<table>
<tr><td colspan="3">Modul 7/8: Ecosystem services and biodiversity</td><td>Study points 10</td></tr>
<tr><td colspan="4">Learning goals and qualifications

Course participants obtain a sound understanding of the basic structure and functioning of ecosystems and the services provided by them, concepts and spatial patterns of biodiversity, as well as the significance of biodiversity for ecosystem functioning and services. Students extend their methodological background regarding concepts and tools for the quantification, mapping, and assessment of ecosystem services and biodiversity. Furthermore, students obtain key competencies for the identification and evaluation of decision making conflicts related to trade-offs between different services and biodiversity conservation, and the resolution of such conflicts. Particular emphasis is put on analyzing, summarizing and discussing primary, English literature. Moreover, students will deepen their ability to develop and pursue individual research questions, and to present their ideas and results to a variety of audiences.</td></tr>
<tr><td colspan="4">Prerequisites for participating in this module: successful participation in modules 3, 4 and 6</td></tr>
<tr><td>Type of teaching</td><td>Class-room time</td><td>Workload (SP)</td><td>Topics</td></tr>
<tr><td>Seminar</td><td>2 SWS</td><td>90 hours (3 SP):
25h classroom time,
65h preparation time, exercises, etc.</td><td>Foundations
- Ecosystems, ecosystem functioning (ESF) and ecosystem services (ESS)
- Concepts and patterns of biodiversity
- Significance of biodiversity for ESF and ESS
- Natural dynamics of ecosystems and biodiversity
ESS and biodiversity in the anthropocene
- Dynamics of ecosystems and biodiversity in the context of global change
- Threats to ecosystems and biodiversity
- Trade-offs and synergies between ESS
- Resilience and planetary boundaries
Analyzing and protecting ESS
- ESS quantification and evaluation
- Modeling and mapping of ESS
- ESS conservation
Analyzing and protecting biodiversity
- Quantification and evaluation of biodiversity
- Mapping of biodiversity and threat potentials
- Conservation strategies (design of protected areas, networks, nature reserve management, conservation outside protected areas)
Analysis of trade-offs and synergies
- Between different ESS
- Between the protection of biodiversity and ESS
- Between biodiversity, ESS, and development</td></tr>
<tr><td>Computer labs</td><td>3 SWS</td><td>150 hours (5 SP):
37.5h classroom time,
112.5h project work</td><td>Application of quantitative methods and computer models for the assessing, mapping, and evaluating of ESS and biodiversity. Transfer of knowledge will be mainly achieved via problem-oriented and project-related exercises, and will include modeling of the spatial patterns of ESS and biodiversity, the application of evaluation and prioritization approaches, and trade-off analyzes. Furthermore, it includes analysis of uncertainties connected to model outputs.</td></tr>
<tr><td colspan="2">Final exam</td><td>60 hours (2 SP)</td><td>Report of 10 pages (ca. 15.000 to 20.000 characters, without appendices)</td></tr>
<tr><td colspan="2">Duration</td><td>☒ 1 term</td><td></td></tr>
<tr><td colspan="2">Offered in</td><td>☐ Winter term</td><td>☒ Summer term</td></tr>
</table>

AGNES

Module 7 / 8: Ecosystem services and biodiversity

Study points: 10

Learning goals and qualifications
Course participants obtain a sound understanding of the basic structure and functioning of ecosystems and the services provided by them, concepts and spatial patterns of biodiversity, as well as the significance of biodiversity for ecosystem functioning and services. Students extend their methodological background regarding concepts and tools for the quantification, mapping, and assessment of ecosystem services and biodiversity. Furthermore, students obtain key competencies for the identification and evaluation of decision making conflicts related to trade-offs between different services and biodiversity conservation, and the resolution of such conflicts. Particular emphasis is put on analyzing, summarizing and discussing primary, English literature. Moreover, students will deepen their ability to develop and pursue individual research questions, and to present their ideas and results to a variety of audiences.

Prerequisites for participating in this module:
Participation in modules 3, 4 and 6

Teaching forms
Integrated module with 5 hours of classroom time (2h seminars und 3h computer labs and other exercises)

Topics:
Foundations
- Ecosystems, ecosystem functioning (ESF) and ecosystem services (ESS)
- Concepts and patterns of biodiversity
- Significance of biodiversity for ESF and ESS
- Natural dynamics of ecosystems and biodiversity

ESS and biodiversity in the anthropocene
- Dynamics of ecosystems and biodiversity in the context of global change
- Threats to ecosystems and biodiversity
- Trade-offs and synergies between ESS
- Resilience and planetary boundaries

Analyzing and protecting ESS
- ESS quantification and evaluation
- Modeling and mapping of ESS
- ESS conservation

Analyzing and protecting biodiversity
- Quantification and evaluation of biodiversity
- Mapping of biodiversity and threat potentials
- Conservation strategies (design of protected areas, networks, nature reserve management, conservation outside protected areas)

Analysis of trade-offs and synergies
- Between different ESS
- Between the protection of biodiversity and ESS
- Between biodiversity, ESS, and development

Methodological focus:
Application of quantitative methods and computer models for the assessing, mapping, and evaluating of ESS and biodiversity. Transfer of knowledge will be mainly achieved via problem-oriented and project-related exercises, and will include modeling of the spatial patterns of ESS and biodiversity, the application of evaluation and prioritization approaches, and trade-off analyzes. Furthermore, it includes analysis of uncertainties connected to model outputs.

Examination:
Report of 10 pages (ca. 15.000 to 20.000 characters, without appendices)