Elective 3:
Forest Growth and Silviculture
Conservation Biology

Module No.	**Module name** Forest Growth and Silviculture
Module coordinators Prof. Dr. J. Bauhus, Prof. Dr. H. Spiecker	
Additional teaching staff Dr. H.-P. Kahle, Dr. C. Kühne	
Syllabus In this module students will learn how to analyse and interpret the growth of individual trees and the dynamics of forest stands in order to develop decision tools and design silvicultural prescriptions for their management. Based on an introduction to tree growth and its environmental control and an introduction to forest dynamics, regeneration methods and stand density management will be explored in the context of traditional silvicultural systems as well as in the context of ecosystem management and close to nature silviculture. Students will be introduced into various methods of sampling trees and stands in the field and analysis of trees and their parts. The participants will learn how to assess and interpret data and parameters of trees and stands for controlling tree and stand growth and will be able to apply methods of forest site productivity assessment. Students will be introduced to models of tree and stand growth and their critical application. Based on the understanding of the environmental and spatial determinants of tree growth and wood quality development, students will learn approaches to control tree and stand growth and apply their analytical and planning skills to a number of case studies incl. mixed-species and uneven-aged forests and stands undergoing conversion. Students will also learn the ecological implications of controlling tree and stand growth as well as silvicultural approaches to manage and restore forest structure for forest conservation goals.	

Learning goals and qualifications

Students:

- will be able to understand silvicultural and growth and yield techniques and terminology.
- will gain an appreciation for various management approaches and their implications on growth and yield and ecosystem functions and processes.
- will be able to discuss principles of natural and artificial regeneration, intermediate stand treatments, and silvicultural systems in the context of growth and yield relationships and other ecosystem functions and processes.
- will be able to predict short- and long-term ecosystem responses to common silvicultural practices, based on fundamental ecological concepts, such as succession, stand dynamics, growth and yield relationships.
- will be able to apply silvicultural and growth and yield concepts to case studies.

Teaching and learning methods

Lectures will provide an overview over basic silvicultural and growth and yield concepts and highlight the scientific basis for silvicultural practices. They also aim at putting the readings into perspective and link silvicultural, ecological, and quantitative analysis concepts. The instructors assumes students have read the assigned material and the lecture will not just duplicate material covered in the readings.

Field trips: Field trips will provide real world experiences. They will help visualize basic ecological and silvicultural concepts. Students are expected to read assigned readings before the field trip.

Laboratory and computer excercises:

Prerequisites

Students should:

- have skills to review and synthesize information from the literature and other sources
- be able to work in small teams and make presentations to a larger audience
- have a basic understanding of forest mensuration
- have a basic understanding of tree physiology
- have a basic understanding of vegetation dynamics of and animal populations
- understand landscape considerations for the protection of biodiversity

Requirements for registration

Distribution of work load

Contact hours	60 h (Lectures, pracs, excursion, exam)
Independent learning	65 h (Preparation, research, report writing etc.)

Proposed assessment

Assignment: Students will be assigned a stand and are expected to develop management prescriptions in two stages. Stage 1 is to be completed at the beginning of the course, by the beginning of the 3rd day. This provides the student with a quick overview of concepts and challenges of managing forest ecosystems. The prescription developed in stage 1 can be modified throughout the 3 week period and the revised prescription is due at the end of the course, including a write-up and an oral presentation. Aim of the two stage assignment is to put the various lecture, field trips, and discussions into context. Grading of the assignment will reflect the write-up (for both stages, with a higher emphasis on the final product) and the oral presentation.

Written exam

Link to learning resources

https://campusonline.uni-freiburg.de

Module No.	Module name
P	Conservation Biology

Module coordinator

Prof. Dr. A. Reif

Additional teaching staff

Prof. Dr. I. Storch, N.N.

Syllabus

Introduction: Conservation goals; Conservation Biology as discipline between fundamental and applied research

Ecological concepts I - Patterns and consequences of landscape change: Stability/disturbance; Succession/climax; Ecosystem processes, Habitat degradation and loss; Ecological thresholds

Ecological concepts II - Dynamics of small populations: Habitat concept; Fragmentation, Metapopulation concept; Minimum Viable Popoulations; Genetic diversity and extinction vortex

Conservation instruments - **Legal framework and major players:** International conventions (Ramsar, Rio 92, IUCN, Natura 2000), Organisations (GOs, NGOs; IUCN, WWF, UNEP

Setting conservation priorities: Diversity, rarity and endangerment (incl. Red lists of threatened species), naturalness/originality, restorability; Biodiversity hotspots; Protected areas; Surrogate species concepts: indicators, umbrellas, flagships

Restoration ecology – aims and principles; Restoration of environment (site) conditions (physical and chemical environment, landscape scale)

Techniques in ecosystem restoration and habitat management: Topsoil removal, rising of water level, nutrient depletion, Grazing, mowing, burning, "mulching", etc.

Animal species recovery programmes (Restocking and re-introduction)

Restoration in practice - proiect work: Species compositions, structures, dynamics (field work; sampling plots; interviews; Land use, land use history; site); Evaluation (diversity, endangerment, naturalness, restorability, …), economy: Yields and costs; Planning options

Learning goals and qualifications

Course participants will get acquainted with aims and methods of conservation biology, and an introduction into use: (1) Nature conservation goals; (2) Conservation biology and ecology in the landscape scale, the habitat scale, and the species scale; (3) conservation instruments; (4) restoration goals and methods; and (5) application in practice (project work).

Teaching and learning methods Lectures, excursions, group work, project work
Relevance/use of the module
Prerequisites
Requirements for registration
Distribution of work load *Contact hours* *Independent learning*
Proposed assessment
Link to learning resources
Preliminary Reading
Comments