniques in forest sciences. Through a series of dedicated methodological workshops and group work, the students will acquire basic knowledge and develop their skills for example in literature search and management, scientific writing, presentation skills, as well as in project management. Through group work in which they develop their presentations (e.g., poster, oral presentation), students will gain experiences and skills in presentation, communication and time management. Peer feedback by other students and teachers will support the students in their group work.

Qualification

Students
- know the main principles and professional applications of forest sciences
- can assess the main opportunities and risks of forest sciences with reference to the history, the present practice and future developments of science-based forest management
- are able to successfully apply natural science research skills to collect and analyse forest related data, and assess these from a social science perspective
- can communicate scientific issues in form of oral presentations, posters and short texts
- have acquired competences in project and time management

Examination achievement

Oral presentation

Course achievement
None
Literature
Creswell, J. W. (2005): Research design: qualitative, quantitative, and mixed methods approaches. Thousand oaks, California: Sage. 2. Edition Duerr, W. A. & Duerr, J. B. (1975): The Role of Faith in Forest Resource Management. In Social Sciences in Forestry: A Book of Readings, Eds. F. Rumsey & W. Duerr, pp. 30-41. W. B. Saunders Company: Philadelphia, London, Toronto. Glück, P. (1987): Das Wertesystem der Forstleute. Centralblatt für das gesamte Forstwesen: 44-51. Glück, P. (2001): Modelle rationaler Wahlhandlungen in der Forstpolitikwissenschaft. Forst und Holz 56 (6): 171-178. McCool, S. & Stankey, G. (2004): Indicators of Sustainability: Challenges and Opportunities at the Interface of Science and Policy. Environmental Management 33 (3): 294–305 Schanz, H. (1997): Sustainable forest management – on the meanings and functions of a central term in forestry. XI. World Forest Congress, Antalya: http://www.ulb.ac.be/assoc/iff/section1/otherlinks/sfm.PDF
Compulsory requirement
None
Teaching method
Lectures, group work, exercises, professional exchange with forestry practitioners, peer feedback

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Name of node	Number of node
Major Area	10LE07KT-PLF-2023-22000
Faculty	
Fakultät für Umwelt und natürliche Ressourcen	

Mandatory or Elective (M/E)	Mandatory

↑

Name of node	Number of node
Major Forstwirtschaft (in German)	10LE07KT-PLF-2023-FW-22100
Faculty	
Fakultät für Umwelt und natürliche Ressourcen	

Mandatory or Elective (M/E)	Mandatory

↑

Name of module	Number of module
Analyse der Waldpolitik	10LE07MO-M.22101
Responsible	
Prof. Dr. Daniela Kleinschmit	
Faculty	
Fakultät für Umwelt und natürliche Ressourcen	

ECTS-Points	5.0
Workload	150h
Hours of week	4.0
Attendance	60 h
Independent study	90 h
Recommended semester	1
Duration	1 Semester
Mandatory or Elective (M/E)	Mandatory
Frequency	every winter semester

Compulsory requirement
None / Keine

Assigned Courses					
Name	Type	M/E	ECTS	HoW	Workload
Analyse der Waldpolitik	Course	Mandatory	5.0	4.0	150 h davon 60h in Präsenz

Contents
Das Politikfeld Wald ist gekennzeichnet durch eine Vielzahl von Akteuren mit verschiedenen Interessen und Erwartungen und unterschiedlichen Möglichkeiten diese durchzusetzen. Eine systematische Analyse der Waldpolitik hilft relevante Akteure zu identifizieren, ihre formalen und informalen Interessen zu erkennen und Machtverhältnisse aufzudecken. Damit können Konflikte besser eingeschätzt werden und eingesetzte politische Instrumente bewertet werden. Das Modul hat das Ziel den Studierenden politikwissenschaftlich basiertes Werkzeug an die Hand zu geben, mit dessen Hilfe komplexe waldpolitische Konflikte systematisch analysiert werden können. Zu Beginn werden Konzepte vorgestellt, die zur Einordnung in den politischen Kontext von Bedeutung sind. Gemeinsam mit den Analysemethoden bilden sie das Grundgerüst für eine eigenständig durchgeführte Analyse im zweiten Teil des Moduls. Gastvorträge von Experten aus der waldpolitischen Praxis tragen dazu bei, mögliche Waldkonflikte und ihre politische Lösungsmöglichkeit besser zu verstehen. Im Rahmen einer Exkursion wird das angeeignete Wissen mit der Praxis konfrontiert.
Qualification
Die Studierenden können: ■ Probleme der politischen Steuerung (Anlass, Ansätze, Wirksamkeit) verstehen und erklären,

- ausgewählte theoretische Grundlagen (Steuerungskonzepte, Steuerungsinstrumente) beschreiben,
- praktische Steuerungsbemühungen einer Analyse und kritischen Würdigung unterziehen und diese klassifizieren sowie
- eigene Vorstellungen und Vorschläge zur politischen Steuerung der Waldnutzung entwickeln und vertreten.

Examination achievement
Mündliche und schriftliche Literaturzusammenfassung (20%) Politikanalyse Poster-Präsentation (45%) Ausschreibung einer Masterarbeit max. 500 Wörter (35%)
Course achievement
none
Teaching method
Vorlesungen, Übungen, Seminar
Literature

Pflichtlektüre:
- Max Krott, 2001. Politikfeldanalyse Forstwirtschaft. Paul Parey, Berlin.

Weiterführende Literatur:
- Klaus Schubert, Nils C. Bandelow, 2009. Lehrbuch der Politikfeldanalyse 2.0, Oldenbourg, München.

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Name of module	Number of module
Analyse der Waldpolitik	10LE07MO-M.22101
Event	
Analyse der Waldpolitik	
Event type	Number
Course	10LE07S-M.22101/41120

ECTS-Points	5.0
Workload	150 h davon 60h in Präsenz
Attendance	60 h
Independent study	90 h
Hours of week	4.0
Recommended semester	1
Frequency	Winter semester
Mandatory or Elective (M/E)	Mandatory
Group size	40

Contents

Das Politikfeld Wald ist gekennzeichnet durch eine Vielzahl von Akteuren mit verschiedenen Interessen und Erwartungen und unterschiedlichen Möglichkeiten diese durchzusetzen. Eine systematische Analyse der Waldpolitik hilft relevante Akteure zu identifizieren, ihre formalen und informalen Interessen zu erkennen und Machtverhältnisse aufzudecken. Damit können Konflikte besser eingeschätzt werden und eingesetzte politische Instrumente bewertet werden.
Das Modul hat das Ziel den Studierenden politikwissenschaftlich basiertes Werkzeug an die Hand zu geben, mit dessen Hilfe komplexe waldpolitische Konflikte systematisch analysiert werden können. Zu Beginn werden Konzepte vorgestellt, die zur Einordnung in den politischen Kontext von Bedeutung sind. Gemeinsam mit den Analysemethoden bilden sie das Grundgerüst für eine eigenständig durchgeführte Analyse im zweiten Teil des Moduls.
Gastvorträge von Experten aus der waldpolitischen Praxis tragen dazu bei, mögliche Waldkonflikte und ihre politische Lösungsmöglichkeit besser zu verstehen.
Im Rahmen einer Exkursion wird das angeeignete Wissen mit der Praxis konfrontiert.

Qualification

Die Studierenden können:
- Probleme der politischen Steuerung (Anlass, Ansätze, Wirksamkeit) verstehen und erklären,
- ausgewählte theoretische Grundlagen (Steuerungskonzepte, Steuerungsinstrumente) beschreiben,
- praktische Steuerungsbemühungen einer Analyse und kritischen Würdigung unterziehen und diese klassifizieren sowie
- eigene Vorstellungen und Vorschläge zur politischen Steuerung der Waldnutzung entwickeln und vertreten.

Examination achievement

Mündliche und schriftliche Literaturzusammenfassung (20%)
Politikanalyse Poster-Präsentation (45%)
Ausschreibung einer Masterarbeit max. 500 Wörter (35%)

Course achievement
none
Literature
Pflichtlektüre: ■ Max Krott, 2001. Politikfeldanalyse Forstwirtschaft. Paul Parey, Berlin. Weiterführende Literatur: ■ Klaus Schubert, Nils C. Bandelow, 2009. Lehrbuch der Politikfeldanalyse 2.0, Oldenbourg, München.
Compulsory requirement
keine
Recommended requirement
keine
Teaching method
Vorlesungen, Übungen, Seminar

↑

Name of module	Number of module
Forest Inventory and Information Systems	10LE07MO-M.22102
Responsible	
Prof. Dr. Teja Kattenborn	
Faculty	
Fakultät für Umwelt und natürliche Ressourcen	

ECTS-Points	5.0
Workload	150h
Hours of week	4.0
Recommended semester	1
Duration	1 Semester
Mandatory / Elective (M/E)	Mandatory
Frequency	Every winter semester

Compulsory requirement
None

Assigned Courses					
Name	Type	M/E	ECTS	HoW	Workload
Forest Inventory and Information Systems	Course	Mandatory	5.0	4.0	150 h

Contents
This module aims to give an overview of current methods in forest inventories. Students will be introduce to field-based methods (measuring tree locations with global navigation satellite systems and acquiring tree related metrics). Starting from a full inventory of a forest stand, we will analyze the effect of sample-based forest inventories (e.g. effect of sample method, size and quality). Moreover, we will compare the accuracy and efficiency of future-oriented methods, such as drone-based LiDAR surveys and AI tools for forest inventories. Moreover, students will be introduced to a broad geomatic toolset and geodata sources that can support large-scale forest assessments (e.g. tree species distribution maps, canopy height maps, and site factors such as soil and climate data).
Qualification
■ Students can apply basic field methods for forest inventories (e.g., measuring diameter at breast height, measuring coordinates with global navigation systems). ■ Students know have a solid understanding of forest inventories and related data (effect of sample size, plot size, sampling method and sampling design) ■ Students can perform advanced geospatial analytics with vector and raster data in the forestry context. ■ Students can acquire and analyze remote sensing data from drones and satellites and analyze them with advanced methods for forestry-related applications
Examination achievement
Exam
Course achievement
none

↑

Name of module	Number of module
Forest Inventory and Information Systems	10LE07MO-M.22102
Name of event	
Forest Inventory and Information Systems	
Event type	Number
Course	10LE07S-M.22102/22303

ECTS-Points	5.0
Workload	150 h
Hours of week	4.0
Recommended semester	1
Frequency	Every winter semester
Mandatory / Elective (M/E)	Mandatory
Group size	80

Contents
This module aims to give an overview of current methods in forest inventories. Students will be introduce to field-based methods (measuring tree locations with global navigation satellite systems and acquiring tree related metrics). Starting from a full inventory of a forest stand, we will analyze the effect of sample-based forest inventories (e.g. effect of sample method, size and quality). Moreover, we will compare the accuracy and efficiency of future-oriented methods, such as drone-based LiDAR surveys and AI tools for forest inventories. Moreover, students will be introduced to a broad geomatic toolset and geodata sources that can support large-scale forest assessments (e.g. tree species distribution maps, canopy height maps, and site factors such as soil and climate data).
Qualification
■ Students can apply basic field methods for forest inventories (e.g., measuring diameter at breast height, measuring coordinates with global navigation systems). ■ Students know have a solid understanding of forest inventories and related data (effect of sample size, plot size, sampling method and sampling design) ■ Students can perform advanced geospatial analytics with vector and raster data in the forestry context. ■ Students can acquire and analyze remote sensing data from drones and satellites and analyze them with advanced methods for forestry-related applications.
Examination achievement
Exam
Course achievement
None
Compulsory requirement
None
Teaching method
Fieldwork, discussions, application of Geographic Information Systems and geodata analyses, applied statistics

↑

Name of module	Number of module
Forstökonomie (in German)	10LE07MO-M.22103
Responsible	
Dr. Roderich von Detten	
Faculty	
Fakultät für Umwelt und natürliche Ressourcen	

ECTS-Points	5.0
Workload	150h
Hours of week	4.0
Attendance	60 h
Independent study	90 h
Recommended semester	1
Duration	1 Semester
Mandatory / Elective (M/E)	Mandatory
Frequency	Every winter semester

Compulsory requirement
None

Assigned Courses					
Name	Type	M/E	ECTS	HoW	Workload
Forstökonomie	Course	Mandatory	5.0	4.0	150 h

Contents

Planspiel TopSim
- Einführung in die Betriebswirtschaftslehre anhand zweier Planspiele zum betriebl. Leistungssystem. Inhalte: unternehmerisches Denken, Wertschöpfung im Unternehmen; betriebliche Kennzahlen und ihre Analyse, Bilanzanalyse, Produktionssteuerung und strategisches Management von Unternehmen, betriebswirtschaftliche Entscheidungsfindung

Grundlagen der Forstökonomie
- Ökonomie des Waldes
- Waldbewertung – generelle Einführung,
- Privatwaldverkauf
- Wert und Bewertungsverfahren, die wichtigsten Grundlagen und Verfahren der klassischen Waldbewertung, praktische Waldbewertung, Waldwertermittlungsrichtlinien

Waldentscheidungen unter Unsicherheit & Beispiele aus der Forschung)
- Betriebliche Analyse und Entscheidungsfindung
- Ökonomische Analyse der Waldanpassungen an den Klimawandel
- Waldumbauplanung
- Waldoptimierung

Qualification
Die Studierenden können ■ Grundlagen des managements von Forstbetrieben umsetzen. (Einführung betriebl. Leistungssystem; Grundlagen zu Wert und Bewertung) ■ Betriebswirtschaftliche Analysen umsetzen und Entscheidungsfindungsmethoden anwenden ■ Analyseergebnisse darstellen ■ Eine praktische Waldbewertung umsetzen ■ vorhandenes Wissen nutzen und sich problembezogenes neues Wissen aneignen
Examination achievement
Klausur (90 min)
Course achievement
none
Teaching method
Vorlesung, Lehrgespräch, Übung
Literature
■ Lehrbuch "Management von Forstbetrieben" von Gerhard Oesten & Axel Roeder - alle drei Bände sind auf der Webseite des Instituts für Forstökonomie unter http://www.ife.uni-freiburg.de/lehre/lehrbuch als freie Downloads verfügbar. ■ Weiterführende Literatur wird zu Kursbeginn bereitgestellt

↑

Name of module	Number of module
Forstökonomie (in German)	10LE07MO-M.22103
Name of event	
Forstökonomie	
Event type	Number
Course	10LE07S-M.22103/53130

ECTS-Points	5.0
Workload	150 h
Attendance	60 h
Independent study	90 h
Hours of week	4.0
Recommended semester	1
Frequency	Every winter semester
Mandatory / Elective (M/E)	Mandatory
Group size	45

Contents

Planspiel TopSim
- Einführung in die Betriebswirtschaftslehre anhand zweier Planspiele zum betriebl. Leistungssystem. Inhalte: unternehmerisches Denken, Wertschöpfung im Unternehmen; betriebliche Kennzahlen und ihre Analyse, Bilanzanalyse, Produktionssteuerung und strategisches Management von Unternehmen, betriebswirtschaftliche Entscheidungsfindung

Grundlagen der Forstökonomie
- Ökonomie des Waldes
- Waldbewertung – generelle Einführung,
- Privatwaldverkauf
- Wert und Bewertungsverfahren, die wichtigsten Grundlagen und Verfahren der klassischen Waldbewertung, praktische Waldbewertung, Waldwertermittlungsrichtlinien

Waldentscheidungen unter Unsicherheit & Beispiele aus der Forschung)
- Betriebliche Analyse und Entscheidungsfindung
- Ökonomische Analyse der Waldanpassungen an den Klimawandel
- Waldumbauplanung
- Waldoptimierung

Qualification

Die Studierenden können
- Grundlagen des managements von Forstbetrieben umsetzen. (Einführung betriebl. Leistungssystem; Grundlagen zu Wert und Bewertung)
- Betriebswirtschaftliche Analysen umsetzen und Entscheidungsfindungsmethoden anwenden
- Analyseergebnisse darstellen
- Eine praktische Waldbewertung umsetzen
- vorhandenes Wissen nutzen und sich problembezogenes neues Wissen aneignen

Examination achievement

Klausur (90 min)

Course achievement
none
Literature
■ Lehrbuch "Management von Forstbetrieben" von Gerhard Oesten & Axel Roeder - alle drei Bände sind auf der Webseite des Instituts für Forstökonomie unter http://www.ife.uni-freiburg.de/lehre/lehrbuch als freie Downloads verfügbar. ■ Weiterführende Literatur wird zu Kursbeginn bereitgestellt.
Compulsory requirement
Keine / None
Recommended requirement
Basiswissen Forstwissenschaften und Forstökonomie und/oder Forstliches Management
Teaching method
Game based learning (TopSim), Vorlesungen, Übungen, Exkursion

↑

Name of module	Number of module
Naturschutz im Wald (in German)	10LE07MO-M.22104
Responsible	
Prof. Dr. Markus Hauck	
Faculty	
Fakultät für Umwelt und natürliche Ressourcen	

ECTS-Points	5.0
Workload	150h
Hours of week	4.0
Attendance	60 h
Independent study	90 h
Recommended semester	1
Duration	1 Semester
Mandatory / Elective (M/E)	Mandatory
Frequency	Every winter semester

Compulsory requirement
None

Assigned Courses					
Name	Type	M/E	ECTS	HoW	Workload
Naturschutz im Wald	Course	Mandatory	5.0	4.0	150h

Contents
Das Modul gibt einen Überblick über Naturschutzfragen im Wald. Grundlagen für den Biodiversitäts- und Klimaschutz im Wald werden erörtert. Darauf aufbauend sollen Naturschutzkonzepte in Wirtschafts- und Naturwäldern betrachtet werden. Durch externe ReferentInnen sollen Naturschutzfragen aus unterschiedlichen Blickwinkeln beleuchtet werden und Konzepte und Schwerpunkte verschiedener Interessengruppen kennengelernt werden.
Qualification
Die Studierenden kennen: ■ Naturschutzstrategien im Wald von unterschiedlichen Interessengruppen ■ Instrumente des Naturschutzes in Wirtschaftswäldern ■ Strategien und Vermittlungsprobleme des Waldnaturschutzes in Schutzgebieten ■ Naturschutzprobleme bei der Holzernte
Examination achievement
Seminarvortrag
Course achievement
Keine / None

Teaching method
Vorlesung und Seminar

↑

Name of module	Number of module
Naturschutz im Wald	10LE07MO-M.22104
Name of event	
Naturschutz im Wald	
Event type	Number
Course	10LE07S-M.22104

ECTS-Points	5.0
Workload	150h
Attendance	60
Independent study	90
Hours of week	4.0
Recommended semester	1
Frequency	Every winter semester
Mandatory / Elective (M/E)	Mandatory

Contents
Das Modul gibt einen Überblick über Naturschutzfragen im Wald. Grundlagen für den Biodiversitäts- und Klimaschutz im Wald werden erörtert. Darauf aufbauend sollen Naturschutzkonzepte in Wirtschafts- und Naturwäldern betrachtet werden. Durch externe ReferentInnen sollen Naturschutzfragen aus unterschiedlichen Blickwinkeln beleuchtet werden und Konzepte und Schwerpunkte verschiedener Interessengruppen kennengelernt werden.
Qualification
Die Studierenden kennen: ■ Naturschutzstrategien im Wald von unterschiedlichen Interessengruppen ■ Instrumente des Naturschutzes in Wirtschaftswäldern ■ Strategien und Vermittlungsprobleme des Waldnaturschutzes in Schutzgebieten ■ Naturschutzprobleme bei der Holzernte
Examination achievement
Seminarvortrag
Course achievement
Keine / None
Compulsory requirement
Keine / None
Teaching method
Seminarvorträge, Diskussion

↑

Name of module	**Number of module**
Forstliche Verfahrenstechnik, Logistik und digitale Wertschöpfungsketten	10LE07MO-M.22109
Responsible	
Prof. Dr. Thomas Frank Purfürst	
Faculty	
Fakultät für Umwelt und natürliche Ressourcen	

ECTS-Points	5.0
Workload	150 h
Hours of week	4.0
Attendance	65%
Independent study	35%
Recommended semester	3
Duration	1 Semester
Mandatory / Elective (M/E)	Mandatory
Frequency	Every winter semester

Compulsory requirement
None / Keine

Assigned Courses					
Name	Type	M/E	ECTS	HoW	Workload
Forstliche Verfahrenstechnik, Logistik und digitale Wertschöpfungsketten	Course	Mandatory	5.0	4.0	150 h

Contents
■ Methoden zur Bewertung und Optimierung der Forsttechnischen Produktion ■ Methoden zur Optimierung der Holzlogistik ■ Digitalisierung forstlicher Wertschöpfungsketten
Qualification
Studierende ■ kennen die Methodik der technischen Produktionsplanung sowie dazu erforderliche Parameter und ihre Abhängigkeiten ■ kennen die Logistischen Herausforderungen der Forst-Holz-Kette ■ können Arbeitsverfahren hinsichtlich ihrer Einsatzbereiche und dabei zu erwartendeProduktivität bewerten, ihre Auswirkungen auf die Umwelt und den Menschen beurteilen, kritische Punkte benennen und Alternativen entwickeln ■ können zuverlässig Arbeitsverfahren für Holzernteverfahren, auch in schwierigen Lagen, bewerten und auswählen ■ kennen die Potentiale der Digitalisierung in der Forst-Holz-Kette
Examination achievement
Klausur 50% + Schriftliche Ausarbeitung 50%

Course achievement
none
Literature
Die Literatur wird während des Kurses mitgeteilt

↑

Name of module	Number of module
Forstliche Verfahrenstechnik, Logistik und digitale Wertschöpfungsketten	10LE07MO-M.22109
Name of event	
Forstliche Verfahrenstechnik, Logistik und digitale Wertschöpfungsketten	
Event type	Number
Course	10LE07V-M.22109

ECTS-Points	5.0
Workload	150 h
Attendance	65%
Independent study	35%
Hours of week	4.0
Recommended semester	3
Frequency	Every winter semester
Mandatory / Elective (M/E)	Mandatory
Group size	30

Contents

Das Modul befasst sich mit der technischen Planung, der Logistik und Digitalisierung forstlicher Produktion entlang der Forst-Holz-Kette von der Holzernte und -bereitstellung bis zum Holztransport. Die Ziele sind eine
Bewertung und Optimierung der Forsttechnischen Produktion, das wissen über Methoden zur Optimierung der Holzlogistik sowie über die Digitalisierung forstlicher Wertschöpfungsketten
Dabei werden u.a. folgende Themenfelder behandelt:

- Akteure der Forst-Holz-Kette mit ihren Zielen und Aufgaben und resultierende Restriktionen und Möglichkeiten, Methoden und Verfahren zur Hiebsdatenerfassung
- Technik und Kosten von Holzernteverfahren in befahrbaren und nicht-befahrbaren Lagen
- innovative Holzernteverfahren in nicht-befahrbaren Lagen
- daraus resultierende verschiedene Bereitstellungsformen von Rohholz
- Möglichkeiten der Anwendung von DV-Programmen zur Planung der Holzbereitstellung
- Aufbau eines Forstlichen Informationssystems (FIS)
- Berechnung von Holzerntekosten und – erlösen, Transportmöglichkeiten und –optimierung
- Wirkungen auf die Umwelt und soziale Implikationen der Holzernte sowie Restriktionen
- Fragen der Erschließung und deren Auswirkungen auf die Umwelt
- Schäden durch Befahrung
- Bewertung der Nachhaltigkeit von Arbeitsverfahren und der Forst-Holz-Kette insgesamt (Sustainability Impact Assessment)

Die Vor- und Nachteile unterschiedlicher Systeme werden diskutiert, um Optimierungspotenzial hinsichtlich einer effizienteren Gestaltung der Abläufe in Forst-Holz-Ketten ableiten zu können.

Qualification

Studierende

- kennen die Methodik der technischen Produktionsplanung sowie dazu erforderliche Parameter und ihre Abhängigkeiten
- kennen die Logistischen Herausforderungen der Forst-Holz-Kette
- können Arbeitsverfahren hinsichtlich ihrer Einsatzbereiche und dabei zu erwartendeProduktivität bewerten, ihre Auswirkungen auf die Umwelt und den Menschen beurteilen, kritische Punkte benennen und Alternativen entwickeln

■ können zuverlässig Arbeitsverfahren für Holzernteverfahren, auch in schwierigen Lagen, bewerten und auswählen ■ kennen die Potentiale der Digitalisierung in der Forst-Holz-Kette
Examination achievement
Klausur 50% + Schriftliche Ausarbeitung 50%
Course achievement
none
Literature
Die Literatur wird während des Kurses mitgeteilt
Compulsory requirement
none
Recommended requirement
Bachelor-Grundlagen in Forsttechnischer Produktion
Teaching method
Vorlesung, Feldarbeit, Diskussionen, Subsidium, Gruppenarbeit

↑

Name of module	Number of module
Genetische Methoden in Naturschutz und Forstwirtschaft (in German)	10LE07MO-M.22110
Responsible	
Prof. Dr. Katrin Heer	
Faculty	
Fakultät für Umwelt und natürliche Ressourcen	

ECTS-Points	5.0
Workload	150 h
Hours of week	4.0
Attendance	60 h
Independent study	90 h
Recommended semester	3
Duration	1 Semester
Mandatory / Elective (M/E)	Mandatory
Frequency	Every winter semester

Compulsory requirement
Keine / None

Assigned Courses					
Name	Type	M/E	ECTS	HoW	Workload
Genetische Methoden in Naturschutz und Forstwirtschaft	Course	Mandatory	5.0	4.0	150 h

Contents
Die Anwendung genetischer und genomischer Methoden hat unser Verständnis über die genetischen Vielfalt innerhalb der Arten und ihrer räumlichen Verteilung, zur lokalen Anpassung und der genetischen Grundlage phänotypischer Merkmale erheblich verbessert. Außerdem ermöglichen genetische Methoden die Bewertung von Populationseigenschaften, die für das Management und die Erhaltung von Arten relevant sind, wie z. B. effektive Populationsgrößen, Muster des Genflusses und der Hybridisierung. In diesem Modul werden wir aktuelle Methoden und Anwendungen vorstellen, einschlägige Literatur lesen und diskutieren und die Vorteile und Grenzen genetischer Methoden kritisch erörtern. Die Studierenden werden sich intensiv mit der wissenschaftlichen Literatur zur relevanten Themen in Forst- und Naturschutzgenetik auseinandersetzen und in Kleingruppen einen Review verfassen.
Qualification
■ Die Studierenden verstehen, wie man auf der Grundlage genetischer Daten Parameter und Prozesse wie effektive Populationsgröße, genetische Vielfalt, Hybridisierung und lokale Anpassung bestimmen kann. ■ Die Studierenden können wissenschaftliche Literatur zu den oben genannten Themen kritisch lesen und diskutieren. ■ Die Studierenden sind in der Lage, Ergebnisse von wissenschaftlichen Studien zusammenzufassen, kritisch zu evaluieren und in wissenschaftlicher Sprache und mit adäquaten Abbildungen zu präsentieren.

Examination achievement
Schriftliche Ausarbeitung
Course achievement
Seminarvortrag
Literature
Wissenschaftliche Literatur wird während des Kurses bereitgestellt

↑

Name of module	Number of module
Genetische Methoden in Naturschutz und Forstwirtschaft (in German)	10LE07MO-M.22110
Name of event	
Genetische Methoden in Naturschutz und Forstwirtschaft	
Event type	Number
Course	10LE07V-M.12109/22110

ECTS-Points	5.0
Workload	150 h
Attendance	60 h
Independent study	90 h
Hours of week	4.0
Recommended semester	3
Frequency	Every winter semester
Mandatory / Elective (M/E)	Mandatory
Group size	35

Contents
Die Anwendung genetischer und genomischer Methoden hat unser Verständnis über die genetischen Vielfalt innerhalb der Arten und ihrer räumlichen Verteilung, zur lokalen Anpassung und der genetischen Grundlage phänotypischer Merkmale erheblich verbessert. Außerdem ermöglichen genetische Methoden die Bewertung von Populationseigenschaften, die für das Management und die Erhaltung von Arten relevant sind, wie z. B. effektive Populationsgrößen, Muster des Genflusses und der Hybridisierung. In diesem Modul werden wir aktuelle Methoden und Anwendungen vorstellen, einschlägige Literatur lesen und diskutieren und die Vorteile und Grenzen genetischer Methoden kritisch erörtern. Die Studierenden werden sich intensiv mit der wissenschaftlichen Literatur zur relevanten Themen in Forst- und Naturschutzgenetik auseinandersetzen und in Kleingruppen einen Review verfassen.
Qualification
Die Studierenden verstehen, wie man auf der Grundlage genetischer Daten Parameter und Prozesse wie effektive Populationsgröße, genetische Vielfalt, Hybridisierung und lokale Anpassung bestimmen kann. Die Studierenden können wissenschaftliche Literatur zu den oben genannten Themen kritisch lesen und diskutieren. Die Studierenden sind in der Lage, Ergebnisse von wissenschaftlichen Studien zusammenzufassen, kritisch zu evaluieren und in wissenschaftlicher Sprache und mit adäquaten Abbildungen zu präsentieren.
Examination achievement
Schriftliche Ausarbeitung
Course achievement
Seminarvortrag
Literature
Wissenschaftliche Literatur wird während des Kurses bereitgestellt

Compulsory requirement
None / Keine
Teaching method
Vorlesungen, Seminarvorträge, Diskussion wissenschaftlicher Literatur

↑

Name of node	Number of node
Major Forest Ecology Research	10LE07KT-PLF-2023-FER-22200
Faculty	
Fakultät für Umwelt und natürliche Ressourcen	

Mandatory / Elective (M/E)	Mandatory

↑

Name of module	Number of module
Analysis of Biodiversity Data	10LE07MO-M.22201
Responsible	
Prof. Dr. Markus Hauck	
Faculty	
Fakultät für Umwelt und natürliche Ressourcen	

ECTS-Points	5.0
Workload	150 h
Hours of week	4.0
Attendance	60 h
Independent study	90 h
Recommended semester	1
Duration	1 Semester
Mandatory / Elective (M/E)	Mandatory
Frequency	Every winter semester

Compulsory requirement
None

Assigned Courses					
Name	Type	M/E	ECTS	HoW	Workload
Analysis of Biodiversity Data	Course	Mandatory	5.0	4.0	150 h

Contents
Main focus of this module: ■ Measuring and comparing biological diversity (α-, β- and γ-Diversity) by using rarefaction/extrapolation and modelling approaches ■ Analysing community data with multivariate statistics (ordinations)
Qualification
Students will ■ receive a deeper understanding about how to measure biological diversity ■ learn widely applied methods, especially in plant ecology ■ increase R-knowledge
Examination achievement
Written report
Course achievement
Attendance
Teaching method
Lectures, practical exercises

↑

Name of module	Number of module
Analysis of Biodiversity Data	10LE07MO-M.22201
Name of event	
Analysis of Biodiversity Data	
Event type	Number
Course	10LE07V-M.12501/22201

ECTS-Points	5.0
Workload	150 h
Attendance	60 h
Independent study	90 h
Hours of week	4.0
Recommended semester	1
Frequency	Every winter semester
Mandatory / Elective (M/E)	Mandatory

Contents
Main focus of this module:- Measuring and comparing biological diversity (α-, β- and γ-Diversity) by using rarefaction/extrapolation and modelling approaches- Analysing community data with multivariate statistics (ordinations)
Qualification
Students will - receive a deeper understanding about how to measure biological diversity - learn widely applied methods, especially in plant ecology - increase R-knowledge
Examination achievement
Written report
Course achievement
Attendance
Compulsory requirement
None
Recommended requirement
Basic statistical knowledge and familiar with R
Teaching method
Lectures, practical exercises

↑

Name of module	Number of module
Ecosystem Functioning	10LE07MO-M.22202
Responsible	
Prof. Dr. Christiane Werner Pinto	
Faculty	
Fakultät für Umwelt und natürliche Ressourcen	

ECTS-Points	5.0
Workload	150h
Hours of week	4.0
Attendance	60 h
Independent study	90 h
Recommended semester	1
Duration	1 Semester
Mandatory / Elective (M/E)	Mandatory
Frequency	Every winter semester

Compulsory requirement
None

Assigned Courses					
Name	Type	M/E	ECTS	HoW	Workload
Ecosystem Functioning (ECOFUN)	Course	Mandatory	5.0	4.0	150 h

Contents
This module will cover different aspects of ecosystem processes across scales, providing insights into advanced knowledge of ecosystem functioning. It will cover the fundamental ecological processes of ecosystems, such as the carbon and water cycle, biogeochemical cycles, soil processes, and community dynamics. Lectures will showcase how ecosystem functioning is driven by changes in environmental factors, while in turn ecosystem processes feed-back to the environment. Lectures will cover how ecosystem functions relate to structural components of an ecosystem (e.g. vegetation, water, soil, atmosphere and biota) and how they interact with each other, within and across ecosystems. Further lecture material to deepen the knowledge will be provided. The lectures are accompanied by discussion groups on specific aspects and link the different thematic fields.
Qualification
Students will ■ get an overview on ecosystem processes and functioning at an advanced level from a scientific point of view. ■ be qualified to critically follow the scientific and public debates on the subject and give them background knowledge for careers in research, education and consultancy. ■ achieve an in depth understanding of the complexity and interactions of processes within ecosystems and their feedback on the environment.

■ study examples of case studies and additional literature, which will be provided to deepen their understanding of such processes.
Examination achievement
Written Exam (90 min)
Course achievement
none
Teaching method
Lecture, tutoria, group work
Literature
Will be provided during the course

↑

Name of module	Number of module
Ecosystem Functioning	10LE07MO-M.22202
Name of event	
Ecosystem Functioning (ECOFUN)	
Event type	Number
Course	10LE07S-M.12202/12302/12401/22202

ECTS-Points	5.0
Workload	150 h
Attendance	60 h
Independent study	90 h
Hours of week	4.0
Recommended semester	1
Frequency	Every winter semester
Mandatory / Elective (M/E)	Mandatory

Contents

This module will cover different aspects of ecosystem processes across scales, providing insights into advanced knowledge of ecosystem functioning.

It will cover the fundamental ecological processes of ecosystems, such as the carbon and water cycle, biogeochemical cycles, soil processes, and community dynamics. Lectures will showcase how ecosystem functioning is driven by changes in environmental factors, while in turn ecosystem processes feed-back to the environment. Lectures will cover how ecosystem functions relate to structural components of an ecosystem (e.g. vegetation, water, soil, atmosphere and biota) and how they interact with each other, within and across ecosystems. Further lecture material to deepen the knowledge will be provided. The lectures are accompanied by discussion groups on specific aspects and link the different thematic fields.

Qualification

Students will
- get an overview on ecosystem processes and functioning at an advanced level from a scientific point of view.
- be qualified to critically follow the scientific and public debates on the subject and give them background knowledge for careers in research, education and consultancy.
- achieve an in depth understanding of the complexity and interactions of processes within ecosystems and their feedback on the environment.
- study examples of case studies and additional literature, which will be provided to deepen their understanding of such processes.

Examination achievement

Written Exam (90 min)

Course achievement

none

Literature

Will be provided during the course

Compulsory requirement
none
Recommended requirement
none
Teaching method
Lecture, tutoria, group work

↑

Name of module	Number of module
Forest Soils and Climate	10LE07MO-M.22203
Responsible	
Prof. Dr. Friederike Lang	
Faculty	
Fakultät für Umwelt und natürliche Ressourcen	

ECTS-Points	5.0
Workload	150h
Hours of week	4.0
Recommended semester	1
Duration	1 Semester
Mandatory / Elective (M/E)	Mandatory
Frequency	Every winter semester

Compulsory requirement
None

Assigned Courses					
Name	Type	M/E	ECTS	HoW	Workload
Forest Soils and Climate	Course	Mandatory	5.0	4.0	

Contents
Forest soils and their anthropogenic influence are currently the focus of public and scientific discussion because they are of crucial importance in the context of climate change. They store CO2 but can also become sinks of CO2 and other climate gases. In addition, their ability to store water is central to forest overstory during prolonged dry periods and to watershed flooding. These key topics will be addressed in the session. At the same time, we will critically examine recent publications on these topics.
Qualification
Students ■ get the ability to explain the importance of forest soils in climate change ■ understandi the processes occurring in the soil as well as their control variables and possible anthropogenic influence ■ develop current scientific literature on this and place it in the context of the acquired basic knowledge ■ are able to critically evaluate primary literature read, or to recognize limitations of the validity of the information.
Examination achievement
Presentation/oral exam (50/50)
Course achievement
none
Teaching method
Lecture, literature research, presentation

Literature
will be announced within the lecture

↑

Name of module	Number of module
Forest Soils and Climate	10LE07MO-M.22203
Name of event	
Forest Soils and Climate	
Event type	Number
Course	10LE07V-M.22203

ECTS-Points	5.0
Hours of week	4.0
Recommended semester	1
Frequency	Every winter semester
Mandatory / Elective (M/E)	Mandatory
Group size	22

Contents
Forest soils and their anthropogenic influence are currently the focus of public and scientific discussion because they are of crucial importance in the context of climate change. They store CO2 but can also become sinks of CO2 and other climate gases. In addition, their ability to store water is central to forest overstory during prolonged dry periods and to watershed flooding. These key topics will be addressed in the session. At the same time, we will critically examine recent publications on these topics.
Qualification
Students ■ get the ability to explain the importance of forest soils in climate change ■ understandi the processes occurring in the soil as well as their control variables and possible anthropogenic influence ■ develop current scientific literature on this and place it in the context of the acquired basic knowledge ■ are able to critically evaluate primary literature read, or to recognize limitations of the validity of the information.
Examination achievement
presentation/oral exam (50/50)
Course achievement
none
Literature
will be announced within the lecture
Compulsory requirement
None
Recommended requirement
Basic knowledge of soil ecology
Teaching method
Lecture, literature research, presentation

↑

Name of module	**Number of module**
Genetic and Genomic Methods in Forest Management and Conservation	10LE07MO-M.22204
Responsible	
Prof. Dr. Katrin Heer	
Faculty	
Fakultät für Umwelt und natürliche Ressourcen	

ECTS-Points	5.0
Workload	150h
Hours of week	4.0
Attendance	60 h
Independent study	90 h
Recommended semester	1
Duration	1 Semester
Mandatory / Elective (M/E)	Mandatory
Frequency	Every winter semester

Compulsory requirement
None

Assigned Courses					
Name	Type	M/E	ECTS	HoW	Workload
Genetic and Genomic Methods in Forest Management and Conservation	Course	Mandatory	5.0	4.0	150 h

Contents
The application of genetic and genomic methods has greatly enhanced our understanding of the extent and spatial distribution of genetic diversity within species, of patterns of local adaptation and the genetic basis underlying phenotypic traits. Also, genetic methods allow assessing population properties that are relevant for species management and conservation such as effective population sizes, patterns of gene flow and hybridization. In this module, we will present current methods and applications, read and discuss relevant literature and critically discuss the advantages and limitations of genetic methods. Students will learn how to carry out plant molecular studies in the lab, and acquire basic knowledge in analyzing genetic data in R. Finally, they will learn how to write a scientific report about the conducted experiments with a strong emphasis on the adequate presentation of methods and results.
Qualification
Students understand how to determine parameters and processes like effective population size, genetic diversity, hybridization and local adaptation based on genetic data. Students can critically read and discuss scientific literature on the above mention topics. Students are able to carry out molecular lab work like DNA or RNA extractions, PCR, or qPCR, and analyze and graphically display the data in R. The students are able to present the methods and results in scientific language and with adequate illustrations.

Examination achievement
Written report (about laboratory work and data analysis, max. 10 pages)
Course achievement
Seminar presentation
Teaching method
Lectures, Presentations, Discussions, Practical training (laboratory), Supervised data analysis in R
Literature
Scientific literature will be provided during the course

↑

Name of module	Number of module
Genetic and Genomic Methods in Forest Management and Conservation	10LE07MO-M.22204
Name of event	
Genetic and Genomic Methods in Forest Management and Conservation	
Event type	Number
Course	10LE07S-M.22204

ECTS-Points	5.0
Workload	150 h
Attendance	60 h
Independent study	90 h
Hours of week	4.0
Recommended semester	1
Frequency	Every winter semester
Mandatory / Elective (M/E)	Mandatory

Contents
The application of genetic and genomic methods has greatly enhanced our understanding of the extent and spatial distribution of genetic diversity within species, of patterns of local adaptation and the genetic basis underlying phenotypic traits. Also, genetic methods allow assessing population properties that are relevant for species management and conservation such as effective population sizes, patterns of gene flow and hybridization. In this module, we will present current methods and applications, read and discuss relevant literature and critically discuss the advantages and limitations of genetic methods. Students will learn how to carry out plant molecular studies in the lab, and acquire basic knowledge in analyzing genetic data in R. Finally, they will learn how to write a scientific report about the conducted experiments with a strong emphasis on the adequate presentation of methods and results.
Qualification
Student understand how to determine parameters and processes like effective population size, genetic diversity, hybridization and local adaptation based on genetic data. Students can critically read and discuss scientific literature on the above mention topics. Students are able to carry out molecular lab work like DNA or RNA extractions, PCR, or qPCR, and analyze and graphically display the data in R. The students are able to present the methods and results in scientific language and with adequate illustrations.
Examination achievement
Written report (about laboratory work and data analysis, max. 10 pages)
Course achievement
Seminar presentation
Literature
Scientific literature will be provided during the course
Compulsory requirement
None

Teaching method
Lectures, Presentations, Discussions, Practical training (laboratory), Supervised data analysis in R

↑

Name of module	Number of module
Forest Growth and Structure	10LE07MO-M.22209
Responsible	
Prof. Dr. Thomas Seifert	
Faculty	
Fakultät für Umwelt und natürliche Ressourcen	

ECTS-Points	5.0
Workload	150 h
Hours of week	4.0
Recommended semester	3
Duration	1 Semester
Mandatory / Elective (M/E)	Mandatory
Frequency	Every winter semester

Compulsory requirement
None

Assigned Courses					
Name	Type	M/E	ECTS	HoW	Workload
Forest Growth and Structure	Course	Mandatory	5.0	4.0	150 h

Contents

Forests are complex adaptive systems. Through the analysis of growth-related patterns and processes in forests we aim to better understand the functioning of these systems. Insights gained from such investigation of the production ecology of forests are used for their improved management. Through lectures and guided field exercises in combination with practical lab experiences and modelling students will learn and apply modern methods in the measurement and analysis of forest trees and stands. The skills gained in this module will enable students to better design and conduct cross- and multiscale-research in complex ecological systems.

Qualification

Students:

- are familiar with modern measurement equipment and techniques to assess forest tree and stand parameters and their changes.
- are able to carry out advanced field and laboratory measurements in forest production ecology (e.g. LIDAR, TLS, dendrometer, increment cores, remote sensing) and interpret their results.
- can independently design a research setup and can carry out, evaluate and record scientific experiments in the field of production ecology and critically discuss the results.
- can apply advanced statistical methods for the quantitative analysis of spatial, temporal and hierarchically structured data in the field of production ecology.
- are aware of potentials and limitations of different forest research concepts and experimental approaches applied in production ecology of forests.
- are able to independently develop a research proposal covering all steps of the research process and present such a proposal to an expert audience.

Examination achievement
Written assignment
Course achievement
None

↑

Name of module	Number of module
Forest Growth and Structure	10LE07MO-M.22209
Name of event	
Forest Growth and Structure	
Event type	Number
Course	10LE07V-M.22209

ECTS-Points	5.0
Workload	150 h
Attendance	60 h
Independent study	90 h
Hours of week	4.0
Recommended semester	3
Frequency	Every winter semester
Mandatory / Elective (M/E)	Mandatory
Group size	20

Contents

In the module the following topics will be covered in lectures, seminars, and through field studies and laboratory exercises:

Research methods in forest production ecology:
• Field methods, e.g. LiDAR, TLS, dendrometer, increment core sampling
• Laboratory methods, e.g. point cloud data processing, tree-ring measurement, cross-dating
• Statistical analysis and modelling methods, e.g., calculation of tree and stand parameters, indices for competition and spatial heterogeneity growth modelling

Research concepts in forest production ecology:
• Observational vs. experimental studies
• Environmental gradient studies, transect studies
• Process hierarchy/scaling issues in forest ecosystems studies

Ecosystem processes addressed in the production ecology of forests:
• Biomass growth/carbon sequestration and allocation
• Differentiation dynamics in forest stands, e.g. competition vs. facilitation
• Disturbances and mortality

Qualification

Students:
- are familiar with modern measurement equipment and techniques to assess forest tree and stand parameters and their changes.
- are able to carry out advanced field and laboratory measurements in forest production ecology (e.g. LIDAR, TLS, dendrometer, increment cores, remote sensing) and interpret their results.
- can independently design a research setup and can carry out, evaluate and record scientific experiments in the field of production ecology and critically discuss the results.
- can apply advanced statistical methods for the quantitative analysis of spatial, temporal and hierarchically structured data in the field of production ecology.
- are aware of potentials and limitations of different forest research concepts and experimental approaches applied in production ecology of forests.

■ are able to independently develop a research proposal covering all steps of the research process and present such a proposal to an expert audience.
Examination achievement
Written assignment
Course achievement
None
Literature
Will be given in the course.
Compulsory requirement
None
Recommended requirement
None
Teaching method
Lectures/seminars/field studies

↑

Name of module	Number of module
Frontiers in Forest Science	10LE07MO-M.22210
Responsible	
Prof. Dr. Peter Biedermann	
Faculty	
Fakultät für Umwelt und natürliche Ressourcen	

ECTS-Points	5.0
Workload	150 h
Hours of week	4.0
Attendance	60 h
Independent study	90 h
Recommended semester	3
Duration	1 Semester
Mandatory / Elective (M/E)	Mandatory
Frequency	Every winter semester

Compulsory requirement
None

Assigned Courses					
Name	Type	M/E	ECTS	HoW	Workload
Frontiers in Forest Science	Course	Mandatory	5.0	4.0	150 h

Contents
In this course, students will get insights into emerging fields in forest sciences. We will invite speakers from our faculty as well as from other research institutions to present their current work with a special focus on topics related to the modules in Forest Ecology Research. Also, the speakers will provide insights into career paths in forest sciences. Each presenter will provide recent publications from their own work with guiding questions for the students that will be read before the actual talks and discussed with the speakers after the talk.
Qualification
Students will gain insights into current research topics in forest ecology research. By reading and discussing scientific literature, the students will gain scientific literacy in forest ecology research and learn how to critically assess the results of a study.
Examination achievement
None
Course achievement
Presence in the seminar
Literature
Scientific literature will be provided during the course

↑

Name of module	Number of module
Frontiers in Forest Science	10LE07MO-M.22210
Name of event	
Frontiers in Forest Science	
Event type	Number
Course	10LE07V-M.22210

ECTS-Points	5.0
Workload	150 h
Attendance	60 h
Independent study	90 h
Hours of week	4.0
Recommended semester	3
Frequency	Every winter semester
Mandatory / Elective (M/E)	Mandatory
Group size	16

Contents
In this course, students will get insights into emerging fields in forest sciences. We will invite speakers from our faculty as well as from other research institutions to present their current work with a special focus on topics related to the modules in Forest Ecology Research. Also, the speakers will provide insights into career paths in forest sciences. Each presenter will provide recent publications from their own work with guiding questions for the students that will be read before the actual talks and discussed with the speakers after the talk.
Qualification
Students will gain insights into current research topics in forest ecology research. By reading and discussing scientific literature, the students will gain scientific literacy in forest ecology research and learn how to critically assess the results of a study.
Examination achievement
none
Course achievement
Presence in the seminar
Literature
Scientific literature will be provided during the course
Compulsory requirement
none
Recommended requirement
none
Teaching method
Seminar talks, discussion of scientific literature

↑

Name of node	Number of node
Major International Forestry	10LE07KT-PLF-2023-IF-22300
Faculty	
Fakultät für Umwelt und natürliche Ressourcen	

Mandatory / Elective (M/E)	Mandatory

↑

Name of module	Number of module
Carbon Forestry	10LE07MO-M.22301
Responsible	
Wilhelmus de Jong	
Faculty	
Fakultät für Umwelt und natürliche Ressourcen	

ECTS-Points	5.0
Workload	150 h
Hours of week	4.0
Attendance	60 h
Independent study	90 h
Recommended semester	1
Duration	1 Semester
Mandatory / Elective (M/E)	Mandatory
Frequency	Every winter semester

Compulsory requirement
none

Assigned Courses					
Name	Type	M/E	ECTS	HoW	Workload
Carbon Forestry	Course	Mandatory	5.0	4.0	150 h

Contents

The module will provide an introduction to:
- recent developments in international climate change policy and their implications for land-based carbon and restoration initiatives
- compliance and voluntary carbon markets
- carbon measuring and accounting in different land-use based activities aimed at sequestering carbon, including afforestation and reforestation (A/R), Improved Forest Management (IFM), Climate Smart Agriculture, Reducing Emissions from deforestation and forest degradation (REDD+)
- social and environmental safeguards in land-based carbon projects
- cash flows in carbon projects
- development, analysis and evaluation of carbon project design documents (PDDs)

Qualification

Students will be able to
- analyze and design carbon forestry and related land use project documents
- determine emission reduction effects of such projects, using appropriate methods and tools
- plan and undertake carbon measurements to monitor forestry and other land-use projects;
- apply safeguards to reduce risks in such projects
- critically evaluate climate change policies, including development perspectives of carbon forestry and emission reduction markets
- plan financing mechanisms for forestry C projects

Examination achievement
Oral exam (20 min, 50%), oral presentation (20min) with written carbon project assessment report (max. 6000 words, 50%)
Course achievement
none
Teaching method
Lectures, field trips, group works, presentations
Literature
To be announced before the start of the course.

↑

Name of module	Number of module
Carbon Forestry	10LE07MO-M.22301
Name of event	
Carbon Forestry	
Event type	Number
Course	10LE07S-M.22301/54200

ECTS-Points	5.0
Workload	150 h
Attendance	60 h
Independent study	90 h
Hours of week	4.0
Recommended semester	1
Frequency	Every winter semester
Mandatory / Elective (M/E)	Mandatory

Contents

The sequestration of carbon by forests and soils is one of the most important ecosystem services of terrestrial ecosystems. Therefore, large efforts have been undertaken and major political initiatives started to facilitate the storage of C in forests and their products. Competencies are needed to develop projects for land- use based mitigation and knowledge of related climate policy instruments at national and international levels. Participants will learn to develop and evaluate such greenhouse mitigation projects. The module will provide an introduction to

- recent developments in international climate change policy and their implications for land-based carbon and restoration initiatives;
- compliance and voluntary carbon markets
- carbon measuring and accounting in different land-use based activities aimed at sequestering carbon, including afforestation and reforestation (A/R), Improved Forest Management (IFM), Climate Smart Agriculture, Reducing Emissions from deforestation and forest degradation (REDD+);
- social and environmental safeguards in land-based carbon projects;
- cash flows in carbon projects;
- development, analysis and evaluation of carbon project design documents (PDDs);
- rules and procedures for Gold Standard certification.

Qualification

Students will be able to

- analyze and design carbon forestry and related land use project documents
- determine emission reduction effects of such projects, using appropriate methods and tools
- plan and undertake carbon measurements to monitor forestry and other land-use projects;
- apply safeguards to reduce risks in such projects
- critically evaluate climate change policies, including development perspectives of carbon forestry and emission reduction markets
- plan financing mechanisms for forestry C projects

Examination achievement

Oral exam (20 min, 50%), oral presentation (20min, 50%)

Course achievement

None

Literature
To be announced before the start of the course.
Compulsory requirement
none
Recommended requirement
none
Teaching method
Lectures, field trips, group works, presentations

↑

Name of module	Number of module
Forest Economics and Management	10LE07MO-M.22302
Responsible	
Dr. Dominik Sperlich	
Faculty	
Fakultät für Umwelt und natürliche Ressourcen	

ECTS-Points	5.0
Workload	150 h
Hours of week	4.0
Recommended semester	1
Duration	1 Semester
Mandatory / Elective (M/E)	Mandatory
Frequency	Every winter semester

Compulsory requirement
None

Assigned Courses					
Name	Type	M/E	ECTS	HoW	Workload
Forestry Economics and Management	Course	Mandatory	5.0	4.0	150 h

Contents
The module teaches basic knowledge in forestry and business economics and forest management. It seeks to give a background into standard economic methods and indices.
Qualification
Students will ■ know about standard business economic terms and methods ■ learn about specific forest economic approaches ■ apply the methods to model case studies ■ build and apply simplified forest models ■ analsyse of forest enterprises from an economic and managerial point of view
Examination achievement
Written exam (90 min)
Course achievement
none
Teaching method
Lectures, simulation Game, discussion, presentations
Literature
Standard textbooks in forestry economics (to be determined)

↑

Name of module	Number of module
Forest Economics and Management	10LE07MO-M.22302
Name of event	
Forestry Economics and Management	
Event type	Number
Course	10LE07S-M.22302/42255

ECTS-Points	5.0
Workload	150 h
Attendance	60 h
Independent study	90 h
Hours of week	4.0
Recommended semester	1
Frequency	Every winter semester
Mandatory / Elective (M/E)	Mandatory

Contents

The module teaches basic knowledge in forestry and business economics and forest management. It seeks to give a background into standard economic methods and indices focussing on the following topics:

- Introduction into business economics based on the simulation game „TopSim“
- Basics of Forestry Economics (revenue, costs, cost-benefit, ...)
- Investment calculus – (compounding, discounting, NPVs, annuitiies)
- Faustmann and derivatives (generalized Faustmann, Hartmann, ...)
- Valuation methods for ecosystem goods and services (introduction) related to forestry
- Management of forest enterprises
- Standard management models: from forest stands to working circles and forest enterprises – fully regulated normal forests, risk – induced working circles
- Basic introduction into optimization methods (LP, ...)
- Even-aged vs. Uneven-aged management
- Decision making under risk and uncertainty
- Multi – Criteria Decision making methods.

Qualification

Students will

- know about standard business economic terms and methods
- learn about specific forest economic approaches
- apply the methods to model case studies
- build and apply simplified forest models
- analsysef forest enterprises from an economic and managerial point of view

Examination achievement

Written exam (90 min)

Course achievement

None

Literature

Standard textbooks in forestry economics (to be determined)

Compulsory requirement
None
Recommended requirement
Basic knowledge in general and forestry economics
Teaching method
Lectures, simulation Game, discussion, presentations

↑

Name of module	Number of module
Forest Inventory and Information Systems	10LE07MO-M.22303
Responsible	
Prof. Dr. Teja Kattenborn	
Faculty	
Fakultät für Umwelt und natürliche Ressourcen	

ECTS-Points	5.0
Workload	150h
Hours of week	4.0
Recommended semester	1
Duration	1 Semester
Mandatory / Elective (M/E)	Mandatory
Frequency	Every winter semester

Compulsory requirement
None

Assigned Courses					
Name	Type	M/E	ECTS	HoW	Workload
Forest Inventory and Information Systems	Course	Mandatory	5.0	4.0	150 h

Contents
This module aims to give an overview of current methods in forest inventories. Students will be introduce to field-based methods (measuring tree locations with global navigation satellite systems and acquiring tree related metrics). Starting from a full inventory of a forest stand, we will analyze the effect of sample-based forest inventories (e.g. effect of sample method, size and quality). Moreover, we will compare the accuracy and efficiency of future-oriented methods, such as drone-based LiDAR surveys and AI tools for forest inventories. Moreover, students will be introduced to a broad geomatic toolset and geodata sources that can support large-scale forest assessments (e.g. tree species distribution maps, canopy height maps, and site factors such as soil and climate data).
Qualification
■ Students can apply basic field methods for forest inventories (e.g., measuring diameter at breast height, measuring coordinates with global navigation systems). ■ Students know have a solid understanding of forest inventories and related data (effect of sample size, plot size, sampling method and sampling design) ■ Students can perform advanced geospatial analytics with vector and raster data in the forestry context. ■ Students can acquire and analyze remote sensing data from drones and satellites and analyze them with advanced methods for forestry-related applications
Examination achievement
Exam
Course achievement
none

↑

Name of module	Number of module
Forest Inventory and Information Systems	10LE07MO-M.22303
Name of event	
Forest Inventory and Information Systems	
Event type	Number
Course	10LE07S-M.22102/22303

ECTS-Points	5.0
Workload	150 h
Hours of week	4.0
Recommended semester	1
Frequency	Every winter semester
Mandatory / Elective (M/E)	Mandatory
Group size	80

Contents
This module aims to give an overview of current methods in forest inventories. Students will be introduce to field-based methods (measuring tree locations with global navigation satellite systems and acquiring tree related metrics). Starting from a full inventory of a forest stand, we will analyze the effect of sample-based forest inventories (e.g. effect of sample method, size and quality). Moreover, we will compare the accuracy and efficiency of future-oriented methods, such as drone-based LiDAR surveys and AI tools for forest inventories. Moreover, students will be introduced to a broad geomatic toolset and geodata sources that can support large-scale forest assessments (e.g. tree species distribution maps, canopy height maps, and site factors such as soil and climate data).
Qualification
■ Students can apply basic field methods for forest inventories (e.g., measuring diameter at breast height, measuring coordinates with global navigation systems). ■ Students know have a solid understanding of forest inventories and related data (effect of sample size, plot size, sampling method and sampling design) ■ Students can perform advanced geospatial analytics with vector and raster data in the forestry context. ■ Students can acquire and analyze remote sensing data from drones and satellites and analyze them with advanced methods for forestry-related applications.
Examination achievement
Exam
Course achievement
None
Compulsory requirement
None
Teaching method
Fieldwork, discussions, application of Geographic Information Systems and geodata analyses, applied statistics

↑

Name of module	Number of module
Plantation Forestry	10LE07MO-M.22304
Responsible	
Prof. Dr. Jürgen Bauhus	
Faculty	
Fakultät für Umwelt und natürliche Ressourcen	

ECTS-Points	5.0
Workload	150 h
Hours of week	4.0
Attendance	60 h
Independent study	90 h
Recommended semester	1
Duration	1 Semester
Mandatory / Elective (M/E)	Mandatory
Frequency	Every winter semester

Compulsory requirement
none

Assigned Courses					
Name	Type	M/E	ECTS	HoW	Workload
Plantation Forestry	Course	Mandatory	5.0	4.0	150 h

Contents

In this module, students learn basic objectives, strategies, concepts and management of plantation forestry. Students learn about options to optimize wood production in plantations by considering

- ecological, legal and social frameworks of forest management,
- the landscape context e.g. to optimize the effects of plantations on biodiversity,
- selection of species including clones, soil preparation and fertilizing, planting,
- silviculture, including thinning, pruning and mixed-species plantations,
- stand management for pulp and sawn wood as a value added product,
- forest growth models as management tools,
- harvesting strategies and transportation logistics.

Qualification

Students

- will be able to understand the dynamics of fast growing plantations and silvicultural approaches to manage them
- will gain an appreciation for various management approaches and their implications for growth and yield and ecosystem functions and processes
- can select appropriate variables and design experiments to analyze the effects of silvicultural operations on productivity
- can analyze and compare different plantation forestry concepts and judge differences in productivity and risk

■ can analyse and evaluate dimensions of sustainability in the context of plantation management
Examination achievement
Learning journal (ca. 10 pages, 60%), written exam (60 min, 40%)
Course achievement
none
Teaching method
Lectures, group work, presentations
Literature
■ West, P. W. (2014). Growing Plantation Forests. Springer, Cham. E-book can be downloaded from the university library. ■ Cossalter, C. & Pye-Smith, C. (2003), Fast-wood forestry: myths and realities. Center for International Forestry Research. Bogor Barat, Indonesia ■ Evans, J. & Turnbull, J. W. (2004). Plantation forestry in the tropics: The role, silviculture, and use of planted forests for industrial, social, environmental, and agroforestry purposes (No. 3. ed.). Oxford University Press

↑

Name of module	Number of module
Plantation Forestry	10LE07MO-M.22304
Name of event	
Plantation Forestry	
Event type	Number
Course	10LE07S-M.22304/54130

ECTS-Points	5.0
Workload	150 h
Attendance	60 h
Independent study	90 h
Hours of week	4.0
Recommended semester	1
Frequency	Every winter semester
Mandatory / Elective (M/E)	Mandatory

Contents

Plantations are globally one of the most rapidly expanding types of forest land use. They provide a disproportionally and increasingly large share of the global industrial round wood demand. Intensifying wood production will be necessary to meet the increasing global demand for wood products. Concentrating this intensification in plantations may have many benefits like reduced harvesting pressure on native forests.
In this module, students learn basic objectives, strategies, concepts and management of plantation forestry. Students learn about options to optimize wood production in plantations by considering

- ecological, legal and social frameworks of forest management,
- the landscape context e.g. to optimize the effects of plantations on biodiversity,
- selection of species including clones, soil preparation and fertilizing, planting,
- silviculture, including thinning, pruning and mixed-species plantations,
- stand management for pulp and sawn wood as a value added product,
- forest growth models as management tools,
- harvesting strategies and transportation logistics.

The lectures will set the foundations to enable the students to develop management strategies for plantation estates. Students will employ a modelling tool to explore different plantation management options.

Methods:
Lectures will provide an overview of basic silvicultural and growth and yield concepts and highlight the scientific basis for silvicultural practices in plantation forests. They also aim at putting the readings into perspective and link silvicultural, ecological, and quantitative analytical concepts. Lectures will be complemented with reading of a range of publications that will be discussed in class. Students will produce a learning journal to reflect on the content and discussions and to document their learning progress.
In the section ‚silvicultural operations research' within the module ‘Plantation Forestry' the students will learn how to analyze and judge the efficiency of certain silvicultural operations which aim at optimizing wood production and productivity of Norway spruce and Douglas fir plantations in Southwest Germany. The analyses to be performed are based on empirical permanent silvicultural experiments. Most importantly, the students will learn to select relevant variables for experimental design, field work and analysis.

Qualification

Students

- will be able to understand the dynamics of fast growing plantations and silvicultural approaches to manage them
- will gain an appreciation for various management approaches and their implications for growth and yield and ecosystem functions and processes
- can select appropriate variables and design experiments to analyze the effects of silvicultural operations on productivity
- can analyze and compare different plantation forestry concepts and judge differences in productivity and risk
- can analyse and evaluate dimensions of sustainability in the context of plantation management

Examination achievement

Learning journal (ca. 10 pages, 60%), written exam (60 min, 40%)

Course achievement

none

Literature

- West, P. W. (2014). Growing Plantation Forests. Springer, Cham. E-book can be downloaded from the university library.
- Cossalter, C. & Pye-Smith, C. (2003), Fast-wood forestry: myths and realities. Center for International Forestry Research. Bogor Barat, Indonesia
- Evans, J. & Turnbull, J. W. (2004). Plantation forestry in the tropics: The role, silviculture, and use of planted forests for industrial, social, environmental, and agroforestry purposes (No. 3. ed.). Oxford University Press

Compulsory requirement

none

Recommended requirement

none

Teaching method

Lectures, group work, presentations

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Name of module	Number of module
Forest Legality and Sustainability Regulation	10LE07MO-M.22309
Responsible	
Dr. Metodi Georgiev Sotirov	
Faculty	
Fakultät für Umwelt und natürliche Ressourcen	

ECTS-Points	5.0
Workload	150 h
Hours of week	4.0
Attendance	60 h
Independent study	90 h
Recommended semester	3
Duration	1 Semester
Mandatory / Elective (M/E)	Mandatory
Frequency	Every winter semester

Compulsory requirement
None

Assigned Courses					
Name	Type	M/E	ECTS	HoW	Workload
Forest Legality and SustainabilityRegulation	Course	Mandatory	5.0	4.0	150 h

Contents
The module deals with the regulation of international forest-related environmental risks such as deforestation and forest degradation, biodiversity loss, and climate change, through policy and market instruments. The focus is, on the one hand, on the presentation of central theoretical foundations (state government regulation, private regulation, regulation mix) and basic concepts (e.g., risk, sustainability, legality, legitimacy, effectiveness, efficiency) in risk assessment and risk regulation. The second focus is on the application of the theoretical approaches and evaluation questions by the students to concrete practical examples and regulatory processes within the framework of supervised group work and exchange with experts (if possible, field trips and excursions).
Qualification
Students can ■ describe and apply theoretical approaches from the political sciences to understand risk assessment and risk regulation, and classify regulatory processes accordingly; ■ apply, explain and assess theoretical/abstract knowledge using current forest-related practical examples of legality and legitimacy as well as risk assessment and risk regulation; ■ compare, analyze and evaluate practical examples regarding sustainability and legality issues ■ obtain, evaluate and summarize data through social science research (content analysis of documents, statistics, interviews, surveys); ■ further develop their writing, presentation and communication skills.

Examination achievement
Oral presentation
Course achievement
None
Teaching method
Lectures, group work, knowledge exchange with experts, excursion, supervision and peer feedback
Literature

- Hood, Christopher, Henry Rothstein, and Robert Baldwin. (2001). The Government of Risk: Understanding Risk Regulation Regimes. Oxford: Oxford University Press.
- Kleinschmit, D., Mansourian, S., Wildburger, C., Purret, A. (eds.) (2016): Illegal Logging and Related Timber Trade - Dimensions, Drivers, Impacts and Responses. A Global Scientific Rapid Response Assessment Report. IUFRO World Series Volume 35. Vienna.
- Sotirov, M., Azevedo-Ramos, C. Rattis, L., Berning, L. (2022): Policy options to regulate timber and agricultural supply-chains for legality and sustainability: The case of the EU and Brazil. Forest Policy and Economics 144 (2022): 102818.
- Sotirov, M., Pokorny, B., Kleinschmit, D., Kanowski, P. (2020). International Forest Governance and Policy: Institutional Architecture and Pathways of Influence in Global Sustainability. Sustainability 2020, 12, 7010; doi:10.3390/su12177010

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Name of module	Number of module
Forest Legality and Sustainability Regulation	10LE07MO-M.22309
Name of event	
Forest Legality and SustainabilityRegulation	
Event type	Number
Course	10LE07V-M.22309

ECTS-Points	5.0
Workload	150 h
Attendance	60 h
Independent study	90 h
Hours of week	4.0
Recommended semester	3
Frequency	Every winter semester
Mandatory / Elective (M/E)	Mandatory
Group size	15

Contents

The module deals with the regulation of international forest-related environmental risks such as deforestation and forest degradation, biodiversity loss, and climate change, through policy and market instruments. The focus is, on the one hand, on the presentation of central theoretical foundations (state government regulation, private regulation, regulation mix) and basic concepts (e.g., risk, sustainability, legality, legitimacy, effectiveness, efficiency) in risk assessment and risk regulation. This then serves as the basis for deriving central evaluation questions: 1. How are the forest-related risks defined and assessed? 2. What is the relationship between legality and legitimacy? 3. Which actors, organizations and institutions regulate which risks? 4. How are the risks regulated? 5. Why are the risks assessed and regulated the way they are assessed and regulated? 6. What are the consequences of assessing and regulating risks? The second focus is on the application of the theoretical approaches and evaluation questions by the students to concrete practical examples and regulatory processes within the framework of supervised group work and exchange with experts (if possible, field trips and excursions). Possible case studies include informal and illegal wood use and trade, transnational trade agreements involving forests, laws and policies to ensure deforestation-free, sustainable and legal wood and agricultural products, as well as the market-based certification of wood, palm oil and soy supply chains. The results of the group work are then presented, discussed and evaluated in the form of a written report and an oral presentation. Feedback from lecturers and experts is offered.

Qualification

Students can
- describe and apply theoretical approaches from the political sciences to understand risk assessment and risk regulation, and classify regulatory processes accordingly;
- apply, explain and assess theoretical/abstract knowledge using current forest-related practical examples of legality and legitimacy as well as risk assessment and risk regulation;
- compare, analyze and evaluate practical examples regarding sustainability and legality issues
- obtain, evaluate and summarize data through social science research (content analysis of documents, statistics, interviews, surveys);
- further develop their writing, presentation and communication skills.

Examination achievement
oral presentation
Course achievement
none
Literature
■ Hood, Christopher, Henry Rothstein, and Robert Baldwin. (2001). The Government of Risk: Understanding Risk Regulation Regimes. Oxford: Oxford University Press. ■ Kleinschmit, D., Mansourian, S., Wildburger, C., Purret, A. (eds.) (2016): Illegal Logging and Related Timber Trade - Dimensions, Drivers, Impacts and Responses. A Global Scientific Rapid Response Assessment Report. IUFRO World Series Volume 35. Vienna. ■ Sotirov, M., Azevedo-Ramos, C. Rattis, L., Berning, L. (2022): Policy options to regulate timber and agricultural supply-chains for legality and sustainability: The case of the EU and Brazil. Forest Policy and Economics 144 (2022): 102818. ■ Sotirov, M., Pokorny, B., Kleinschmit, D., Kanowski, P. (2020). International Forest Governance and Policy: Institutional Architecture and Pathways of Influence in Global Sustainability. Sustainability 2020, 12, 7010; doi:10.3390/su12177010
Compulsory requirement
None
Teaching method
Lectures, group work, knowledge exchange with experts, excursion, supervision and peer feedback

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Name of module	Number of module
Forests and Rural Development	10LE07MO-22310
Responsible	
Prof. Dr. Hans-Dietrich Schmidt-Vogt	
Faculty	
Fakultät für Umwelt und natürliche Ressourcen	

ECTS-Points	5.0
Workload	150 h
Hours of week	4.0
Attendance	55 h
Independent study	95 h
Recommended semester	3
Duration	1 Semester
Mandatory / Elective (M/E)	Mandatory
Frequency	Every winter semester

Compulsory requirement
None

Assigned Courses					
Name	Type	M/E	ECTS	HoW	Workload
Forests and Rural Development	Course	Mandatory	5.0	4.0	150 h

Contents
Forests and trees play an important role in rural landscapes of the Tropics as habitat and as providers of ecosystem services and of usable products. This is especially true for forest-agriculture frontiers which can be highly dynamic in terms of deforestation, forest degradation or forest transition processes. Recognition of the importance of forests in the rural tropics has led to a plethora of policy and development approaches such as community forestry, agroforestry, forest restoration etc. The dynamics affecting the relations of forests with other land uses are driven by many factors - economic, demographic, societal, political and others – and can result in negative impacts such environmental degradation and marginalization of people on the one hand, and of environmental restoration, livelihood diversification on the other. Against this backdrop, the module intends to analyze the drivers, mechanisms and impacts of land use dynamics, and to critically reflect on approaches to development in rural forest landscapes of the Tropics.
Qualification
In this module students learn to: ■ develop an understanding of the options of forest-based development in the context of rural tropics; ■ recognize the complexity and dynamism of socio-ecological systems and identify mechanisms to cope with this complexity; ■ apply skills to design research projects and policy recommendations; ■ critically reflect on the implications of development paradigms; ■ engage in interdisciplinary teamwork to formulate holistic development concepts for a case study in rural tropics.

Examination achievement
PL written exam (60%) PL Group-based Presentation (40%)
Course achievement
none

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Name of module	Number of module
Forests and Rural Development	10LE07MO-22310
Name of event	
Forests and Rural Development	
Event type	Number
Course	10LE07T-M.22310/94360

ECTS-Points	5.0
Workload	150 h
Attendance	ca. 55h
Independent study	ca. 95h
Hours of week	4.0
Recommended semester	3
Frequency	Every winter semester
Mandatory / Elective (M/E)	Mandatory

Contents

Forests and trees play an important role in rural landscapes of the Tropics as habitat and as providers of ecosystem services and of usable products. This is especially true for forest-agriculture frontiers which can be highly dynamic in terms of deforestation, forest degradation or forest transition processes. Recognition of the importance of forests in the rural tropics has led to a plethora of policy and development approaches such as community forestry, agroforestry, forest restoration etc. The dynamics affecting the relations of forests with other land uses are driven by many factors - economic, demographic, societal, political and others – and can result in negative impacts such environmental degradation and marginalization of people on the one hand, and of environmental restoration, livelihood diversification on the other. Development approaches to these dynamics and their impacts range from classical nature conservation to unrestrained economic development. Against this backdrop, the module intends to analyze the drivers, mechanisms and impacts of land use dynamics, and to critically reflect on approaches to development in rural forest landscapes of the Tropics. Discussion of scientific articles will provide orientation for students to navigate the complexity of environmental conditions, multi-stakeholder situations, multiple objectives and convoluted dynamics in such landscapes and to reflect upon concepts of development, and the potential and limitations of different approaches and instruments. Exploring options for development in rural forest landscapes will provide students with an opportunity to apply lessons learned in this module.

Qualification

In this module students learn to:
- develop an understanding of the options of forest-based development in the context of rural tropics;
- recognize the complexity and dynamism of socio-ecological systems and identify mechanisms to cope with this complexity;
- apply skills to design research projects and policy recommendations;
- critically reflect on the implications of development paradigms;
- engage in interdisciplinary teamwork to formulate holistic development concepts for a case study in rural tropics.

Examination achievement

PL written exam (60%)
PL Group-based Presentation (40%)

Course achievement
none
Compulsory requirement
none
Recommended requirement
none
Teaching method
Lecture, group work

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